HEARINGS

BEFORE THE

SUBCOMMITTEE ON AGREEMENTS FOR COOPERATION

OF THE

JOINT COMMITTEE ON ATOMIC ENERGY

CONGRESS OF THE UNITED STATES

EIGHTY-NINTH CONGRESS

FIRST SESSION

ON

INTERNATIONAL AGREEMENTS FOR COOPERATION

APRIL 29, JUNE 4, AND JULY 13 AND 27, 1965

Printed for the use of the Joint Committee on Atomic Energy

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THURSDAY, APRIL 29, 1965

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON AGREEMENTS FOR COOPERATION,
JOINT COMMITTEE ON ATOMIC ENERGY,
Washington, D.C.

The subcommittee met at 2 p.m., pursuant to call, in room AE–1, the Capitol, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senators Gore and Bennett; Representatives Holifield, Price, Bates, and Anderson.

Also present: John T. Conway, executive director, Edward J. Bauser, assistant director; Leonard M. Trosten, staff counsel; Jack Rosen and William T. England, staff consultants.

Senator GORE. The committee will come to order.

The purpose of today's hearing by the Subcommittee on Agreements for Cooperation of the Joint Committee on Atomic Energy is twofold: The subcommittee will consider a proposed amendment to the agreement for cooperation with the Government of Israel on civilian uses of atomic energy, and hear testimony relating to current activities of the International Atomic Energy Agency.

The vitality of the International Atomic Energy Agency is a matter of considerable interest to all those who have been associated with the creation and development of the IAEA. However, the well-being of the Agency is of particular interest to this country, which has been one of the Agency's principal supporters. Tangible evidence of this Nation's support of and confidence in the IAEA was given again only last year when the United States and six other nations executed amendments to their existing agreements for cooperation which permitted transfer to the Agency of the responsibility for safeguards inspections under those agreements. The Joint Committee on Atomic Energy has supported the policy of transferring safeguards responsibilities to the IAEA. One of the subjects we wish to explore today is the effectiveness with which the Agency is carrying out these important functions.

The proposed amendment before the subcommittee today further testifies to our Government's adherence to this policy. In addition to extending the effective period of the Israeli bilateral to April 11, 1975, this amendment provides for negotiation by the parties of an agreement with the IAEA whereby the Agency will assume safeguards responsibility.

The proposal to amend the agreement for cooperation with Israel was submitted to the Joint Committee pursuant to section 123 c. of the

Atomic Energy Act of 1954, as amended, which requires that such arrangements lie before the Joint Committee for a statutory 30-day period before becoming effective.

In accordance with normal committee procedure, on April 9, 1965, I inserted in the Congressional Record copies of the proposed amendment and supporting correspondence in order to inform the Congress of the pendency of this matter. Without objection, I would like to insert into the record of this hearing the proposed amendment and supporting correspondence. (See app. 1, p. 57.)

Dr. Seaborg, I understand that you will be our first witness. Please proceed.

STATEMENT OF DR. GLENN T. SEABORG, CHAIRMAN, ATOMIC ENERGY COMMISSION; ACCOMPANIED BY COMMISSIONER JAMES T. RAMEY, AND M. B. KRATZER, DIRECTOR, DIVISION OF INTERNATIONAL AFFAIRS

Dr. SEABORG. Mr. Chairman, members of the committee, we are pleased to appear here today to discuss two important matters in our international program: the extension of our agreement for cooperation with Israel, and the current status of the International Atomic Energy Agency with particular reference to the progress which is being made by the Agency in the area of international safeguards. I am pleased to note that Ambassador Henry D. Smyth, U.S. representative to the International Atomic Energy Agency, is present with us today. Ambassador Smyth has been one of the chief architects and most effective advocates of the U.S. policy on international safeguards, and I understand that he has a statement to make before the committee on this subject today.

I have a statement to present covering each of the items scheduled for discussion today, and I or other Commissioners and members of the staff will be glad to answer any questions you may have.

ISRAEL

The amendment to the agreement for cooperation with Israel was submitted to the Joint Committee on April 2, 1965. The committee is aware of the reasons why it was not possible for us to submit this amendment in time for the full 30-day waiting period to run prior to the April 11 expiration date of the agreement. We have obtained an assurance from the Government of Israel that they will hold the materials and facilities they have received under the agreement as subject to the terms and conditions of the agreement. I wish to personally assure the committee that we are making every effort to submit future amendments to the committee on a timely basis.

The existing United States-Israeli agreement for cooperation provides for the transfer to Israel of up to 10 kilograms of contained U^{235} in uranium. The principal facility being fueled under the agreement is the 5-megawatt pool-type reactor located at Nahal Soreq near Rehovoth. The purpose of the current amendment is to extend the agreement for a period of 10 years beyond its expiration date of April 11, 1965, and to provide that the International Atomic Energy Agency will be promptly requested to assume responsibility for apply-

ing safeguards to materials and facilities subject to safeguards under this agreement.

The committee will recall that a 9-month extension of the agreement with Israel was entered into in the summer of 1964. At the time of this extension it was the intention of the Israeli Government to allow the agreement to expire upon the completion of its 9-month term and to obtain thereafter necessary supplies of enriched uranium, previously obtained under the agreement for cooperation, from the International Atomic Energy Agency. It was also understood that the administration of safeguards with respect to enriched uranium or reactors supplied by the United States under the existing agreement would be transferred to the IAEA upon expiration of the agreement.

In December 1964, the Government of Israel informed us that, upon further review, it desired to renew the agreement for cooperation so that fuel could be obtained on a bilateral basis, rather than terminating the agreement at the end of its 9-month extension and obtaining future fuel supplies through the IAEA. The Government of Israel, however, stated its willingness to accept Agency safeguards over material supplied by the United States under the agreement for cooperation.

This arrangement would be in line with U.S. policy that upon expiration or amendment of an agreement for cooperation, responsibility for administering safeguards should be transferred to the Agency. So far, 20 (Argentina, Austria, Brazil, China, Congo, Finland, Greece, India, Iran, Israel, Japan, Mexico, Norway, Pakistan, Philippines, Portugal, South Africa, Thailand, Vietnam, Yugoslavia) of our cooperating partners have agreed to the application of IAEA safeguards to materials and facilities received from the United States. I will have more to say about the significance of this development in the next portion of my statement.

THE INTERNATIONAL ATOMIC ENERGY AGENCY

The IAEA has come of age during the past year, as a result of both its real accomplishments and the growth in urgency of its responsibilities that derive from the prospect of early widespread use of nuclear powerplants.

I should like to elaborate briefly on this generalization. As the Third Geneva Conference revealed, there was widespread agreement that large nuclear powerplants with high load factors can compete with conventional plants in many parts of the world. An atmosphere of confidence, rooted in the reality of experience, pervades the international nuclear community. Concurrently, the IAEA has made major progress in the critical matter of international safeguards. Acceptable, uniform international responsibility in this area, which is the province of the IAEA, is an important basis of the high hope that nuclear energy can eventually satisfy the power needs of the world.

Before going into detail on the subject of international safeguards, I would like to mention briefly some of the other achievements of the IAEA.

The Agency has emphasized the development of health and safety codes and practices and has increased its technical assistance to member states in this field, as well as in radioactive waste management.

It has served as a focal point for international cooperation in the use of large reactors for the dual purpose of power production and water desalination. It carries on research, training, and technical assistance programs in all aspects of the atomic energy field which help the member states achieve the technical competence necessary to take advantage of the developing nuclear technology.

In cooperation with the Government of Italy, the Agency established the International Center for Theoretical Physics at Trieste in October 1964 and has already attracted the attention of outstanding scientists in the field. It also has cooperative research projects involving the NORA reactor in Norway, and the Marine Biological Laboratory at Monaco; and it has a program of research contracts which have been awarded to research reactor centers and laboratories in the developing countries. It has organized cooperative regional training and research activities in the United Arab Republic, the Congo, and the Philippines.

These Agency programs are illustrative of the broad scope of the IAEA's involvement in the worldwide development of atomic energy. They demonstrate, I believe, that our confidence in the Agency's purpose and in its ability to make an important contribution to the peaceful development of atomic energy has been well founded.

IAEA SAFEGUARDS

I should now turn to that area of the IAEA's activities which I believe to be of the most importance to the worldwide utilization of peaceful uses of atomic energy—that is, the development and application of a system of international control to assure that peaceful atomic activities are not diverted to any military use. Heartening progress has been made in this area in the recent past—progress which has its foundation on the foresight and determination of those who played an active role in the establishment of the IAEA.

As we move closer to the time when nuclear power will be widespread around the world, and as nuclear knowledge and materials become available from a variety of sources in addition to the United States, the importance and urgency of developing and obtaining acceptance of international safeguards increase. Through our own strong support of these safeguards and through the fortunate circumstance that U.S. technology and materials offer an extremely favorable means of generating nuclear power, we are in a position to help avoid the risk of proliferation of atomic weapons that might otherwise accompany the expanding use of atomic power.

There is no question that atomic power is going to see widespread application throughout the world. Until international controls are universal in their application, the policies of individual suppliers and recipients will have an important bearing on the extent to which this growing use will carry with it a growing risk of proliferation of nuclear weapons. Each time that we can bring about the use of a U.S. reactor or U.S. fuel material, with their accompanying safeguards—while we await the universal application of these controls—we have contributed to a reduction in the risk that these nuclear facilities might someday be turned to other than peaceful purposes.

The advantages of having widely accepted international safeguards with uniform standards and methods of inspection have always been clear. Every nation supplying nuclear technology and materials must call for the application of consistent and credible safeguards if we are to avoid contributing to nuclear weapons proliferation through encouragement of peaceful uses. Neither the United States nor any other nation alone can provide assurance against proliferation. It has also been long recognized that a multilateral control system would be more efficient and objective than bilateral safeguards and that it would contribute in the long run to the evaluation of a broader system of arms limitation or disarmament. It was these considerations that led the United States at an early date, to take a leading role in the development of the IAEA system of control and inspection which is in operation today.

As you well know, this development had many complexities. It required nearly 4 years from the announcement of the U.S. Atoms-for-Peace program in December 1953 to bring the IAEA into existence, another 3 years to develop the initial IAEA safeguards system, and the past 4½ years to put it into operation, to extend its application to reactors over 100 thermal megawatts, and to improve and clarify certain of its provisions.

As an interim measure, in order to be able to launch the Atoms-for-Peace program without undue delay, it was decided to incorporate into the bilateral agreements implementing this program specific provisions for safeguarding the assistance rendered other nations. As early as 1956, we also included in our bilateral agreements a provision for consultation on turning over the safeguards provisions of the bilateral to an international atomic energy agency, thus setting the stage for international safeguards. However, the logical culmination of the interim bilateral safeguards program is to transfer to the IAEA the responsibility for administration of safeguards which the United States has carried out under its bilateral agreements. This we have undertaken to do, and the first such transfer was accomplished by means of a trilateral agreement signed by the United States, Japan, and the IAEA on September 23, 1963, under which the Agency now administers the safeguards arrangements between the two countries. Thus far, trilateral agreements have been concluded (between the United States, the IAEA, and the other countries) for the IAEA to administer the safeguards applied to the nuclear materials and equipment supplied by the United States to 12 countries; namely, Japan, Norway, Greece, Austria, the Philippines, Vietnam, Argentina, Portugal, Thailand, Iran, the Republic of China, and the Union of South Africa. This list will be extended as we conclude other negotiations now underway. Five additional countries that have received U.S. nuclear materials and equipment through the IAEA in connection with IAEA projects have, of course, agreed to the application of Agency safeguards. These are Finland, Mexico, Yugoslavia, Pakistan, and the Congo.

U.S. REACTORS SUBJECT TO IAEA SAFEGUARDS

In order to help in the development of IAEA safeguards and to demonstrate our conviction that these safeguards are both reasonable and effective, a few years ago the United States voluntarily placed four

of its civilian prototype power and research reactors under the Agency system. This was done as a means of testing the system and giving the IAEA safeguards staff experience in conducting safeguards inspections. This agreement was renewed (one of the original four reactors, the EBWR, was placed under Agency safeguards for a 1-year period and is no longer covered) and extended last year to include the Yankee reactor.

The invitation to apply safeguards to this 600-thermal-megawatt reactor (capable of producing more than 100 kilograms of plutonium per year) was extended to assist the IAEA in developing and demonstrating the effectiveness of its inspection techniques for larger reactors. The Agency has effectively implemented these arrangements. At the Yankee reactor three inspections have taken place since the arrangement was concluded in August of 1964. Two of these inspections were carried out without any advance notice to the U.S. Government or the plant management. Such unannounced inspections constitute an important technique in the safeguarding of large facilities, and their use by the IAEA is indicative of the seriousness with which the Agency is approaching its responsibility for applying effective safeguards.

As I mentioned earlier, it was recognized from the beginning that every nation supplying materials, equipment and technology must require safeguards if they are to be of maximum effectiveness. Among the Western supplier nations there has long been support for this policy, and a number of reactor and fuel exports from other countries have been made subject to safeguards. As a step in the continuing communication between the suppliers on these matters, discussions have taken place recently on the feasibility of other suppliers following the policy that their future supply arrangements with third countries will be subject to IAEA safeguards wherever practicable and that, as far as possible, they will place existing arrangements under IAEA safeguards.

