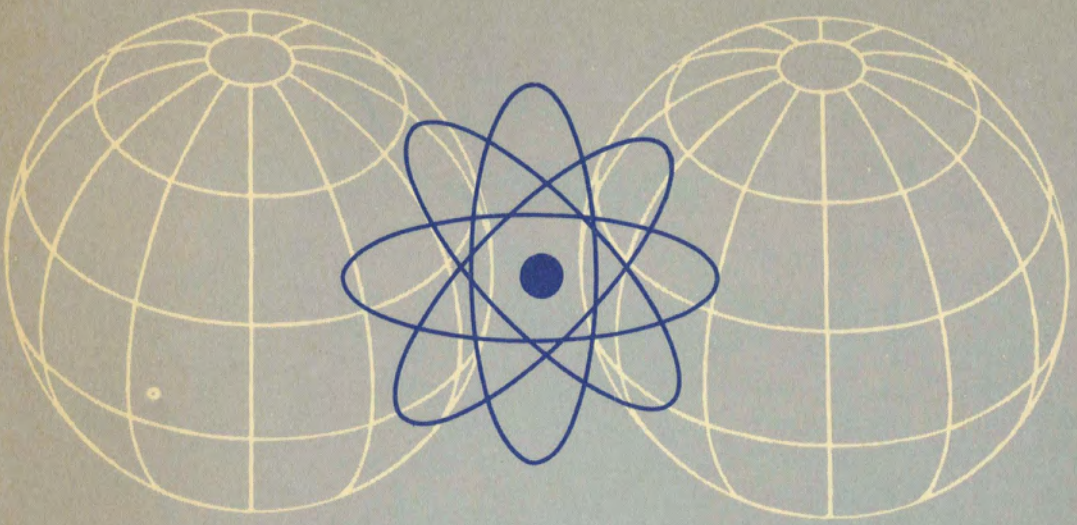
PEACEFUL USES OF ATOMIC ENERGY



Development of International Cooperation

Department of State

6/55

". . . the United States pledges before you—and therefore before the world—its determination to help solve the fearful atomic dilemma—to devote its entire heart and mind to find the way by which the miraculous inventiveness of man shall not be dedicated to his death, but consecrated to his life."

DWIGHT D. EISENHOWER
President of the United States

Addressing the General Assembly of the United Nations, December 8, 1953

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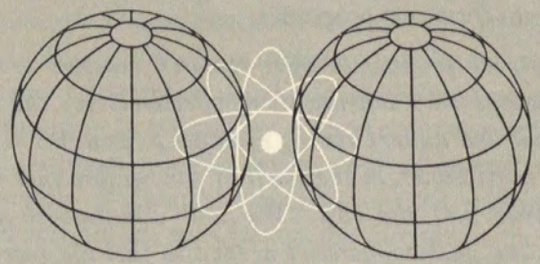

FOREWORD

This booklet has been designed to provide the public with a summary of the steps which are being taken to stimulate and organize an international cooperative program for the rapid development of the peaceful uses of atomic energy.

This momentous forward stride in the affairs of mankind has now become known as the *Atoms for Peace* program. It is a subject that is being discussed extensively and with great enthusiasm throughout the world.

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• As this pamphlet went to press President Eisenhower, in an address at Pennsylvania State University on June 11, announced two new proposals which are expected to give great impetus to the atoms-for-peace program:

"First, we propose to offer research reactors to the people of free nations who can use them effectively for the acquisition of the skills and understanding essential to peaceful atomic progress. The United States, in the spirit of partnership that moves us, will contribute half the cost. We will also furnish the acquiring nation the nuclear material needed to fuel the reactor.

"Second, within prudent security considerations, we propose to make available to the peoples of such friendly nations as are prepared to invest their own funds in power reactors, access to and training in the technological processes of construction and operation for peaceful purposes.