REVISIONS TO SAFEGUARDS SYSTEM

In conclusion, let me say that the current climate appears to be particularly favorable to the further widespread acceptance of the IAEA safeguards system. The Agency's Board of Governors has recently adopted unanimously the clarifying revisions recommended by an international working group of governmental experts. It is anticipated that these revisions will be endorsed by the Agency's general conference this September and go formally into effect shortly thereafter.[1] I believe that it is important to note that the work on these revisions proceeded with a high degree of cooperation and agreement among the nations involved, and that these included the leading atomic powers as well as representatives from each of the major underdeveloped areas of the world.

We are aware, on the technical side, that large-scale nuclear power will be a reality in many countries of the world in the not too distant future. It appears to us reasonable to anticipate with optimism the development of international safeguards that will allow us to assist all countries to obtain the benefits of the peaceful atom and that will

[1] In this connection, see explanatory footnote on p. 79.

advance the ultimate creation of a comprehensive program of arms control and disarmament.

Senator GORE. Senator Bennett.

Senator BENNETT. I have no questions.

Senator GORE. Congressman Price.

Representative PRICE. Dr. Seaborg, what effect, if any, has the United States-Israeli desalting project had upon the research programs being carried out under the United States-Israeli agreement for cooperation?

Dr. SEABORG. Essentially no effect to date because the United States-Israeli desalting project is only a study project up until this stage.

Mr. RAMEY. Mr. Chairman, I might mention there has been no question about applying IAEA safeguards to the reactor that might be built in connection with the United States-Israeli desalting project.

Representative PRICE. Has there been a followup by the AEC to see that the assistance being given by this country is effectively utilized by the Israeli?

Dr. SEABORG. Yes, we have had visits by scientists to the Israeli Laboratory where the reactor is located and we have been able to see first hand the interesting scientific work that is being performed there.

Representative PRICE. What basically are some of the programs being conducted by the Israeli in cooperation with the United States?

Dr. SEABORG. With this reactor, the Nahal Soreq reactor? There have been experiments on the production of radioactive isotopes, the measurement of their properties, their use in scientific and medical investigations, and general experiments on low-energy nuclear physics including experiments on such things as neutron spectroscopy and related areas.

Representative PRICE. How long has the agreement been in effect?

Mr. KRATZER. I believe, Mr. Chairman, the agreement originally went into effect in 1955.

Representative PRICE. It was originally for 10 years, also?

Mr. KRATZER. No; the original agreement was for 5 years but it has been extended on several subsequent occasions for short periods of time.

Representative PRICE. This is the longest period of extension?

Mr. KRATZER. Yes, sir.

Representative PRICE. Ten years?

Mr. KRATZER. That is correct.

Mr. CONWAY. This is the fifth amendment you have had to this agreement.

Mr. KRATZER. Yes.

Representative PRICE. Do you know whether or not Israel plans to build any other reactors under this agreement?

Dr. SEABORG. No; not under this agreement. If we entered into another cooperative venture with them it would have to be under a new agreement, or an amendment to the existing agreement. We don't know of any. It would have to be under a new arrangement of some type.

Representative PRICE. I have no more questions.

Senator GORE. In testifying before the Subcommittee on Agreements for Cooperation last summer you said that the Israeli bilateral

would be allowed to expire at the end of 9 months, that is April 1965, at which time the supply and safeguard function with respect to Israel would be taken over by IAEA. Will you please explain for the record what caused the change in the proposed arrangements.

Dr. SEABORG. That was the intention of the Israeli Government at that time. Upon reconsideration in the interim they changed their mind and decided it would be to their advantage to have the supply function continue through the bilateral agreement. That is, to obtain the fissionable material, for example, directly from the U.S. Government rather than through the IAEA.

Senator GORE. Where will these fuels be reprocessed?

Dr. SEABORG. They would be reprocessed in the United States or, I believe, there is a provision in the agreement whereby they could be reprocessed in another country acceptable to the United States.

Senator GORE. Is it necessary that they obtain our approval?

Dr. SEABORG. Yes, in case they intend to use another country's reprocessing facilities.

Senator GORE. I take it that international safeguards would apply or we would not give our approval.

Dr. SEABORG. That is right. It would have to be under conditions of safeguards.

Representative PRICE. What was the reason for the 10-year extension this time when previously we were holding the extensions down to 2 and 3 years?

Dr. SEABORG. During the time when we would only agree to shorter periods, we were trying to convince the country involved—Israel in this case, other countries in other cases—that they should allow the safeguards function to be performed by the IAEA. When Israel agreed with that position we felt there was no reason to effect an agreement for a shorter period. It is just more efficient to have the longer period for the agreement.

UNITED STATES-ISRAEL DESALTING STUDY

Representative PRICE. I think I would like to have more clarification in my own mind of the desalting research agreement. Does that program come within the scope of the existing agreement?

Dr. SEABORG. No. That required a separate agreement.

Representative PRICE. Between the United States and the Israeli.

Dr. SEABORG. Yes; between the United States and the Israeli, with the involvement of the IAEA.

Mr. RAMEY. They sent an observer.

Dr. SEABORG. They sent an observer to the meetings and discussions and so forth.

Representative PRICE. What is the status of that and what experience have we had so far in connection with that agreement?

Dr. SEABORG. The cooperative program began with a sort of preliminary study of the feasibility of a dual purpose, electricity producing and desalting reactor, involving personnel from the United States and Israel. This was to be followed by a more definitive study contract if the preliminary results indicated that, which they did. Therefore, following this preliminary study, a study contract involving Israel on the one hand and the United States, through the Atomic

Energy Commission and the Department of the Interior, on the other, has been arranged with the Kaiser Co. The total for this desalting contract is $340,000, and I believe that is to be funded half by Israel and half by the United States.

Representative PRICE. Now, earlier research done by the Government of Israel in connection with desalting was nonnuclear and in no way connected with any of these arrangements.

Dr. SEABORG. That is right.

Representative PRICE. Whatever happened to that program?

Dr. SEABORG. I don't know that they have done very much research on desalting. I guess it is only a moderate program.

Mr. RAMEY. They have worked on a freezing process and have built a small pilot plant that has not been in operation yet. I don't think it is quite completed. Then they have also built a larger plant, I think, up to around a million gallons of water a day, fossil fired, that is in process or has just gone into operation, I believe.

Representative PRICE. Of course, I knew that there was no nuclear connection with their program but I was wondering if they had any degree of success at all in their research on the freezing process.

Mr. RAMEY. I think they have had problems just like we have on the freezing process. I think our desalting people in the Office of Saline Water believe that this process does still have some possibilities and may, perhaps, if they solve some of their conventional problems on some of the components, such as compressors, it still might work pretty well.

Representative PRICE. I think that they had some arrangement with an American company, Fairbanks-Whitney, in connection with that.

Mr. RAMEY. Yes.

Representative PRICE. Are they still interested in that program?

Mr. RAMEY. I am not sure whether they are at this time, Mr. Price. Until fairly recently they were.

Representative PRICE. That is all.

Senator GORE. What other bilaterals do you anticipate during the year?

Dr. SEABORG. I think we have, in addition to Israel, about six other bilaterals.

INDONESIAN AGREEMENT FOR COOPERATION

Senator GORE. Does that include the one with Indonesia?

Dr. SEABORG. No. That is a special case. I did not include it among the six.

Senator GORE. Tell us about that special case. To begin with, do we not have some uranium in Indonesia in a research reactor?

Dr. SEABORG. Yes; we have a small amount of enriched uranium 235, approximately 3 kilograms.

Senator GORE. What are our chances either of recovering that uranium or requiring or persuading Indonesia to comply with international safeguards?

Dr. SEABORG. Indonesia is complying with the safeguards required by our bilateral agreement in every way. We would require them, as we do with all other agreements, if the agreement should be renewed, to transfer the safeguards function to the IAEA.

Senator GORE. When was this last inspected?

Mr. KRATZER. It was last inspected in January, Mr. Chairman, and the result of the inspection was completely satisfactory. The inspector was well received. He accounted for all of the material present.

Senator GORE. Maybe we should place AEC in charge of our diplomatic relations with Indonesia. I currently notice a forecast of a break in diplomatic relations. Should such occur how would that affect the agreement, Mr. Chairman?

Dr. SEABORG. This is being studied by the highest councils in Government.

Senator GORE. You are rapidly approaching a diplomatic status.

Dr. SEABORG. Yes.

Representative PRICE. In that connection I wonder if they could describe the reactor which we supplied Indonesia.

Dr. SEABORG. It is a TRIGA Mark II reactor, 250 kilowatts.

Representative PRICE. About the size we might have in a university.

Dr. SEABORG. Yes; one of the small ones.

Representative PRICE. Smaller than the ones they have at the University of Illinois, for instance?

Dr. SEABORG. I don't know, but it is smaller than the one they have, let us say, at the University of California and the University of Michigan.

Senator GORE. Senator Bennett.

Senator BENNETT. No questions.

Senator GORE. Thank you, Mr. Chairman.

Dr. SEABORG. Thank you.

Senator GORE. Ambassador Smyth, we will be pleased to hear from you.

STATEMENT OF DR. HENRY D. SMYTH, U.S. REPRESENTATIVE TO THE IAEA

Dr. SMYTH. Senator Gore, Senator Bennett, Mr. Price, I am very pleased to appear again before the Joint Committee.

As you know, the development of an effective international safeguards system has been a major objective of U.S. policy in the international atomic energy field since the beginning of the Atoms-for-Peace program. It became clear, however, when that program was begun that the goal of safeguards, international safeguards, was not going to be achieved overnight but that it was going to involve time-consuming negotiations with other member states, not only to reconcile different philosophies concerning the desirability of safeguards but to reach an agreement on the basic technical elements that constitute an effective system. Pending the establishment of an acceptable and effective IAEA safeguards system, it was clear that bilateral safeguards or materials or equipment transferred would have to be applied by the United States and other supplier nations were encouraged to do the same.

The U.S. persistence in supporting the development of IAEA safeguards was finally partially rewarded when the IAEA adopted a safeguards system applicable to reactors of less than 100 megawatts thermal in January 1961. The next major development took place with the extension of that system to large reactors of over a hundred megawatts thermal in February 1964. This extension was adopted by the

IAEA's Board of Governors without a single negative and was approved by the Agency's general conference.

Since the adoption of the Agency system the United States has moved swiftly and firmly to transfer the administration of safeguards to materials and equipment transferred abroad under bilateral agreements to the IAEA. Trilateral agreements for the transfer of safeguards have been concluded with 12 countries and several more are expected to be completed in the near future.

We have taken steps to persuade other supplier countries to adopt a similar policy. We hope that these efforts will bear fruit. We have also placed four American reactors including the large Yankee power reactor under Agency safeguards to demonstrate further our conviction of the desirability of international safeguards and our belief that these are not an intrusion on national sovereignty.

In addition, this action provides Agency personnel with valuable experience. The Agency has sought to make international safeguards more effective but at the same time simpler and more understandable. In May of 1964 a working group was established in Vienna to review the safeguards procedures approved in 1961 and extended in 1964. This review was completed in February of this year, February 1965, and a much better document in terms of clarity was approved by the Board of Governors of the International Atomic Energy Agency unanimously. In this area of international security it is gratifying to realize that the East and the West both give strong support to the idea of international safeguards.

I might interpolate a remark here. I have found it extremely interesting to discover that in a group like this, a group representing 23 countries of whom usually at least 20 had representatives present, it was possible to work out a solution to rather difficult problems with—I won't say with an absence of political debate but with a generally reasonable debate and reasonably objective consideration of the technical and political problems. In conclusion I believe it is fair to say that substantial progress has been made in the Agency in the past few years.

The Agency is still a small international organization but its programs are good and the strong support for international safeguards which has been noted recently is indicative of its growing vigor and importance.

Thank you.

Senator GORE. Congressman Price.

AGENCY INSPECTORS

Representative PRICE. Dr. Smyth, according to the testimony we had last year from you, the IAEA safeguards system permits any country to object formally to a particular inspector. I understand that the Israel press carried an article last year in connection with the negotiation leading to the 1964 amendment that Israel's objection to IAEA inspection was due in part to Israel's fear that there might be an attempt by unfriendly elements in the Agency to embarrass them by designating a series of inspectors which Israel would have to refuse. Is there any policy or procedure followed by the Agency to avoid incidents of this nature?

Dr. SMYTH. Yes, Mr. Price. As a matter of sensible administrative policy the Agency conducts informal conversations with a country that is to be under IAEA safeguards with the hope and expectation that the question of a formal objection will never come up.

In other words, the administration of the Agency endeavors to assign inspectors that will not raise any objection in the country to which they are going. There is, of course, as a last resort the formal possibility of objection being raised, but many countries, as you imply, would prefer not to be put in that position.

Representative PRICE. In relation to nationality, what is the relationship of the present corps of international inspectors?

Dr. SMYTH. I will just give you the countries. I don't think you are interested in the names, are you?

Representative PRICE. No.

Dr. SMYTH. One from Argentina, one from the United States, one from Hungary, one from Burma, one from Pakistan, one from the United Kingdom, one from Japan, one from Australia, one from Yugoslavia, one from Sweden, one from the U.S.S.R.