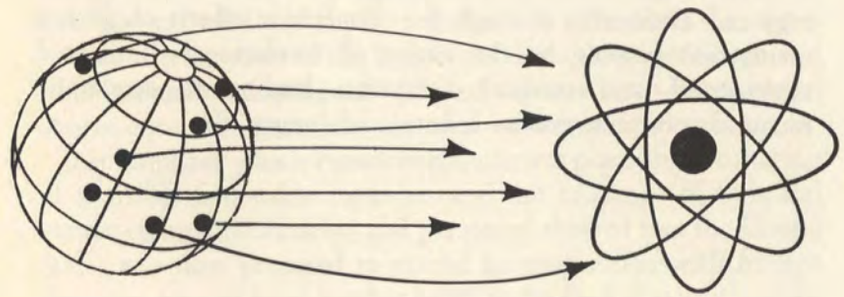
"If the technical and material resources of a single nation should not appear adequate to make effective use of a research reactor, we would support a voluntary grouping of the resources of several nations within a single region to acquire and operate it together."

Atomic energy is a new and tremendous source of power and tools for a better life.

The enormous heat generated by the reactions which take place when an atom splits can be transformed into electric power. The total energy contained in one pound of uranium is potentially equal to the energy from 1,300 tons of coal burned to produce steam. Atomic reactions also yield valuable radioactive materials called isotopes. These radioactive isotopes are being used as tools and instruments in industry, agriculture, and medicine, and may benefit mankind as much as atomic power itself.

The capacity of atomic energy for wholesale destruction in war has been dramatically demonstrated. From the first the United States has sought also to unlock its infinite possibilities for peaceful use. Governments, scientists, and businessmen are now exploring this challenging new technology with ever-increasing vigor.

International cooperation in the development of atomic energy, through the pooling of national resources and the exchange of knowledge and techniques, will hasten the day when the atom will contribute to a higher standard of living for all nations.



The United States Takes the Initiative—Origin of the Atoms-for-Peace Program

The international atoms-for-peace program was initiated in the dramatic and now historic address of President Eisenhower to the United Nations General Assembly on December 8, 1953.

President Eisenhower in making his proposal recalled the common danger of atomic warfare facing men in the modern world. Since the beginning of World War II, the United States had invested billions of dollars in a massive effort to harness atomic energy for military purposes. The Soviet Union had also engaged in an all-out drive to manufacture atomic weapons. The awesome culmination of those efforts was the successful explosion of the hydrogen bomb, first by the United States and later by the Soviet Union.

Fear of the terrible possibility of nuclear warfare by people everywhere heightened the impact of the President's announcement that the United States was now prepared to contribute from its stockpile of atomic materials to an international program for the development of atomic energy for peaceful uses.

The great significance of President Eisenhower's initiative is the recognition that the real promise of atomic energy transcends its present unavoidable use for weapons. This same atomic energy can eventually, through the cooperative efforts of governments and peoples, be the source of revolutionary industrial, agricultural, and medical discoveries leading to accelerated economic progress, greater leisure, and longer life.

The Background of the U.S. Proposals

The U.S. atomic energy program has been administered since the war by the Atomic Energy Commission, an independent

Government agency. Atomic energy has been a Government monopoly for military and security reasons, although the research and production activities have been largely accomplished by American industrial firms and universities under contract to the Atomic Energy Commission.

While the Commission has given priority to its work on nuclear weapons, it has not neglected the development of peacetime applications of atomic energy even before the recent revision of the Atomic Energy Act. The progress in development of power and research reactors, the growth of its industrial participation program, the remarkable expansion in the varied uses of radioisotopes, and the continuous support of fruitful basic and applied research are evidences of the faith of the AEC in the future of benign uses of the atom.

It was evident that the great new economic possibilities of atomic energy could be of deep significance in the struggle for peace. The postwar efforts of the United States to strengthen the economies of the countries of the free world through economic aid and technical assistance programs pointed the way to an international atomic energy program also aimed at economic development.

The emphasis which President Eisenhower placed on the sharing of available fissionable materials and the exchange of technical atomic energy information and personnel showed that the United States was now prepared to extend its cooperation with foreign countries, long in force in other fields, to the field of atomic energy.

Congress provided legislative authority for international atomic energy cooperation in the Atomic Energy Act of 1954. This revision of the original atomic energy legislation relaxes the restrictions on atomic research and development by private industry and clears the way for cooperation with friendly nations in the

development of peaceful uses of atomic energy. U.S. atomic energy appropriations also continue to provide Government funds for research and development of peaceful uses of the atom under the direction of the AEC.