Representative PRICE. How do they operate? As individuals or as teams when they make an inspection.

Dr. SMYTH. Usually as teams, Mr. Price, at least initially. And then occasionally on checkup inspections an individual goes.

Mr. CONWAY. The last surprise visit to Yankee, I believe, was a single Argentinian inspector.

Dr. SMYTH. That is correct.

Representative PRICE. When you operate a team do you try to strike a balance between East and West on inspectors?

Dr. SMYTH. I don't think it is quite that formally done, Mr. Price. It would be a little hard with this rather small number. I should say that the attempt was made to pick inspectors who would be ostensibly neutral and regarded as neutral by the countries to which they are going and would be acceptable to the country.

Representative PRICE. When they make an inspection, are they on their own or are they escorted by the representatives of the facility?

Dr. SMYTH. Normally, certainly on a first inspection where notice is given they would be escorted by the management initially. But they certainly have the right to go around by themselves, and as Mr. Conway just mentioned, this last inspection the IAEA man just showed up one morning at the Yankee plant. I don't know what happened from then on. Do you know?

Mr. KRATZER. No, sir; I don't.

Dr. SMYTH. Is my general statement correct?

Mr. KRATZER. I think in general, Mr. Chairman, the country being inspected does have the right to accompany the Agency inspectors if he can do so without in any way impeding their inspection activities. In the inspections that the Agency has conducted in the United States we have normally accompanied them by people from our own safeguards group not because of a lack of trust but because this is something of a demonstration project. We want to see how they are doing the work and get ideas ourselves as to how these inspections can be carried out. In the case of a surprise inspection we would have the same opportunity. As soon as the inspector showed up at the Yankee plant we were promptly advised he was there so that we could have,

without impeding their work, sent someone to accompany him, but we did not do so in the last case.

Representative PRICE. How many facilities would you say have been subject to safeguards inspection since the beginning of the program?

Dr. SMYTH. I am afraid I will have to ask Mr. Kratzer again.

Mr. KRATZER. The Agency has inspected 20-odd facilities in 11 countries. Some of these have been what the Agency refers to as preinspection visits—in other words, visits to make sure that the country has a proper record system, and so forth—which take place before the formal trilateral agreement goes into effect. But there have been some 20-odd inspections.

Representative PRICE. Have there been any problems at all in connection with going in to make these inspections?

Dr. SMYTH. No, sir; none that we are aware of.

Mr. CONWAY. How many inspections have been made behind the Iron Courtain?

Dr. SMYTH. None.

I would like to make a comment on that, Mr. Price, relevant to these questions.

As you know, nearly all these bilateral arrangements have involved research reactors or very small reactors. In fact, most of the inspection activity, I think all of it, until quite recently, has involved very low-power reactors. I think that one can say that the period up to the present time has been extremely important in establishing the system and in giving practice to the corps of inspectors and of uncovering problems that are very difficult to foresee.

The real test of the whole system is going to come over the next 4 or 5 years when we begin to get into the really big powerplants where the amounts of material are significant. The Yankee powerplant is the first high-power reactor to go under the system.

Representative PRICE. In other words, up to this point the largest reactor that has been inspected has been Yankee.

Dr. SMYTH. That is correct.

Senator GORE. Thank you, Mr. Ambassador.

Mr. Thomas, of the State Department.

STATEMENT OF CHARLES W. THOMAS, OFFICER IN CHARGE, ATOMIC ENERGY AFFAIRS, OFFICE OF INTERNATIONAL SCIENTIFIC AFFAIRS, DEPARTMENT OF STATE

Mr. THOMAS. Mr. Chairman, Congressman Price, I have two statements, one related to the Israeli agreement and one related to the general subject of safeguards and the International Atomic Energy Agency. Although the Israeli one is second in my document I think I should like to read that one first.

Senator GORE. All right.

Mr. THOMAS. The Department of State endorses the testimony given by Dr. Glenn Seaborg concerning the amendment to the Agreement for Cooperation on the Civil Uses of Atomic Energy between Israel and the United States. As Dr. Seaborg has indicated, the purpose of this amendment is to extend the present agreement for a period of 10 years until April 11, 1975, and, also, to provide for a prompt

transfer of the responsibility for administering safeguards under this bilateral agreement to the International Atomic Energy Agency in Vienna.

In August 1964 this agreement was extended for a period of 9 months with the understanding that at the end of that period the Israeli Government would permit the bilateral agreement to expire and would transfer all functions of that bilateral agreement, both supply and safeguards, to the IAEA. Subsequently Israeli officials decided that they would prefer to retain the bilateral agreement for supply purposes and transfer only the safeguards function to the IAEA. Inasmuch as present U.S. policy provides that safeguards functions will be transferred to the IAEA and that supply functions can remain on a bilateral basis or be transferred to the IAEA in accordance with the wish of the recipient country, the Department of State and the AEC saw no reason for not granting the change which the Israeli Government requested. Inasmuch, however, as the testimony before this committee last summer had indicated that both supply and safeguards would be transferred to the Agency in this instance, we felt it proper to inform the Joint Committee of this change in concept before agreeing to the Israeli request. Consultations were held with the staff of the Joint Committee by representatives of the Atomic Energy Commission and the Department of State on March 13 concerning these changes.

The Department of State and the Atomic Energy Commission then proceeded to negotiate the amendment which is before the committee today.

Senator GORE. Do you wish to read your other statement or have it printed in the record?

Mr. THOMAS. I would like to have it printed in the record.

(The statement of Mr. Thomas follows:)

SAFEGUARDS AND THE INTERNATIONAL ATOMIC ENERGY AGENCY—TESTIMONY BY CHARLES W. THOMAS, STATE DEPARTMENT

From the inception of the Atoms-for-Peace program, the U.S. Government has taken the lead in the field of safeguards. This U.S. leadership was first demonstrated in the rigid bilateral safeguards provisions that were included in all of our bilateral agreements. Our next step was to work intensely with many close allies in developing a statute for the International Atomic Energy Agency which authorized that Agency "to establish and administer safeguards designed to insure that special fissionable and other materials, services, equipment, facilities, and information made available by the Agency * * * are not used in such a way as to further any military purpose * * *." This statute came into force on July 29, 1957.

In January of 1961, the Board of Governors of the IAEA approved, under the statute, a system of safeguards covering reactors with a rating of 100 thermal megawatts or less. In February 1964, this system was expanded to include reactors of any size. At the time of this latter action, many members of the IAEA who had felt that the IAEA system needed clarification and simplification proposed that the whole system be revised. This revision was undertaken during 1964 and early 1965 and was provisionally approved by the IAEA Board of Governors in February 1965. The U.S. Government feels that this newly established system is intelligible, comprehensive, and will provide a mechanism for effective safeguards on peaceful nuclear programs around the world. It is interesting to note that the first safeguards system which was established in January 1961 was the subject of strong controversy within the IAEA and was approved only after vigorous political conflicts, and with many negative votes. In contrast, the revised system which was provisionally approved in February was accepted unanimously by the IAEA Board of Governors. This statement is not meant to

imply that there was no disagreement on the system, because there was. It does, however, suggest to us that in the coming years there will be a broad acceptance of this new system by members of the IAEA and that the U.S. overall policy of transferring safeguards to the IAEA will meet with increasing success.

As Chairman Seaborg has indicated, we have already taken great steps in that direction by transferring the safeguards under 12 of our bilateral agreements to the IAEA.[1] Additionally, U.S. material and equipment have been transferred to five additional countries through the IAEA and are, as a consequence, subject to IAEA safeguards.[2] We are currently negotiating additional agreements for the transfer of safeguards to the IAEA and hope that we will continue to be successful in making these transfers. I am happy to report that certain other governments are engaged in negotiations which should soon lead to the transfer of some of their bilateral safeguards functions to the IAEA.

During the past year the IAEA safeguards staff has been strengthened. The position of Inspector General in the IAEA was filled for the first time in September 1964. Moreover, the number of authorized inspectors was increased to nine. Also a lawyer in the Agency, who has very broad experience in safeguards questions, was transferred from the Legal Division of the Agency to the Safeguards Division.

In summary, the State Department is encouraged by these developments and is happy to note that the Agency is now gradually assuming one of the major responsibilities for which it was created.

Senator GORE. Congressman Price.

Representative PRICE. I understand at the time of the 1964 amendment to the Israeli bilateral there was some suggestion in the Israeli press that they were pressured into accepting the safeguards program. Will you comment on that.

Mr. THOMAS. That is a difficult word to define. In the course of those negotiations we did make a very firm case in favor of transferring the safeguards to the international agency.

Representative PRICE. Of course, we do in all of our bilaterals now.

Mr. THOMAS. Yes.

Represetnative PRICE. There is no different treatment there than there would be in any case where we were having an agreement. I think it is public knowledge the world over that we sponsor the safeguards, as a matter of fact insist on it.

Who is the inspector general of the international Agency responsible for national safeguard inspections?

Mr. THOMAS. His name is Allen MacKnight. He is an Australian. He has had 7 years' experience as the Australian representative on the Board of Governors of the IAEA in Vienna and he was at one time, I am not sure of the exact title, the equivalent of the General Manager of the Australian Atomic Energy Commission.

Representative PRICE. In the statement that you are submitting for printing in the record but which you did not read, you mentioned a lawyer in the international Agency. Could you tell us who he is?

Mr. THOMAS. His name is Paul Szasz. He is an American citizen of Hungarian origin. He graduated, I believe, from Cornell University in the United States. From the beginning of the safeguards program he has—that is since it has been developed in the IAEA, he has been the man who had most to do with the legal aspect of it from the IAEA point of view. We all regard him as a very highly competent man. We were most pleased when he was actually transferred to the Safeguard and Inspection Division.

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[1] Japan, Norway, Greece, Austria, Philippines, Vietnam, Argentina, Portugal, Thailand, Iran, Republic of China, and Union of South Africa.

[2] Finland, Mexico, Yugoslavia, Pakistan, and the Congo (Léopoldville).

EURATOM SAFEGUARDS

Representative PRICE. Has any attempt been made to encourage Euratom to accept international safeguards inspection?

Mr. THOMAS. We have had conversations with Euratom about maintaining a compatability between the Euratom safeguards system and that of the IAEA as was agreed at the time of our original agreement with Euratom.

Representative PRICE. Your statement refers to certain clarifying revisions to the international Agency safeguards system that were provisionally approved by the Agency Board of Governors in February of this year. Could you describe the operation of this new system?

Mr. THOMAS. The system is fundamentally the same system that we had before. There were some ambiguities, which have now been eliminated. You asked earlier for examples about the consultations concerning inspectors. The previous system indicated that a country could reject an inspector. The new system explicitly states that there should be a consultation between the Director General and the country which is going to be subject to safeguards, before the inspectors are designated.

Another point of clarification. There was no clear definition of what was meant by resident inspectors or access at all times. This new document makes the nature of the duties of the inspectors somewhat clearer in that regard. (See app. 2, p. 79.)

Representative PRICE. Perhaps Dr. Smyth can comment on this. In the experience now with the safeguards inspections with the international Agency—you say they have all been confined outside the Iron Curtain—how do they come about? How has the system been working? Has it been on the basis of request? Has the agency sent them in? Please give us a general description of how the system has been working.

Dr. SMYTH. Mr. Price, there are two ways in which the IAEA safeguards can be invoked. One is automatic. That is, if a country procures materials through the IAEA, then the safeguards automatically go along with the materials and in the agreement for the provision of materials there is an agreement for safeguards and inspection, and there is a formula, depending upon how much material is involved which states how frequently inspection should be and so forth. That is automatic.

The other way in which IAEA safeguards can be invoked is that if two members of the Agency have a bilateral agreement, then those two members can ask the Agency to administer the safeguards that are incorporated in that agreement. This, of course, is the system we have been pursuing in transferring our bilateral safeguards to the Agency. It is done by a request of the two bilateral partners to the Agency, then a trilateral agreement is drawn up which, of course, has to be agreed upon by the Agency staff and which is approved by the Agency Board of Governors, and that is the binding agreement which specifies the nature of the arrangement and again invokes the formula for inspections and what is to be inspected and so forth. The system used in either of these cases, the actual system of safeguarding by the Agency, is identical. However the system may be invoked, it is identical in all cases. That is, the trilateral agreements have to be consistent with each other.

Representative PRICE. Would the first part of your statement indicate that there are no reactors in the Iron Curtain countries for which materials had been supplied by the international Agency?

Dr. SMYTH. That is correct.

Representative PRICE (presiding). Mr. Bates.

Representative BATES. Why do we have bilaterals? Is it because of the cost or redtape of going through the international Agency?

Dr. SMYTH. I think it is more redtape than cost.

Representative BATES. Then if we are concerned with proliferation and if we can have compulsory safeguards if that is what we want, which would stop a degree of proliferation, why don't we simplify and streamline things in the international Agency and have people go through that Agency?

Dr. SMYTH. We can get the compulsory features by incorporating those in our bilaterals and that is what we do.

Representative BATES. Yes; but that has to be agreed to by both parties.

Dr. SMYTH. Yes.

Representative BATES. Now let us say country X wants the material from the United States. We say, "You go get it through the international Agency," if that is the only way they can get it, at least from us under an agreement. They would have to agree to the compulsory features of the safeguard provision.