The U.N. Atoms-for-Peace Resolution

As a result of President Eisenhower's proposals, the subject of international development of atomic energy claimed much of the time of the U.N. Ninth General Assembly, which convened in September 1954.

The outcome of the debate was unanimous adoption by the General Assembly on December 4, 1954, of a resolution on the atoms-for-peace program. The resolution cited the General Assembly's conviction that the benefits arising from the discovery of atomic energy should be placed at the service of mankind and its desire that the use of atomic energy to serve peaceful pursuits and to ameliorate living conditions be energetically promoted.

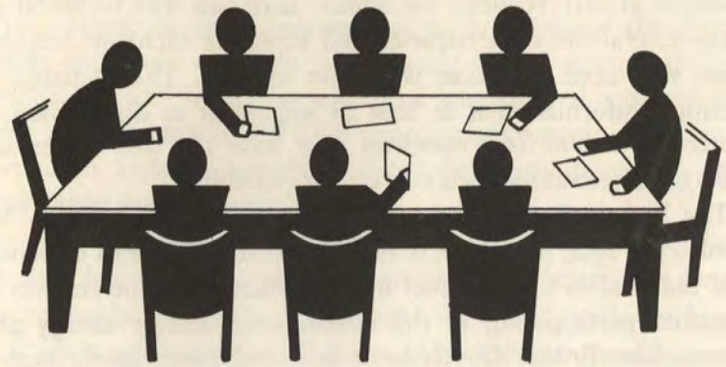
Recognizing the importance and urgency of international cooperation in developing and expanding the peaceful use of atomic energy to assist in lifting the burden of hunger, poverty, and disease in many parts of the world, the General Assembly made two major recommendations.

In accordance with President Eisenhower's original proposal to the United Nations, the early establishment of an International Atomic Energy Agency was endorsed. The second major recommendation accepted the proposal of President Eisenhower for an international conference on the peaceful uses of atomic energy. The conference would be held under U.N. auspices to explore means of international cooperation, particularly in the wide dissemination of knowledge of atomic technology for peaceful ends.

Both these recommendations are now being carried out either by the United Nations or by member countries.

The International Atomic Energy Agency

The U.N. General Assembly approved of the initiative taken by the United States and seven other countries in commencing negotiations to determine the initial organization and functions of an International Atomic Energy Agency. The other countries are Britain, Canada, France, Australia, Belgium, South Africa, and Portugal.



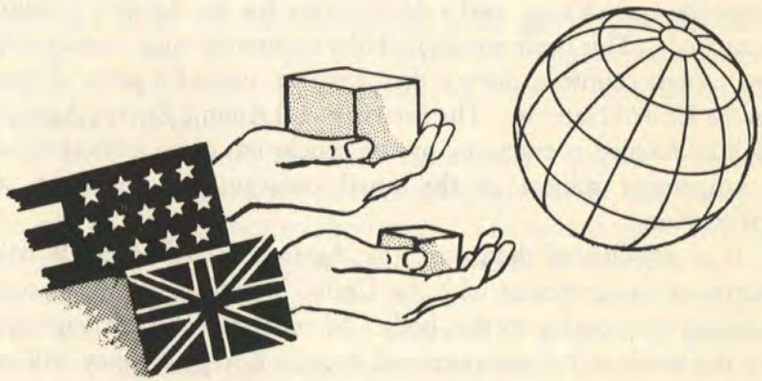
Discussions, led by the United States, have been under way since the end of 1954, and a draft statute for the Agency is being prepared. This draft statute includes numerous suggestions made by various countries during the extensive atoms-for-peace debate in the United Nations. The International Atomic Energy Agency will be formed presumably by the conclusion of an international arrangement subject to the usual constitutional processes of ratification.

It is anticipated that, once the Agency is established, it will arrive at an agreement with the United Nations covering its continuing relationship to that body. Membership and participation in the work of the International Atomic Energy Agency will be open to all countries which are now members of the United Nations or the specialized agencies who share the spirit and the obligations of membership.