Dr. SMYTH. Yes, but our policy has been that if they get the material from us they also have to agree.

Representative BATES. Is that our policy?

Dr. SMYTH. Yes.

Representative BATES. Any time we have an agreement it is compulsory that they have a safeguard provision.

Dr. SMYTH. That is correct.

Representative BATES. Dr. Seaborg, regarding the centers in Italy and Monaco, those are new to me. What are they all about?

Dr. SEABORG. The one in Italy is a center for theoretical physics. There is no laboratory connected with it. It is a place where the theoretical physicists can go to pursue their work in the company of other theoretical physicists for a year or two.

Representative BATES. What is the magnitude?

Mr. KRATZER. The major portion of the costs are borne by the Government of Italy.

Dr. SEABORG. The building is furnished by the Government of Italy?

Mr. KRATZER. Yes; the facilities themselves are furnished by the Government of Italy. The Agency's contributions are in the form of several members of the staff, including the staff director, and in the form of fellowships for a number of students each year. I would want to check this for the record but my recollection is that the Agency's contribution is in the order of $100,000 to $150,000 per year in the form of these staff contributions.[1]

Representative BATES. Is this about the extent to which the Agency is going or do they contemplate going further than this?

Mr. KRATZER. At that particular facility?

Representative BATES. Or generally, either here or somewhere else.

Mr. KRATZER. I think in the field of theoretical physics there is no contemplation of supporting any other institutions. This looks like

[1] According to information supplied by the Atomic Energy Commission, the contributions for 1964 and 1965 were $55,000 annually. The proposed contribution for 1966 is $110,000.

a successful endeavor. It only began a year or so ago. If it continues to be as successful as indications are to date I am sure that there would be thought on the part of the Agency to increasing its support by a modest amount but it will never be, let us say, a predominant part of the Agency's program.

ISRAEL REACTORS

Representative BATES. I have just two other short questions. How many reactors does Israel have all together, of all kinds?

Mr. KRATZER. They have two reactors to the best of my knowledge and one subcritical assembly which I would not characterize as a reactor.

Representative BATES. At a university.

Mr. KRATZER. Of the two reactors they have, the first is the Nahal Soreq reactor which is the subject matter of our cooperative arrangement.

The second is a reactor located in the Negev Desert. It is an approximately 20-megawatt test reactor at an Israeli research institution.

Representative BATES. The other question has to do with the actual physical inspection of reactors by the Agency. What have they done here in the United States?

Mr. KRATZER. The Agency has carried out as we have indicated, three inspections at the Yankee reactor.

Representative BATES. Excuse me, I guess I was down voting when you covered that.

Mr. KRATZER. I am sorry. Shall I continue?

Representative BATES. I don't want you to repeat if you have already covered it.

IAEA INSPECTIONS IN UNITED STATES

Mr. KRATZER. They are inspecting four reactors in the United States at the present time, the principal one being the Yankee reactor in Rowe, Mass. In addition to that they are inspecting two reactors at Brookhaven—the medical research reactor and the general research reactor—and the fourth reactor is the Piqua, Ohio, small power reactor. They have carried out three inspections at Yankee and a number of inspections which I could supply for the record at these other installations.

(The following letter was submitted subsequent to the hearing:)

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., May 11, 1965.

Mr. JOHN T. CONWAY,
Executive Director, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. CONWAY: During the Joint Committee hearings of April 29, 1965, Mr. Kratzer agreed to supply you with the number of inspections the International Atomic Energy Agency has made of the U.S. facilities under both the original four-reactor agreement and the extended agreement, including Yankee. The information is as follows:

Experimental boiling water reactor	3
Brookhaven medical research reactor	5
Brookhaven graphite research reactor	7
Piqua nuclear power facility	5
Yankee atomic power station	3

If you should need any further information on this matter, let us know.

Sincerely yours,

JOHN A. HALL,
Assistant General Manager for International Activities.

Representative BATES. These are in the United States. Did you also cover ispections in other countries?

Mr. KRATZER. Yes.

Representative BATES. They have inspected in other countries.

Mr. KRATZER. Yes, they have. My recollection was that the Agency has inspected in the order of 20 facilities in about 11 countries.

Representative BATES. Does it contemplate inspecting reactors in all countries who were a party to the international agreement?

Mr. KRATZER. I don't think that is a likely probability in the near future. As Dr. Smyth indicated, these inspections can come about through one of two means, either when two parties to a bilateral arrangement ask the Agency to carry out inspections or when the Agency supplies material and, therefore, its inspections are mandatory. Any member can offer reactors for inspection, of course, as we have done in the case of the four U.S. reactors just mentioned.

Now, to date we have made arrangements which will result in the Agency carrying out inspections in about 20 countries. The United Kingdom is in the process of transferring its bilateral safeguards arrangements to the IAEA. They may be the same countries as the ones we are dealing with so that would not necessarily add to the number. But the Agency's membership, of course, is in the order of 80 and a large number of those countries have no reactors or no immediate prospects for reactors.

Representative BATES. I understand we are not going to inspect them if they don't have reactors. I am talking about places where they do. Is the door open or closed?

Mr. KRATZER. The door is very much open and we are helping people through it, as the testimony indicated earlier.

Representative BATES. Or are you going to inspect them primarily in the United States?

Mr. KRATZER. No. Our objective is to bring about inspection in any case where reactors have been transferred from one country to another, or where nuclear fuel has been transferred.

Representative BATES. I understand that but nothing has happened in that respect as far as Yankee is concerned but still it was inspected by the Agency. So the same application should be made in other countries where they were built without any international exchange?

Mr. KRATZER. The Agency is empowered to inspect facilities in a country when these are voluntarily offered for Agency inspection. That is the case with the Yankee.

Representative BATES. So we have volunteered in the United States in the case of four reactors.

Mr. KRATZER. Yes.

Representative BATES. What other countries have voluntarily done this?

Mr. KRATZER. Up to this time none.

Representative BATES. Have they been requested?

Mr. KRATZER. Yes.

Representative BATES. Have there been denials?

Mr. KRATZER. Conversations have gone on with several countries. We think there is interest among them to bring about these transfers.

Representative BATES. I am sure that there is interest. But are there any results? That is what I am talking about.

Mr. KRATZER. To date there have not been, but we feel there are likely to be positive results.

Representative BATES. In all of them?

Mr. KRATZER. No.

Representative BATES. The only point I am making is that I like a little quid pro quo. If we are going to open our facilities, I would like to see the other facilities opened up for inspection.

PUBLICATION OF SAFEGUARDS REPORTS

Representative PRICE. Mr. Thomas, will the international Agency make public its report concerning the results of its inspections of the Israeli facility?

Mr. THOMAS. No, it does not make its report public. Part of the system provides that the data acquired during an inspection will be made available only to those staff members of the Agency who need to have it to do their work and to the Board of Governors of the IAEA.

Representative PRICE. How about to the partner of the Israeli Government, the agreement we have with them, will we be able to get a complete report on the inspections?

Mr. THOMAS. That is not the intention.

Representative PRICE. It is available only to the Agency itself?

Mr. THOMAS. And to the Board of Governors.

Representative PRICE. Limited to the Board of Governors and to the examining staff?

Mr. THOMAS. We are permanent members of the Board of Governors, of course.

Representative PRICE. Our representatives on the Board of Governors would have access to the report?

Mr. THOMAS. Insofar as it is made available to the Board of Governors, yes.

Representative PRICE. Would that indicate that it would be in limited fashion and not a complete report, a summary report, or what?

Mr. THOMAS. To the extent the Board of Governors needs to know about it in order to carry out its function. There has been great concern among many of the members that the safeguards system might be used for commercial espionage purposes. There was considerable worry among many of the members.

Representative PRICE. This goes back to the old policy in our atomic energy program where the information was available to those who had need to know.

Mr. THOMAS. That is exactly it.

Representative PRICE. Now, in the course of time, with all of these amendments to our bilaterals providing for transfer of the responsibility for administering safeguards to the international Agency, the question comes up of the ability of the Agency to handle all this work, Dr. Smyth, would you comment on the competency of the Agency and the personnel available to do this job?

Dr. SMYTH. Mr. Price, we mentioned that Mr. MacKnight is now the Inspector General of the Agency. This was a post that had never been filled until last summer. I think we were fortunate to get him in this position. He is very keenly aware of the probability that the responsibilities of the Agency may enlarge greatly in the next few

years. He is recruiting additional people and will continue to do so. I was most impressed in one of my recent trips to Vienna by the morale which he had instilled among the people he has on his staff as inspectors, and I think they are competent, they are getting experience.

Certainly the staff needs to be strengthened and this is well recognized. It needs additional people, it needs a few people of a different kind from what they have. They need accountants, for example. You realize that there is much more to the whole system than just physical inspections. There is an elaborate system of reporting materials and so forth. But I am confident that they are going to be ready—that they are now doing a good job in the rather limited area in which we have responsibility and that they will enlarge their staff and increase their competence so that they can carry out the jobs that we foresee they will have to take on in the next few years.

Mr. THOMAS. Congressman Price, I might read to you the exact provision about the publication of information.

The Agency shall not publish or communicate to any State, organization, or person any information obtained by it in connection with the implementation of safeguards except that (*a*) specific information relating to such implementation in a State may be given to the Board and to such Agency staff members as require such knowledge by reason of their official duties in connection with safeguards, but only to the extent necessary for the Agency to fulfill its safeguards responsibilities; (*b*) summarized lists of items being safeguarded by the Agency may be published upon decision of the Board; and (*c*) additional information may be published upon decision of the Board, and if all States directly concerned agree.

Representative PRICE. Then the members will be assured that if there is violation of this provision they would know about it?

Mr. THOMAS. We have to count on the thoroughness of the Agency system, that is of the Agency safeguards division, to see that this is enforced. In an organization such as the International Atomic Energy Agency I think it would be rather difficult to have anything of that kind happen, covertly without its soon becoming known to the interested parties.

Representative PRICE. If it did happen what provision is there in the Agency to handle a violation of such a provision?

Mr. THOMAS. Each staff member as he takes office in the Agency takes an oath that he will abide by certain standards of conduct and that would, of course, be a reason for dismissal.

Mr. CONWAY. I think the question is, what action can the inspector take? If that inspector goes out and uncovers a violation, what is his authority, what can he do at that point?

Mr. THOMAS. The authority is that he would report that directly to the Director General.

Mr. CONWAY. He can only report it, he cannot take any authoritative action?

Mr. THOMAS. The Director General would call an immediate session of the Board. The Board would call upon the state to remedy any noncompliance, report it to all members of the IAEA and the Security Council of the United Nations and if they did not take corrective action, then the Agency would initiate action and have the material removed, have it censured in the United Nations and stop all aid to that country and suspend their rights of membership.

Representative PRICE. In the report to the Board of Governors, certainly even though it might be a summary report, it certainly should at least spell out any violation.

Mr. THOMAS. Yes, indeed. This will be a special report and at that moment section 14 of the safeguards document, which I just read would not apply to the Agency's fulfilling its obligation under the statute. Consequently, the nature of the violation would have to be reported in the greatest of detail to the Board of Governors.

Dr. SMYTH. Mr. Price, the section which Mr. Thomas read has to do with the protection of commercial secrets and it has to do with routine reporting. It really does not limit at all what is done if a violation is discovered.

Representative PRICE. Are there any further questions?

Gentlemen, if there are no further questions from the committee, thank you for your presentation today.

We will adjourn the meeting.

(Whereupon, at 3:35 p.m., Thursday, April 29, 1965, the hearing was concluded.)

INTERNATIONAL AGREEMENTS FOR COOPERATION

FRIDAY, JUNE 4, 1965

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON AGREEMENTS FOR COOPERATION,
JOINT COMMITTEE ON ATOMIC ENERGY,
Washington, D.C.

The subcommittee met at 2 p.m., pursuant to call, in room AE–1, the Capitol, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senator Gore; Representatives Holifield, Hosmer, Bates, and McCulloch.

Also present: John T. Conway, executive director; Edward J. Bauser, assistant director; Leonard M. Trosten, staff counsel; George F. Murphy, Jr., professional staff member; Jack Rosen and William T. England, staff consultants.

Senator GORE. The Subcommittee on Agreements for Cooperation of the Joint Committee on Atomic Energy holds hearings this afternoon on proposed amendments to the agreements for cooperation with the Governments of the Turkish Republic, the Republic of Korea, and the Republic of Austria. All three agreements concern civil uses of atomic energy.

The proposed amendment to the Turkish bilateral was submitted to the Joint Committee on May 8. The proposed amendments to the Korean and Austrian bilaterals were received by the committee on May 27 and May 28, respectively. Under the Atomic Energy Act of 1954, as amended, such amendments must lie before the committee for a 30-day period before becoming effective.

TURKISH AGREEMENT

The Turkish bilateral, the first agreement for cooperation in the peaceful uses of atomic energy to be negotiated under the Atomic Energy Act of 1954, would be extended by the proposed amendment for 1 year, to June 9, 1966. The amendment further provides that the parties will initiate negotiations promptly for transfer of safeguards to the International Atomic Energy Agency, and it obligates the Government of Turkey to furnish the United States with its decision by January 31, 1966, as to whether the transfer arrangements are acceptable. The Government of Turkey has requested this additional period to complete its consideration of the transfer of safeguards to the IAEA in order to comply with its constitutional procedures, which require parliamentary consideration of such questions.