President Eisenhower's original proposal for the international Agency contemplated that the organization would have physical custody of, and responsibility for the protection and distribution of, an international pool of fissionable atomic material. Many immediate practical steps in making the benefits of atomic energy available internationally can, of course, be undertaken even before the organization and plant required for these functions are set up. Therefore, the International Atomic Energy Agency as now conceived can commence its operations before it has acquired the necessary facilities for setting up an international pool of materials.

One of the functions of the Agency will be to act as a clearinghouse to receive requests for atomic materials and technical assistance, evaluate such requests, and supervise exchange between those who need and those who have to give. The exchange of technical information is at least as important as distribution of materials, because few countries now have the technicians and skills to utilize atomic fuels safely and profitably.

The United States announced to the United Nations on November 15, 1954, that the AEC had allocated 220 pounds of fissionable material to serve as fuel in experimental atomic reactors in countries participating in the international atomic energy program. The British Government followed immediately with a similar allocation of 44 pounds of atomic fuel.



International Conference on the Peaceful Uses of Atomic Energy

On February 1, 1955, the Secretary-General of the United Nations, Dag Hammarskjold, acting in accordance with the U.N. General Assembly resolution on atoms for peace, sent invitations to 84 nations to participate in an International Conference on the Peaceful Uses of Atomic Energy to be held at Geneva, Switzerland, beginning August 8, 1955. Of the 84 nations, 60 are U.N. members and 24 are members of the various specialized agencies of the United Nations.

The purpose of the Conference is to bring about the freest possible exchange of technical information on atomic energy developments and to explore means of international cooperation. Under the stimulus of the Conference, many papers containing information hitherto unpublished are being submitted by the United States and other countries.

In preparation for the international Conference, an atomic energy staff headed by a prominent American scientist has been recruited within the U.N. Secretariat. This staff, with the help of an advisory committee of seven U.N. member countries, is now engaged in planning the Conference agenda. Each participating country will send a national delegation of atomic energy scientists and experts to Geneva. Papers on subjects to be presented at the Conference are being submitted to the U.N. staff for advance coordination. The work of the Conference will bring together on an unprecedented scale information on the nonmilitary aspects of atomic energy and will lay the necessary foundation for continuing exchange of information on research and development. The U.N. specialized agencies, in particular FAO, WHO, and UNESCO, are being consulted in planning the Conference and will be represented at it.

The U.S. Government has announced that, as a part of its contribution to the International Conference on the Peaceful Uses of Atomic Energy, it will set up at the Conference in Geneva a research-type atomic reactor. Thus all attending the Conference will have an opportunity to study a research reactor in actual operation.

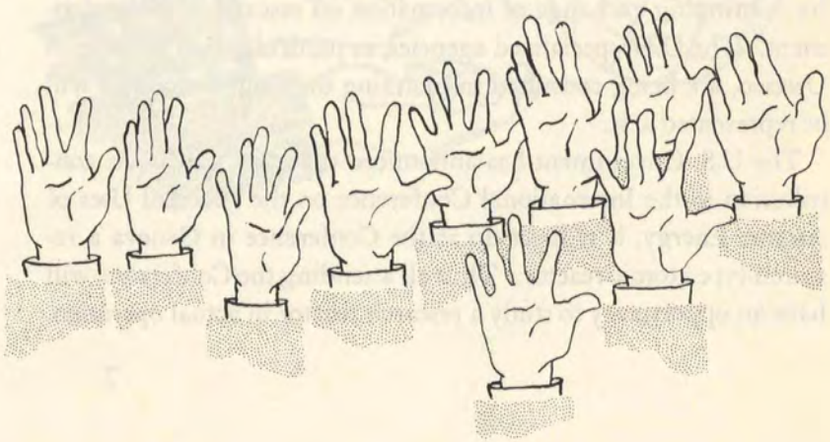
The Conference is purely technical and will not be concerned with the organization of the International Atomic Energy Agency. However, it is anticipated that the papers and reported discussions at the Conference will provide valuable guidance for the use of the Agency.