According to the AEC, the United States has informed the Turkish Government that it does not intend to extend the agreement beyond the expiration of this 1-year extension if arrangements for the transfer of safeguards to the IAEA have not been completed at that time.

KOREAN AGREEMENT

The original agreement for cooperation with Korea was signed in Washington on February 3, 1956, and was amended by an agreement signed on March 14, 1958. The proposed amendment would extend the effective period of the basic agreement, which is due to expire on February 2, 1966, to February 2, 1976, and calls for the parties promptly to request the IAEA to assume responsibility for applying safeguards to materials and facilities subject to safeguards under the agreement.

Further, provisions of the Korean agreement would be changed to permit the AEC to sell as well as lease enriched uranium for fueling defined research reactors. Finally, the amendment makes provision for the reprocessing of source or special nuclear material received from the United States to be performed in other than AEC facilities and adds to the agreement provisions with respect to rights in special nuclear material produced as a result of irradiation processes.

AUSTRIAN AGREEMENT

The original agreement for cooperation with Austria was signed on June 8, 1956, but was superseded by an agreement signed at Washington on July 22, 1959. The latter agreement would be modified by the proposed amendment to permit the AEC in its discretion to transfer to Austria uranium enriched to more than 90 percent in the isotope U^{235} for those uses which now qualify under the agreement for material enriched up to 90 percent. In addition, the amendment would permit the transfer of special nuclear material for performance in Austria of conversion or fabrication services, or both, and subsequent transfer to another nation or group of nations with which the United States has an agreement within the scope of which such subsequent transfer falls. According to the AEC, both of these modifications are in accordance with provisions used in other agreements for cooperation.

In accordance with normal committee procedures, copies of the proposed amendments and supporting correspondence have been inserted in the Congressional Record in order to inform the Congress of the pendency of these matters. Materials relative to the Turkish bilateral were published in the Record on May 13, 1965; materials relative to the Korean and Austrian bilaterals appeared in the Record on June 4, 1965.

Without objection, I will insert in the record of this hearing a copy of each amendment with its supporting correspondence. (See app. 1, pp. 60–70.)

Mr. Palfrey, I understand that you will be our first witness. The committee will be pleased to have your presentation. Please proceed.

STATEMENT OF JOHN G. PALFREY, COMMISSIONER, U.S. ATOMIC ENERGY COMMISSION

Mr. PALFREY. Mr. Chairman, it is a pleasure to appear before the Joint Committee to discuss amendments to several of our agreements for cooperation. If you remember, in April we had the opportunity in connection with the IAEA agreement to examine our agreement and its relationship to the safeguard subject. Today, in view of that, I thought I would limit my remarks with regard to the specific agreements for cooperation before us.

Amendments to our agreements with Turkey, Austria, and Korea have been transmitted to the committee in accordance with section 123 c. of the Atomic Energy Act of 1954, as amended. I shall briefly mention the principal features of each after which I or members of the staff will be glad to answer any questions which the committee may have.

We have Mr. John Hall, the assistant general manager, Myron Kratzer, and Mr. Thomas from the State Department.

The amendment to the agreement with Turkey extends the agreement for 1 year to June 9, 1966. This 1-year extension was requested by the Government of Turkey in order to permit them to complete their parliamentary procedures involved in the transfer of safeguards to the IAEA. Under the terms of the extension, Turkey will provide us with its decision by January 31, 1966, as to the acceptability of the arrangements negotiated for the transfer of safeguards to the IAEA.

The Government of Turkey has been informed that we would not extend the agreement beyond the term of this extension if safeguards are not transferred to the IAEA. This extension thus is in line with U.S. policy with respect to the transfer of safeguards to the Agency and with the practice of entering into short-term extensions to permit other governments to complete the steps necessary to bring about a transfer of safeguards to the IAEA.

The amendment to the agreement with Korea extends the agreement for 10 years to February 2, 1976, and updates the agreement to meet conditions which have arisen since the agreement was last amended in 1958. The provisions of this amendment are consistent with those other agreements which have been before the committee in the past. The main feature of the amendment is the provision for transfer of safeguards to the IAEA. In addition to the safeguards provisions, the amendment provides that the Commission will "transfer" fuel to Korea. The present agreement provides that we will lease fuel to Korea for use in research reactors. This change is designed to permit the Commission to either lease or sell fuel to Korea should it be necessary during the 10-year extension of the agreement to change our policy of leasing fuel to such research reactors. Standard articles with respect to reprocessing and disposition of produced material have also been added to the agreement.

The agreement with Austria is being amended to provide that uranium enriched to more than 90 percent in the isotope U^{235} may be transferred at the Commission's discretion for uses which heretofore have qualified for material enriched up to 90 percent under the agreement. Additionally, at the request of the Government of Austria, a provision has been added to the agreement under which Austria could

use material transferred under the agreement for performance in Austria of conversion or fabrication services for third countries. Subsequent transfer of this material from Austria would be made only to countries with whom the United States has an agreement for cooperation which would cover the material so transferred. This is in accord with Commission policy as reflected in a number of agreements since 1962.

Those are my opening remarks, Mr. Chairman. We shall be happy to answer any questions the committee may have.

Senator GORE. Since the Turkish bilateral was the first agreement concerning peaceful uses of atomic energy to be negotiated under the 1954 act, what has been accomplished under this bilateral?

SISTER LABORATORY ARRANGEMENT

Mr. PALFREY. Perhaps Mr. Kratzer might speak to that. I think we have begun to achieve considerable progress in recent years and to achieve some momentum. I think particularly the sister laboratory arrangement between Turkey and the Brookhaven National Laboratory has been useful in this regard.

Myron, would you like to add to this?

STATEMENT OF MYRON B. KRATZER, DIRECTOR, DIVISION OF INTERNATIONAL AFFAIRS, ATOMIC ENERGY COMMISSION

Mr. KRATZER. Yes, sir. I have very little to add.

Turkey has a research reactor located at their atomic energy research institute near Istanbul. As Mr. Palfrey mentioned, this reactor was the subject of one of our reactor grants. It was also the first reactor and reactor facility to be brought under our sister laboratory arrangements.

Under this arrangement, Brookhaven National Laboratory works closely with Turkey, gives them guidance, gives them inspiration, problems on which to work that are useful to the Turkish scientific and economic community.

It has resulted in a substantial utilization of the research reactor. Before the sister laboratory arrangement began, that laboratory, as others that we are familiar with, was not operating at anywhere near its full capabilities. In addition, Turkey has a small subcritical facility near the capital, Ankara, which is useful for training purposes for students in the university in Ankara. They have begun to use radioisotopes for agricultural research purposes, for industrial purposes such as determining the rate of wear of various sorts of road surfaces.

All in all it's an example of how these reactors and similar facilities can be used to the advantage of developing countries.

Senator GORE. I had some question as to the usefulness of a nuclear research laboratory for many of the countries, one of which was Turkey. What are your views on that?

Mr. KRATZER. Our feeling is that the research reactors and the related facilities are useful from several points of view.

We found in the early days when we surveyed them by sending teams of technical people over, that there were in countries like Turkey small

cadres of really capable people, people capable of doing up-to-date and useful scientific work which just simply did not have the right tools with which to work. The research reactors are one of those tools.

One of the byproducts of putting these reactors in the hands of these people, provided we give them adequate backup, as we are in the case of Turkey through the sister laboratory arrangements, is that the talented, capable people who are present there, in many cases for the first time, can do good work. That means that they are more likely to stay in the country than to leave it. If they do stay, it means they are more likely to be contented rather than discontented with all of the unfortunate byproducts that that can bring.

We feel that these facilities have a general upgrading effect on the whole educational and scientific community. In many cases, they have for the first time brought the universities into a position of doing creditable research work. It is correct they are not a panacea to the economic or technical problems of a developing country. They should not be looked at in that way, but when placed in proper perspective, we think they are a useful tool improving the scientific capability of a country; in creating a focus around which their good people can work and, therefore, stay; and in contributing to the solution of some of the technical problems of the society.

Mr. PALFREY. You can say also in hindsight there was a timelag in some countries, there was a period when they did not know how to use it.

Senator GORE. It may be that period from which I got my impression.

Mr. PALFREY. That is probably true. I think most people will say today the very existence of that facility has attracted what we are talking about and today we are beginning to see another change in the pace at which this is being used.

Senator GORE. Suppose that the bilateral with Turkey expired now, would Turkey be obligated to return the nuclear material she now has?

Mr. PALFREY. The answer is yes.

Mr. KRATZER. Yes, sir; they would.

Senator GORE. Perhaps it might be well for Mr. Thomas to make his statement, and then the whole subject matter will be before the committee.

STATEMENT OF CHARLES W. THOMAS, OFFICER IN CHARGE, ATOMIC ENERGY AFFAIRS, OFFICE OF INTERNATIONAL SCIENTIFIC AFFAIRS, DEPARTMENT OF STATE

Mr. THOMAS. Thank you, Mr. Chairman. I am pleased to appear before the Joint Committee to discuss the pending amendments to three of our bilateral agreements which have been transmitted to the committee in accordance with section 123 c. of the Atomic Energy Act of 1954 as amended. These amendments relate to our current agreements with the Governments of Austria, Korea, and Turkey.

The amendment to the Austrian agreement includes two changes. The first provides that uranium enriched to more than 90 percent in the isotope U^{235} may be transferred to Austria, at the Commission's

discretion, for use in the Austrian program. The previous agreement limited the enrichment to 90 percent. The other change provides that the Commission may transfer to the Government of the Republic of Austria, within the limits of the amounts authorized in the present agreement, special nuclear material for the performance in the Republic of Austria of conversion or fabrication services or both for subsequent transfer to a nation or group of nations with which the United States has an agreement for cooperation within which the scope of such subsequent transfer would fall.

These two changes are both in line with the policy which the U.S. Government has been following for several years.

The amendment to the agreement with Turkey provides for the extension of that agreement for 1 year, to June 9, 1966. The Turkish Government has asked for a 1-year extension so that they can complete the necessary statutory and legislative procedures to authorize the transfer of safeguards to the IAEA.

The agreement provides specifically that the Turkish Government will inform the U.S. Government of its decision on the question of IAEA safeguards before January 31, 1966. This will provide ample time for the negotiation of a further extension of the agreement prior to June 9, 1966. A short-term extension of this type in order to give bilateral partners a chance to work out the details of the transfer of safeguards to the IAEA is consistent with the policy that the AEC and the Department of State have been following on similar agreements in the past.

The Korean agreement expires on February 2, 1966, and is being extended at this time for a period of 10 years until February 2, 1976. The amendment provides that the United States and the Republic of Korea will promptly request the IAEA to assume responsibility for applying safeguards to materials and facilities subject to bilateral safeguards under the present Agreement for Cooperation. The agreement further brings up to date certain aspects of the agreement so as to meet new conditions which have developed since the agreement was last amended in 1958.

The Department of State endorses these three amendments and I will be happy to attempt to answer any questions the committee may have on any of them.

Thank you, Mr. Chairman.

Senator GORE. I have one question.

Why did the Government send a formal communication on this matter to Turkey?

Mr. THOMAS. I beg your pardon, sir?

Senator GORE. Why did the U.S. Government address a formal communication to Turkey regarding this situation?

Mr. THOMAS. The note that is accompanying the agreement?

Senator GORE. Yes.

Mr. THOMAS. The purpose of that was to make quite clear that if the Turkish Government was unable to accept IAEA safeguards a year from now, that the U.S. Government would not be able to extend the agreement beyond June 9, 1966.

Senator GORE. What response have you had to that communication?

Mr. THOMAS. We have had none. Before the note was handed to the Turkish Government, we had discussed it with them, and they

had said it would be acceptable. We should within the next day or two receive a note of complete acceptance of that note. We have not as yet received it.

Senator GORE. Mr. Holifield.

Chairman HOLIFIELD. No questions.

Representative HOSMER. How long ago was that?

Mr. THOMAS. We signed the agreement only yesterday, Mr. Hosmer.

Representative HOSMER. When was the note handed?

Mr. THOMAS. Yesterday.

Representative HOSMER. They really have not had time?

Mr. THOMAS. No, it is not a delay.

REASON FOR INCREASED ENRICHMENT

Representative HOSMER. What is the reason to go above 90 percent enrichment in the case of the Austrian agreement?

Mr. PALFREY. Why don't you answer that, Mr. Kratzer?

Mr. KRATZER. Mr. Chairman, in the United States 93 percent material has become essentially the standard enrichment for use in research reactors and similar facilities. In the foreign program, we got started on the basis of 90 percent enrichment. This meant that the people who were handling the material, primarily the U.S. converters and fabricators, were having to handle two materials of only slightly different enrichment. This increases the cost for both sets of customers, foreign and domestic customers alike. Approximately 2 years ago, therefore, at the request of a number of our local fabricators and converters of enriched uranium, we felt it was appropriate to allow countries who wanted to use 93 percent material to do so for uses for which they had previously obtained the 90 percent material. That has resulted in some cost reductions and better schedules in preparing the research reactor fuel elements.

Representative HOSMER. Are there other agreements where this figure will have to be raised?

Mr. KRATZER. We have been doing this for the last 2 years for any country which has requested it. That has already been done in the case of Canada, France, Iran, United Kingdom, and Euratom. I would say that as other agreements are amended, we will have additional such cases.

Representative HOSMER. In other words, this is the normal thing.

Mr. KRATZER. This is the standard practice.

Representative HOSMER. The safeguards are such and the quantities and the manner in which the material is furnished are such as to insure that it remains in peaceful channels?

Mr. KRATZER. That is correct, sir.

Representative HOSMER. Thank you.

Senator GORE. Congressman McCulloch?

Representative MCCULLOCH. I notice you are talking about 90 percent enriched material. What is the percentage of enrichment of material for Korea? Is it materially lower than that?

Mr. KRATZER. The Korean reactor is a reactor which requires only 20 percent material by its very nature. So there has been no necessity in that case to consider an amendment to raise it to as high as 90 or 93 percent.

Representative McCULLOCH. Was the original conception for Korea at that low rate of enrichment by reason of our difficulty over there and by reason of the uneasy truce that then and now exists?

Mr. KRATZER. No; that is based on their selection of a particular type of reactor which operates with that enrichment of material. The program originally started on the basis of the use of 20 percent material, but by the time that the Korean agreement was first entered into, which was 1956, there was no limitation of that kind, and we would be perfectly prepared to supply 90 percent material to Korea if they had a need for it. It is subject to safeguard which gives us all the assurance we need that it would be properly used.

Representative McCULLOCH. Do you find professional capability in Korea to carry out the project?

Mr. KRATZER. Well, we think there has been progress. Korea is one of the countries where in the absence of proper support, I think the research reactor would not be fully utilized.

Mr. PALFREY. There, too, we have a sister laboratory relationship with the Argonne Laboratory.

Mr. KRATZER. Yes; the Argonne people have made their first visit to Korea and feel there is good material to work with to bring about a very decided improvement in the situation.

Representative McCULLOCH. Does the present Government show real knowledgeable interest in such a project?

Mr. KRATZER. As far as I know it has received full governmental support. As a matter of fact, Korea is now expressing interest in having a survey made by people from the international agency as to the potential for nuclear power in Korea. So, I think the Government is aware of the potential of atomic energy and is giving the project all necessary support.

Mr. PALFREY. Heretofore their interest has been in the medical and radioisotope field principally.

Representative McCULLOCH. What is the principal source of their electric power now?

Mr. KRATZER. They have both thermal and hydroelectric power, but thermal is the principal source.

Representative McCULLOCH. Are we providing any mechanical powerplants for Korea at this time?

Mr. KRATZER. Since approximately 1962, AID has financed two thermal powerplants amounting to approximately 198 megawatts at a cost of approximately $33.7 million. In addition, six powerplants, principally thermal, were built or rehabilitated with AID funds prior to 1962.

Representative McCULLOCH. Thank you. That is all.

Senator GORE. Are there further questions?

Thank you, gentlemen.

Mr. PALFREY. Thank you, Mr. Chairman.

(Whereupon, at 3:25 p.m., Friday, June 4, 1965, the meeting was concluded.)

INTERNATIONAL AGREEMENTS FOR COOPERATION

TUESDAY, JULY 13, 1965

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON AGREEMENTS FOR COOPERATION,
JOINT COMMITTEE ON ATOMIC ENERGY,
Washington, D.C.

The committee met at 10:15 a.m., pursuant to notice, in room AE–1, the Capitol, Senator Henry M. Jackson presiding.

Present: Senators Jackson and Aiken; Representatives Hosmer and McCulloch.

Also present: John T. Conway, executive director; Edward J. Bauser, assistant director; Leonard M. Trosten, staff counsel; George F. Murphy, Jr., professional staff member; Jack Rosen and William T. England, professional staff members.

Senator JACKSON. We will hear from Dr. Smyth.

Doctor, we will be delighted to have you bring us up to date on the recent activities of the Agency, with special reference to the upcoming meeting in Tokyo.

STATEMENT OF DR. HENRY DeWOLF SMYTH, U.S. REPRESENTATIVE TO THE INTERNATIONAL ATOMIC ENERGY AGENCY

Dr. SMYTH. Senator Jackson, I have here the provisional agenda for this Tokyo meeting, which, I believe, has been sent up to the committee.

Mr. CONWAY. We received it late yesterday.

Dr. SMYTH. Yes. I think I might talk to that, citing the things that might possibly cause some difficulty. But before doing so, I will review what seem to me to be the most important developments of the past year, with which you are already familiar, but perhaps I can convey a little in terms of atmosphere in Vienna.

REVISED IAEA SAFEGUARDS SYSTEM

As you know, we have been going over the whole safeguard situation and succeeded last January in getting an agreement among the drafting committee to a revised safeguards document, which was then approved in the February meeting of the Board of Governors, without dissent. (See app. 2, p. 79.) There were two abstentions, for some special reason, but there was no dissent. In particular, the Soviet bloc supported the new system.

But what I really want to talk about is the change in atmosphere. It is a little hard to define, but my impression is that many of the objections that were raised a year or two ago to a safeguards and inspection system are no longer talked very much about in the Board of Governors. As the members of the Board have become familiar with the problem, as they have recognized that we have put a large reactor under the international Agency safeguards, there seems to be a greater realization of the advantage to all members of having a good system and less concern about possible objections which were formerly considered important.

There is one problem that is going to come up on the safeguards system which I won't discuss in detail here, but simply mention it, and that is the question of paying for the inspection system as it becomes more expensive so that it becomes financially significant, which will not be for several years. But this question has been raised, and it is one that we do have to concern ourselves with.

At present, the system is that the Agency pays all the expenses, and there is a great deal to be said for that point of view. But some of the members feel that it is an unfair burden and may become a serious question.

There is no point in discussing that further. It is something that we may have difficulty with later on.

I might say that we also had a Board meeting in June and I am happy to say that the problem of political debate of the Board—irrelevant political discussion, as you know, some years ago was a serious problem in the Agency—did not crop up in any serious way in this June Board meeting. The general atmosphere was about as it has been for the last several years. We seem to have had some success, at least in the Board, in putting across the general attitude that political questions are outside the proper province of the IAEA and should be debated in the United Nations or elsewhere.

Now if I may turn to the provisional agenda, unless you have any questions that you want to ask me before that——

AGENCY SAFEGUARDS INSPECTORATE

Senator JACKSON. I might ask, in connection with the inspectors, how many do you have in the Agency now, roughly?

Dr. SMYTH. Fourteen.

Senator JACKSON. Could you supply for the record the countries providing the inspectors?

Dr. SMYTH. Yes, I can give you the countries and the names of the people.

Senator JACKSON. Fine. We will have those placed in the record.

(The information referred to follows:)

THE STAFF OF THE AGENCY SAFEGUARDS INSPECTORATE

Name	*Nationality*
Mr. F. Arsenault	United States of America.
Mr. C. Büchler	Argentina.
Mr. M. Kahn	Pakistan.
Mr. O. Lendvai	Hungary.
Mr. J. McCullen	United Kingdom of Great Britain and Northern Ireland.
Mr. A. McKnight	Australia.
Mr. Y. Motoda	Japan.
Mr. S. Nakicenovic	Yugoslavia.
Mr. H. Nyunt	Burma.
Mr. B. Semenov	Union of Soviet Socialist Republics.
Mr. B. Sharpe	United Kingdom of Great Britain and Northern Ireland.
Mr. V. Shmelev	Union of Soviet Socialist Republics.
Mr. R. Skjoeldebrand	Sweden.
Mr. P. Szasz	United States of America.

Senator AIKEN. How are they paid? How are they divided among the members?

Dr. SMYTH. They are civil servants. They are international civil servants, paid by the international Agency. You mean what is their scale?

Senator AIKEN. Is it uniform pay?

Dr. SMYTH. They are of somewhat different grades as you go through the list.

Senator AIKEN. Otherwise, they are uniform?

Dr. SMYTH. Yes.

Senator AIKEN. Are they paid in dollars? Is the dollar the monetary unit?

STATEMENT OF JOHN A. HALL, ASSISTANT GENERAL MANAGER, INTERNATIONAL ACTIVITIES, ATOMIC ENERGY COMMISSION

Mr. HALL. Senator Aiken, the salary scale in Vienna is similar to the scale in the United Nations. The pay according to the rules is based on at least 50 percent in the currency of the host country, which would be Austrian schillings, and 50 percent in the choice of the particular individual—which may be dollars, may be pounds, sterling, and so forth. So, it is at least 50 percent in Austrian schillings. The pay scales are precisely the same as United Nations pay scales.

In looking over the list of the 14 inspectors, I would say that they are middle grade according to classification.

Senator AIKEN. That is all, Mr. Chairman.

Senator JACKSON. As I recall, when you testified last April, Dr. Smyth, you indicated that there might be a need for a change in the qualifications. You indicated that inspectors to date had been primarily people with a scientific background. Now you are running into

more and more accounting problems. Do you have anything to report on that?

Dr. SMYTH. Yes, the Agency now does have a man experienced in accounting added to the staff of the inspectorate. There also is at least one lawyer on the inspectorate.

Senator AIKEN. What do they inspect, anyway? Do they inspect the production cost of power? What do they look for when they inspect?

Dr. SMYTH. Primarily, Senator Aiken, they are keeping track of the materials that go through a reactor. Therefore, they check the records of materials very carefully, and they also carry out actual physical inspections.

Senator AIKEN. They are looking for possible diversions?

Dr. SMYTH. They are looking for possible diversions. We have present here today one of the AEC inspectors, who could give you more fully——

Senator AIKEN. Do the inspectors cover technical progress?

Dr. SMYTH. Yes, but that is not their specific purpose. Their specific purpose is to keep track of materials and make sure that there is no diversion of materials intended for peaceful use to military use.

Senator AIKEN. Looking for bad boys?

Dr. SYMTH. That is right.

Senator AIKEN. Thank you.

LARGE POWER REACTORS UNDER IAEA SAFEGUARDS

Senator JACKSON. Dr. Smyth, how many large power reactors throughout the world are now under Agency safeguards? And are we pressing some of the other countries to put some of their large reactors under the Agency system, such as what we have done in the case of Yankee?

Dr. SMYTH. The Yankee is, I think, the only one that is now running and now under inspection. As you know, the United Kingdom has just put their big station at Bradwell under IAEA inspection. But I don't think any inspections have yet occurred. It has happened only recently. That is 300 megawatts electrical, so it is really a big station.

Then the United Kingdom-Japanese bilateral has just been—the safeguards provided in that bilateral have just been transferred to the Agency, so that this big Japanese gas-cooled reactor of the British type, which went critical a few weeks ago, will be under IAEA safeguards. That is the so-called Japco reactor at Tokamura. That is 166 megawatts electrical. So it is a big one.

Senator JACKSON. That is about the size of Yankee?

Dr. SMYTH. About the size of Yankee. A little larger, I think. You know the situation with regard to the Tarapur reactor in India, which is being built. There are also three Spanish reactors: one of 30 megawatts electrical, that is pretty small; and two larger ones, which are the same general scale as the big ones I have mentioned which, under our new amendment to our bilateral, will be under IAEA safeguards. But they are not yet built. I don't know exactly what the schedule on that is.

Similar remarks can be made about a Swiss reactor of 300 megawatts electrical, and a Swedish reactor. The arrangements are being made to put them under IAEA safeguards in terms of transfer of our bilaterals. But they, again, are not built.

So, within the next few months we will have three big ones: Yankee, Bradwell, and the Tokamura reactors, which will be actually under IAEA safeguards. The others will come in as they are constructed.

Senator JACKSON. So it is United States, United Kingdom, and Japan?

Dr. SMYTH. That is right.

Senator JACKSON. What about the Soviets? Do you have any indication of what they might or might not be willing to do?

Dr. SMYTH. I think you may remember at the time we put Yankee, proposed to put Yankee under IAEA safeguards, we made a suggestion to the Soviet that we thought it would be a very fine idea if they would do the same. They did not accept that suggestion. I still think it is a possibility, but we have not been pressing it recently.

Senator JACKSON. I would be interested in knowing the Soviet's explanation of their position when they are trying to create the impression that they want to cooperate in this area, when they make it clear they will not, even on their own, unilaterally, make available a reactor, even if it were a small one, for inspection. I mean, do they have any present explanation of their position in that regard?

Dr. SMYTH. Not one that I would say is really complete. They say this is very difficult for us. Well, we have heard this same thing actually, we heard the same kind of statement from the British for a while—and it is difficult for them. I have pretty good personal relations with the Soviet representative in Vienna, but I never know when I talk to him informally whether what he says is his own personal view or is his Government's view. One of the advantages of such informal talks is that they are essentially confidential. So I would rather not quote such comments.

Senator JACKSON. I think that is wise in a public hearing.

Congressman Hosmer.

Representative HOSMER. I have no questions.

Senator JACKSON. Congressman McCulloch.

Representative MCCULLOCH. I have no questions.

Senator JACKSON. Now, Doctor, you go ahead. You were going to comment on the provisional agenda.

Dr. SMYTH. Yes.