The Position of the Soviet Union

The President's proposal for international atomic energy cooperation, on December 8, 1953, was motivated by a hope that it would prove possible to "open up a new channel for peaceful discussion, and initiate at least a new approach to the many difficult problems that must be solved in both private and public conversations, if the world is to shake off the inertia imposed by fear, and is to make positive progress toward peace." It was thus his explicit hope that the Soviet Union would be one of the countries joining in the formation of the proposed Agency.

The initial Soviet reaction to President Eisenhower's proposals to the United Nations on the international development of atomic energy for peace was characteristically negative.

However, when it became apparent that the entire world hailed these proposals as a great step forward toward international stability and peace, the Soviet attitude changed somewhat. The Soviet representative to the United Nations voted for the General Assembly resolution on atoms for peace, which was therefore approved unanimously.



It has been announced that the Soviets intend to participate in the International Atomic Energy Conference at Geneva, but they have thus far given no indication of cooperation with the proposed International Atomic Energy Agency.

The Soviet Union is known to have produced both the atomic and the hydrogen bomb, and the Soviet Government and press have boasted of successful peacetime developments such as an atomic reactor producing electricity. They have also made public their own atoms-for-peace program, confined significantly enough to the satellites which furnish the U.S.S.R. with uranium atomic fuel. But to date the Soviet Union has not offered, as have the United States and Britain, to share what must be a substantial stockpile of fissionable materials accumulated as a part of the Russian nuclear weapons program.

The United States and other members of the United Nations hope that the Soviet Union will participate in the International Atomic Energy Agency, but there is no disposition to delay the formation of the Agency merely to engage in long-drawn-out negotiations with the Russians.

Bilateral Agreements

The United States is taking the lead in the organization of the International Atomic Energy Agency and will participate fully in the international Conference at Geneva. In addition, the United States is concluding bilateral agreements with friendly nations covering the immediate exchange of atomic information and materials and technical assistance in the development of atomic energy.

These bilateral agreements are authorized by the Atomic Energy Act of 1954 and are required as a legal basis for assistance offered by the Government and by American industry to foreign governments and industrial concerns. Suitable security and safety provisions will be included in all such agreements.

Some agreements between the United States and other countries will be concluded in advance of the organization of the International Atomic Energy Agency. The first, with Turkey, has already been announced. This is a definite advantage, since it would otherwise be necessary to delay the spread of information, assistance, and know-how abroad. A number of announcements have been made by the United States of other assistance to foreign countries. An example is the disclosure on February 15, 1955, of the sale of 10 tons of heavy water by the Atomic Energy Commission to India for use in a research reactor being built near Bombay.

The AEC has been carrying out for the past 8 years an important atoms-for-peace operation. This is the program for the sale of radioactive isotopes for medical research and industrial uses. By the end of 1954 more than 53,000 shipments of these isotopes had been made to 2,400 different American users, and 3,000 shipments had also been made to 46 countries abroad. Shipments to foreign lands are covered by agreements restricting use to peaceful purposes and requiring reports on results achieved.

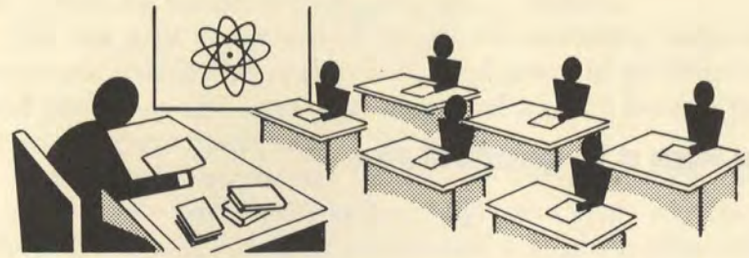
A great deal has already been done in the development of peaceful uses of the atom in other countries as well as in the United States. The United Kingdom, for example, has announced a 10-year power reactor program.

Education and Training in Atomic Reactor Technology

The atomic reactor is the basic plant in the production of atomic power and radioactive materials.

The design, construction, and operation of reactors are very specialized engineering problems calling for highly trained personnel. In order to achieve the benefits of atomic energy in nations not now active in research and development in this field, many engineers and technicians must be trained in these new techniques.