The first six items are mechanical sorts of things, the election of the President of the Conference. I think it is obvious, since Japan is the host to this particular Conference, that he should be a Japanese.

Then there are appointments to various committees, election of vice president, and so on. I would only say about this that I think the committee should realize what an enormous amount of work is carried out by the mission in Vienna long before this Conference.

Senator JACKSON. Staff work?

Dr. SMYTH. Staff work, the sort of thing that Mr. Lewis will be very much involved in directing, in consulting with the other missions in Vienna and in consulting with the Soviet mission, in the hope—which has been realized for the last several years—that there would be agreement on all these slates before the general Conference ever opens.

Senator JACKSON. In other words, what you are trying to do is to minimize the areas of possible friction that could develop at a meeting, by doing extensive staff work prior to the meeting.

Dr. SMYTH. Exactly.

Senator JACKSON. You feel you have come a long way in that regard in minimizing the areas of possible friction?

Dr. SMYTH. Yes; I do. I cannot speak too highly of the activities of the mission in this respect.

Then we have a statement by the Director General and a couple of routine items. Then the general debate.

As I said earlier, we have been pretty successful in reducing the amount of political oratory in the Board of Governors. Of course, it its much more difficult to do this in the general Conference, where all the 92 members of the Agency may be represented. And, also, those are public sessions, so the opportunity to speak for the people back home or for propaganda purposes is very tempting. I think we may have more of that kind of debate in this session in Tokyo than we have had in the last couple of sessions. I think in the last session there was only one major speech that was clearly not appropriate to the session. But we just don't know. We will do our best to hold it down.

The election of members to the Board of Governors, we do not anticipate serious trouble there except it may again trigger political speeches.

I might skip now to an item which is related to this item 18, a proposal from the Democratic Republic of Congo, Léopoldville, to amend one of the provisions for the designation of Governors. This came up in the Board meeting and may make some difficulty. Actually, the lineup in the Board was split in rather interesting ways, but I don't know how this will come out. That is one of the items I have marked as possibly being troublesome in the meeting.

Another item that may make some trouble is item 13, a supplement to the Agency's budget for 1965. This amounts to $100,000 and is the result of the Agency's success in filling vacant posts so that whereas heretofore there have always been vacant posts so that the salary budget was somewhat lower than we have allocated, now they have succeeded in filling all the posts and find themselves short of money.

IAEA BUDGET

Representative HOSMER. Doctor, you might give us a review of how that Agency budget is handled, who puts up the money, and so forth.

Dr. SMYTH. I think Mr. Hall can do this more accurately than I can.

Mr. HALL. The current budget, the 1965 budget, is about $8 million. This is the assessed budget. By that, I mean the participating governments contribute based on the assessment percentages followed by the United Nations. In other words, ours is running now about 32 percent. This is the principal budget.

There is a second budget which is called the voluntary budget. The goals set every year by the Director General, however, have not been met. There has been a shortfall running about $500,0000. I think the current budget is about $1,300,000 on the voluntary side, of which the United States is the largest contributor.

Mr. CONWAY. What percentage does the United States pay of that $1.3 million?

Mr. HALL. We pledge on the basis of $500,000 plus a matching formula. I think that we are a little over that, probably around $600,000.

Mr. CONWAY. Basically, the United State is paying about 50 percent, or half of the voluntary budget?

Mr. HALL. It comes out about 45 percent, I am told.

Mr. CONWAY. The other nations have not been meeting their commitments, you say?

Mr. HALL. That is an old story, as you know.

Senator JACKSON. Not only in this Agency.

Mr. HALL. That is right.

About 3 years ago the general Conference passed a resolution recommending that the participating governments contribute on a voluntary basis up to the same percentage that they are assessed. This has helped some, but we still are running short.

Representative HOSMER. Is there any way of getting rid of this dual budget thing and actually assessing up to what is needed to support the Agency?

Mr. HALL. Here again, Mr. Hosmer, about 3 years ago—you may have been in Vienna at the time—we attempted over a period of 2 years to get general support of an amendment to article 14, of the IAEA statute which, in effect, would integrate the budget. Unfortunately, because of the nature of the participation and the fact that the developing countries, quite frankly, are interested in paying less, we never got the necessary support to get that amendment through.

So, to answer your question, I think——

Representative HOSMER. The situation has not changed?

Mr. HALL. It has not changed. It is a desirable goal, but we are confronted with the same type of political resistance that happens in New York in the U.N. The budget, accordingly, is $8 million in the current year, 1965, on the assessed side; the assessments have been running rather close to 95 percent. On the assessed side, we have a few delinquents, but very few. The voluntary budget is about $1,300,000, which is principally used by definition for technical assistance projects.

Then in addition, the Agency executes for the Special Fund in New York and the United Nations expanded technical assistance program, about $1,500,000. Now, this money which comes from the Special Fund and the U.N. Technical Assistance Fund in New York is transferred to the Agency for execution. These are, again, technical assistance projects.

So the total funding, you might say, in Vienna is pretty close to $10 or $11 million.

Senator JACKSON. Congressman Hosmer, may I interrupt for a moment?

We will have a vote in the Senate in just a moment. It will be necessary for me to leave. The Chair wishes to express his appreciation to all of those who have come here this morning. I will ask Congressman Hosmer to complete the hearing.

NOMINATION OF MR. VERNE B. LEWIS

The Chair will announce that Mr. Lewis' nomination will be approved subject to the polling of the Senate members of the committee, those who were not here this morning.[1] Senator Aiken announced his vote in favor, and the Chair announced his. So that will be completed as soon as the Senators have been able to be polled.

Thank you very much. I am going to ask Congressman Hosmer to continue and to complete the hearing this morning.

Representative HOSMER. Thank you, Mr. Chairman.

Mr. Conway, do you have any further questions?

REVISED IAEA SAFEGUARDS SYSTEM

Mr. CONWAY. I think for the record, Dr. Smyth, you could explain exactly what formal action is still to be taken by the Agency at this upcoming meeting. The safeguards matter is on the agenda and as I understand it there is still some formal action that must yet be taken. Isn't that right?

Dr. SMYTH. Yes; that is correct. Item 16 of the agenda—and the Conference certainly could—I am not sure formally that they do have to do anything more than to take note. Formally, they only have to take note of this action of the Board. Of course, conceivably there could be objection to it, but we do not really anticipate a problem here, since we have had unanimous support in the Board.[2]

Mr. CONWAY. To all intents and purposes, the Agency has assumed and is capable of continuing to have responsibility for inspections of large-size reactors throughout the world?

Dr. SMYTH. That is right.

Representative HOSMER. Dr. Smyth, I think you had something further to add.

Dr. SMYTH. Well, I think I was going to go through the rest of the agenda, but actually the one that Mr. Conway has just asked about is, I think, except for one, the only other important item. There is only one other important item. That is the reappointment of the Director General. Now this is recommended by the Board unanimously at its general meeting, the reappointment of Dr. Eklund, and therefore I don't anticipate any difficulty, but there may be.

Representative HOSMER. There was a contest when Dr. Eklund was first appointed, and that opposition has subsided, I take it.

Dr. SMYTH. Yes; completely. He got the support of the Soviet and everybody else. This is a unanimous action of the Board.

IAEA CONFERENCE IN TOKYO

Representative HOSMER. This meeting in Tokyo is the first conference which has been held outside of Vienna?

Dr. SMYTH. Yes.

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[1] This refers to the nomination of Mr. Verne B. Lewis to be deputy U.S. representative to the IAEA, upon which a confirmation hearing was held by the Senate section of the Joint Committee immediately prior to the hearing by the full committee on the activities of the IAEA. Mr. Lewis was nominated by the President on June 7, 1965, to fill the vacancy created by the transfer of Mr. Frank Hefner to other State Department duties. Mr. Lewis' nomination was reported favorably by the Joint Committee on July 13, 1965, and approved by the Senate on July 15, 1965.

[2] In this connection see explanatory footnote on p. 79.

Representative HOSMER. Will this be a policy of the IAEA now, or is it just an experiment, or what?

Dr. SMYTH. I would say it is an experiment. Senator Pastore more or less suggested it.

Mr. HALL. Yes; for the record, and as a matter of interest, Senator Pastore about 3 years ago, when he was in Vienna briefly, suggested that it would be a good idea to take the Agency out of Vienna sometime for a general conference for a change of atmosphere. This was picked up by the Japanese Government and after 3 years of discussions and arrangements the conference will be meeting in Tokyo.

This is the first time a conference has been held outside of Vienna. My guess is probably it will not be tried for another 5 or 6 or 7 or 8 years, because of the mechanics of the shift and the fairly high costs.

Representative HOSMER. Yes. I think the committee generally agreed with Senator Pastore on that, and the simple fact that it helps the IAEA get itself better known, a better image in other parts of the world. I trust it might not be 7 or 8 years again before they try it.

Mr. HALL. I might put in the record that the extra costs of meeting outside of Vienna are borne by the Japanese Government. So, in terms of the participating members, the extra costs are for transportation to get to Tokyo rather than to Vienna.

Dr. SMYTH. That is the cost of the Secretariat. The question of the member countries sending their delegations is up to them. I don't know how that would average out. It is less for some and more for others.

I think those are the only points that are of major importance or that we anticipate trouble on at the Tokyo meeting. As you know very well, from having been at those meetings, the reality is sometimes quite different from the anticipation.

INSPECTIONS OF YANKEE REACTOR

Representative HOSMER. Quite.

I would like to return to inspection for a moment, in particular reference to Yankee, which was inspected in 1964 and February 1965, and I understand in April 1965. There is a query about the frequency of the particular inspections of Yankee. Is there anything behind it? Do you have any explanation for it?

Dr. SMYTH. I did not think there was any problem there, Mr. Hosmer. As you know, the basic notion of inspection of these large reactors is that the inspectors should have access at all times. And, in fact, there was a completely surprise inspection—the one in February was not quite as much of a surprise as the one in April.

STATEMENT OF COMMISSIONER JOHN G. PALFREY, U.S. ATOMIC ENERGY COMMISSION

Mr. PALFREY. I think it ought to be said, Mr. Hosmer, that also Mr. William Webster has been working in a very cooperative way on this whole project. In fact, he is the one who suggested the importance of the unannounced inspection. This came about because he proposed it.

Representative HOSMER. I would assume in that case there would be no objection from management at Yankee on the basis of the inspection being burdensome to them.

Mr. PALFREY. So I understand.

Dr. SMYTH. I think it might be of interest to the committee, Mr. Hosmer, that the Atomic Industrial Forum is trying to arrange a meeting beginning in August between people from the AEC and the State Department and various industrial people essentially to inform the industrial people about the safeguards system and these questions of inspection. The plan is to have the meeting up at Yankee and to make it possible for industrial people and also for us to discuss with the local management whether there have been any problems in connection with safeguards.

Mr. CONWAY. Members of the Joint Committee are being invited to that one.

Dr. SMYTH. Good.

Representative HOSMER. Thank you, Mr. Smyth.

Before we close, I wonder if Mr. Palfrey has anything to add.

Mr. PALFREY. Nothing further, Mr. Hosmer.

Representative HOSMER. The meeting is adjourned.

(Whereupon, at 10:55 a.m., Tuesday, July 13, 1965, the hearing was concluded.)

INTERNATIONAL AGREEMENTS FOR COOPERATION

TUESDAY, JULY 27, 1965

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON AGREEMENTS FOR COOPERATION,
JOINT COMMITTEE ON ATOMIC ENERGY,
Washington, D.C.

The subcommittee met at 2 p.m., pursuant to call in room AE–1, the Capitol, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senator Gore; Representatives Holifield, Price, and Hosmer.

Also present: John T. Conway, executive director; Leonard M. Trosten, staff counsel; George F. Murphy, Jr., professional staff member; James B. Graham, technical adviser; and William T. England, staff consultant.

Senator GORE. The committee will come to order.

The Subcommittee on Agreements for Cooperation of the Joint Committee on Atomic Energy holds a hearing this afternoon on a proposed Agreement for Cooperation With the Government of the United States of Brazil Concerning the Civil Uses of Atomic Energy.

The proposed agreement was submitted to the Joint Committee on July 1, 1965, pursuant to section 123 c. of the Atomic Energy Act of 1954, as amended. This agreement must lie before the committee for a statutory 30-day period before becoming effective.

The proposed new agreement would have a 10-year term and would supersede the existing agreement with Brazil—signed in 1955 and amended in 1958, 1960, 1962, and 1964—which is due to expire on August 2, 1965. According to the Atomic Energy Commission, the proposed agreement maintains all the provisions of the present agreement and adds several standard modifications designed to recognize conditions that have developed since the present agreement was last modified substantively.

AEC's letter transmitting the proposed agreement notes that among these modifications is a provision for the—

> extension of comprehensive safeguards to materials and facilities made available to Brazil under the agreement in lieu of the minimal safeguards provided in * * * the present agreement. The change in safeguards is required because of the increase in the enrichment of the uranium which may be supplied to Brazil under the agreement.

The proposed agreement also provides for assumption of safeguards responsibilities by the International Atomic Energy Agency.

In accordance with normal committee practice, a copy of the proposed agreement and supporting correspondence was inserted in the Congressional Record of July 26, 1965, in order to inform the Con-

gress of the pendency of this matter. Without objection I will insert in the record of this hearing a copy of the proposed agreement and supporting correspondence. (See app. 1, p. 71.)