The United States has already acted on this fundamental problem by establishing an atomic reactor school at the Argonne National Laboratory near Chicago. The first class was enrolled in March 1955. Membership in the school is open to personnel of American firms interested in atomic energy and to students from foreign countries. There are enrolled at present 31 foreign students from 19 countries. Training at the school will produce the



specialists who will operate and benefit by experimental and research reactors to be built abroad as a part of the international atomic energy development program. It is expected that similar courses in atomic energy will be offered by American universities and eventually by foreign universities.

The U. S. Atomic Energy Commission has since 1948 conducted a school for the study of the use of radioactive isotopes at Oak Ridge, Tenn. A course designed exclusively for foreign students opened on May 2, 1955, at this school. Thirty-two students from 20 foreign countries were enrolled in the first class. The facilities of the Department of State's Educational Exchange Program and of the Foreign Operations Administration are being used where needed to expedite the attendance of foreign students at these schools.

The AEC has also assembled a number of extensive libraries of unclassified information on atomic energy. Libraries have been presented to several countries, including Japan, Italy, and France, and arrangements are pending to furnish additional libraries to countries all over the world. These libraries are similar to those which have been distributed to 43 educational institutions in the United States.

The United States is urging other countries to set up research reactors and will encourage American industrial concerns to aid in their construction and initial operation. These research reactors will familiarize engineers and technicians abroad with the type of problems they will encounter at a later date in connection with the operation of full-scale reactors for the production of power. Research reactors are an important part of the educational and training program which is a necessary prelude to atoms for peace on a worldwide basis.

The Future of the International Atom

Impressive progress has been made in organizing the necessary machinery for international cooperation in the field of the peaceful uses of atomic energy.

The training of scientific and engineering personnel on an international level is under way. Many countries other than the leading powers will soon have their own research reactors as a basis for catching up with developments in this swift-moving science.

How soon can practical results be expected from the application of atomic know-how?

. . . In 5 to 10 years electric power in substantial quantities from atomic energy is expected to be a reality in several countries.

. . . Over a longer period atomic energy will do much to overcome the power shortage in various parts of the world and will provide the basis for long-needed increases in industrial and agricultural production.

. . . The widespread use of radioactive isotopes will move on an even faster timetable.

. . . Isotopes are already being used extensively in industry, agriculture, and medicine in the United States and other countries, and this use will spread rapidly.

Atomic energy is not, however, a panacea for all the world's ills.

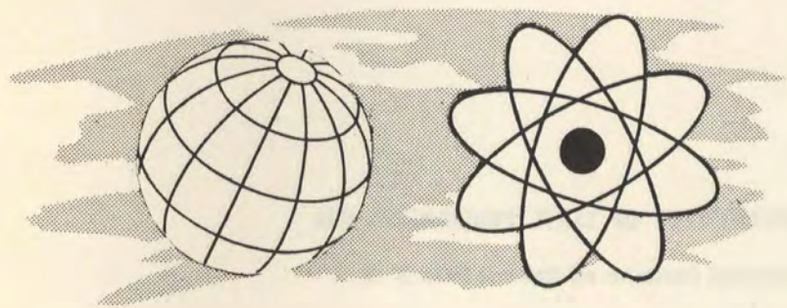
Atomic energy cannot, for example, overcome the acute need for capital investment in the so-called underdeveloped countries. In fact, the construction of atomic reactors for the production of power will require large amounts of capital, and then capital must be found to build the factories to use this atomic power.

Health and safety precautions must be taken in the location and operation of commercial atomic facilities and in the disposal of potentially hazardous radioactive waste products.

But this great new source of energy will eventually make an enormous contribution to agricultural and industrial productivity and production and hence to feeding, clothing, and housing the rapidly increasing population of the world.

The United Nations and its member nations—notably the United States—have been spending huge sums every year since the end of World War II on international health, education, and economic development programs. These programs were undertaken in recognition of the fact that the disease, ignorance, and lack of economic opportunity prevailing in much of the world contain the seeds of war. Every scientific tool available to the more advanced nations has been brought to bear in these technical assistance programs.

Atomic science is a new and perhaps the most promising tool of all. Its enormous potentialities for peace are now being put to increasing use.



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