Senator GORE. The committee notes that Brazil was one of the first nations to sign an agreement for cooperation with the United States after the 1954 amendments to the Atomic Energy Act. One of the matters the committee expects to explore today is the overall effectiveness of this longstanding cooperation between our two nations. Commissioner Palfrey, I understand that you will be our first witness. The committee will be pleased to hear your presentation. Please proceed.

Mr. PALFREY. Yes, Mr. Chairman, we are pleased to appear here today to discuss the agreement for cooperation with Brazil.

Mr. John Hall and I and other members of the staff had a chance to visit Brazil and Argentina this spring and the arrangements to initial this new agreement were made at that time.

This agreement you have noted was submitted to the Joint Committee on July 1, 1965, and will take the place of the agreement for cooperation signed on August 3, 1955, and amended by agreements signed on July 9, 1958, June 11, 1960, May 2, 1962, and September 1, 1964. This 1955 agreement is scheduled to terminate on August 2, 1965. As you know, this agreement maintains all of the provisions of the 1955 agreement, as amended, but adds several standard modifications designed to recognize conditions that have developed since the present agreement was last modified substantively.

In the proposed agreement the word "transfer" is substituted for the word "lease" so as to permit the Commission flexibility to lease or sell fuel to Brazil should a change in the Commission's policy of leasing fuel for research reactors be required during the 10-year term of the agreement.

Brazil is arranging for the return of the fuel elements from the 5-megawatt research reactor to the United States for reprocessing and has asked that replacement elements contain material enriched to 93 percent in the isotope U^{235}. To accommodate this request the proposed agreement provides that the Commission, upon request and in its discretion, may make material enriched to more than 20 percent in the isotope U^{235} available. Similar provisions have been incorporated in several other agreements as reflected in our testimony of June 4, 1965, on the Austrian agreement.

The limited safeguards provisions of the present agreement have been replaced by comprehensive safeguards provisions.

The 1-year extension of the present agreement which was granted in 1964 was based on the understanding that Brazil would complete trilateral arrangements for the transfer of safeguards to the International Atomic Energy Agency by August 2, 1965. As a consequence of the recent revision of the Agency safeguards system by the Agency Board of Governors, a new trilateral agreement reflecting the modified Agency system is under preparation. The requirement that the transfer of safeguards be completed by August 2, 1965, has been relaxed so as to enable Brazil to take advantage of the modified Agency system which is now being developed. Accordingly, the proposed agreement reflects that the transfer of the safeguards will be made by August 2, 1965, or as soon thereafter as the trilateral arrangements reflecting the revised Agency system can be completed.

During negotiation of this agreement it appeared that Brazil could bring the agreement into force promptly upon completion of the 30-day waiting period required by the U.S. Atomic Energy Act. It is now our understanding that this agreement must be submitted to the Brazilian Congress. If this is correct, it will be necessary to exchange notes with the Brazilian Government on or before August 2 confirming the continuing effect of the safeguards and guarantees of the existing agreement pending coming into force of the new agreement. During this interim period, of course, no new material deliveries to Brazil will take place. (See app. 10, p. 130.)

That completes my statement, Mr. Chairman.

Senator GORE. Mr. Holifield.

Chairman HOLIFIELD. According to the letter transmitting the proposed agreement for cooperation to the committee a more comprehensive safeguard system is to be established under this agreement in lieu of the minimal safeguards provided in the present agreement. Are we to infer from this that the safeguards under the existing agreement were possibly inadequate?

Senator GORE. Perhaps Mr. Pollack can answer that.

Chairman HOLIFIELD. Do you want to give your statement?

Mr. POLLACK. I think it might be best if we did get this into the record.

Senator GORE. Yes; proceed.

STATEMENT OF HERMAN POLLACK, ACTING DIRECTOR, OFFICE OF INTERNATIONAL SCIENTIFIC AFFAIRS, DEPARTMENT OF STATE

Mr. POLLACK. I am pleased to appear before this committee to testify on a proposed agreement on the civil uses of atomic energy which has recently been negotiated between the Government of the United States of America and the Government of the United States of Brazil which will supersede our agreement for cooperation with the United States of Brazil dated August 3, 1955, as amended.

The agreement now before the committee maintains all of the provisions of the present agreement and adds several standard modifications. Article II of the present agreement provides that the Commission may transfer uranium enriched up to 20 percent in the isotope U^{235} to Brazil for fueling defined research reactors. The same article uses the word "transfer" in lieu of the word "lease" so as to permit the Commission flexibility either to lease or to sell fuel under this agreement. The agreement provides further, that the Commission may, upon request and in its discretion, make all or a portion of the enriched uranium supplied available as material enriched to more than 20 percent in the isotope U^{235}. This modification has been made at the request of the Government of Brazil so as to make it possible to provide for new fuel elements for the 5-megawatt research reactor at São Paulo using uranium enriched to 93 percent in the isotope U^{235}. This provision is similar to those contained in agreements with several other countries.

As a result of these two changes, article II of the proposed agreement now includes standard provisions with respect to rights concerning special nuclear material produced as a result of irradiation processes and with regard to the reprocessing of source or special nuclear material received from the United States.

Because of the increase in the enrichment of the uranium which may be supplied to Brazil under this agreement, article VI of the proposed agreement includes comprehensive safeguards, covering all material and facilities made available under this agreement, to replace the minimal safeguards which are provided in the present agreement.

Article VII (a) of the agreement now before the committee provides that the International Atomic Energy Agency will be requested to assume responsibility for applying its safeguards to the material and facilities which are subject to safeguards under the new agreement. The committee is aware that the 1-year extension to the present agreement which was approved last year included the understanding that Brazil would, before the expiration of the present agreement, complete trilateral arrangements for the transfer of safeguards to the IAEA. Inasmuch as the IAEA safeguards system was recently revised a new trilateral transfer agreement reflecting the new system is now being drafted by the United States and the IAEA and it has not yet been possible to negotiate the safeguards transfer. It is for this reason that article VII (A) A of the new agreement provides that safeguards wil be transferred to the IAEA as soon as the parties and the Agency are in a position to enter an agreement reflecting the revised Agency safeguards system.

EXPIRATION OF EXISTING AGREEMENT

As the committee is aware, the present agreement with Brazil expires on August 2, 1965. Contrary to what we had thought at the time this agreement was submitted to the committee, we find that it will not be possible for the Brazilian Government to meet all of its statutory requirements, including approval by the Brazilian Congress, before that date. As a consequence, it appears that the current agreement will expire before the present agreement can be brought into force. We are therefore making arrangements to exchange notes with the Brazilian Government to insure that the Brazilian Government recognizes the continuing effect of the safeguards and guarantees provision of the agreement for cooperation dated August 3, 1955, as amended. These notes will also provide that the Brazilian Government will hold any material, equipment and devices it has received under this agreement subject to the terms and conditions of that agreement and those of applicable subsidiary arrangements thereto pending the coming into force of the superseding agreement for cooperation.

The Department of State feels that it is most important that the fruitful cooperation in the peaceful uses of atomic energy between the United States of Brazil and the United States of America continue and, therefore, endorses the agreement which is now resting before the committee.

Now, sir, I think the use of the word "minimal" was not intended to imply that they were substandard but simply to distinguish the nature of the safeguards contained in the 1955 agreement, as amended, and those which we are now able to put into effect.

Mr. PALFREY. The fact that we are now dealing with 93 percent enriched material requires a change in the arrangement.

Chairman HOLIFIELD. What is the plutonium production capacity of a reactor such as this one located at São Paulo?

Mr. KRATZER. Mr. Chairman, it has no appreciable plutonium production capacity. It is a 5-megawatt research reactor. When fueled with fully enriched material, as it will be under the new agreement, it produces no recoverable plutonium. When fueled with the 20-percent material it may produce a few grams a year but in the normal process of recovering that enriched uranium that quantity of plutonium would not be recovered.

Chairman HOLIFIELD. How active is this particular research reactor? Is this reactor being used as we contemplated these research reactors would be used?

Mr. PALFREY. Mr. Staebler who was down there specifically to have an opportunity to give that program a technical review might be well equipped to answer that question.

STATEMENT OF U. M. STAEBLER, DIVISION OF INTERNATIONAL AFFAIRS, ATOMIC ENERGY COMMISSION

Mr. STAEBLER. Yes, sir; I would say that this reactor at São Paulo was being well used and particularly well used for the production of isotopes that they could use in medical research and other activities especially isotopes which have short half lives and which could not otherwise be made available to them. At the time we were there they were in fact stretching out the lifetime of the core in anticipation of being able to order this highly enriched core but were taking pains not to do things with the reactor that would jeopardize the ability to continue to operate it for the production of isotopes.

Chairman HOLIFIELD. Do you have a steady complement of students that are experimenting with this reactor or is this being operated by two or three top people?

Mr. STAEBLER. It is being operated in conjunction with the Nuclear Institute at São Paulo which is associated with the university. So it is providing a training service in that sense.

Chairman HOLIFIELD. That is not my question. That is what it was for, I know that. I ask, is there a full complement of people using it around the clock or are they using it part time? Do you know what the workload of the reactor is?

Mr. HALL. Mr. Holifield, could I answer that?

Chairman HOLIFIELD. Yes.

Mr. HALL. The institute which is associated with the university at São Paulo, is a very impressive institute. The reason I made this point is that the reactor is used in conjunction with graduate research work at the university which has an enrollment of over 50,000, I think.

As to the question of whether the reactor is used around the clock, I think the answer now is "no" because they need new fuel elements. They have had a problem in holding on to some of their technical people because, frankly, the Brazilian industry pays higher salaries. I think if you view the project in the context of some of the political problems that Brazil has had, they are doing quite well indeed.

It is a fairly sophisticated group at São Paulo. Many of them, as you know, were trained here. There are few Americans associated now with the institute.

Chairman HOLIFIED. I know in some countries these research reactors are more or less a badge of prestige, and they are really not

being used. I just wondered if this were one of the countries that is using it properly.

Mr. HALL. I agree, it started that way. In 1958 or 1959 when the reactor went critical there was still some doubt as to whether it would be utilized with some sensible research, but I think that time has passed.

Mr. PALFREY. It is my impression, and again the technical people can speak with more authority, that in recent years we have moved into a new kind of relationship with both Argentina and Brazil. We are not only providing them with help and teaching them, but also receiving benefits from the research they perform.

Representative PRICE. Do they have more than one reactor down there?

Mr. HALL. Yes, sir. They have a Triga reactor at Belo Horizonte, associated with the university, which is north of Rio. One reason we were there was the inauguration of a small Argonaut reactor in Rio de Janeiro which they made thmselves. They have three reactors, and a subcritical assembly at San Jose des Campos.

So, the question of technical status in Brazil is improved enormously if you take that into account. The fact that they do lose people to industry was the complaint that they made with us. But in the Brazilian way I think it is quite a well organized group.

Chairman HOLIFIELD. Do you have any definite information as to whether most or all of irradiation spaces are being used or whether this reactor is just being used to expose samples?

Mr. HALL. The answer to that question is that they told us when we visited the reactor that they could use more space but they had a deJaneiro which they made themselves. They have three reactors, and in particular they are waiting to order the new 93-percent enriched fuel elements under this new agreement.

Chairman HOLIFIELD. When they order this new core, do they pay for it or do we pay for it?

Mr. KRATZER. They pay for the fabrication service to the company of their choice who manufactures them here in the United States. The enriched uranium content of the fuel element is leased to them by the Commission. They pay our standard use charge of 4¾ percent plus all consumption of material.

Chairman HOLIFIELD. Are you having any trouble getting them to agree to the IAEA safeguards?

Mr. KRATZER. No, sir.

HIATUS BETWEEN OLD AND NEW AGREEMENT

Chairman HOLIFIELD. My next statement is an observation rather than a question.

In regard to the time of sending these agreements here I wrote letters some time ago to Dr. Seaborg and to the Secretary of State in which I called attention to the lateness of the time when the committee receives these bilaterals to review. (See app. 3, p. 89 for letters referred to.) The British bilateral was the one in point. This bilateral is also in point. As I understand it there is going to be a hiatus here in which there is going to be no agreement in force.

I want to bring this up again and ask you if you think this is a businesslike way to run a railroad.

Mr. PALFREY. I would like to speak to that if I might, Mr. Holifield.

I think on this particular occasion we went to rather unusual lengths to be sure that this time there would not be any problem. That is one of the reasons we emphasized this during our trip in April and May. We thought that everything was completely squared away and that the agreement was before the Joint Committee so that the 30 days could be run without any question of lapse. It so happens that unknown to us the decision of the Government was to submit the agreement to their Congress. This is something we could not anticipate.

Chairman HOLIFIELD. You had the agreement ready before July 1. You sent it up on July 1, I believe.

Mr. PALFREY. Yes. I just meant that the waiting period it seems to me——

Chairman HOLIFIELD. In my letter of June 28 I said:

> It seems to me that a good working rule might be to submit proposed extensions of these agreements at least 2 to 3 months in advance of their expiration.

If you set a deadline to have them up here 2 months before their expiration, we would not be running into this problem of a hiatus between the expiration date and the effective date of the new agreement. I just feel either the State Department or the AEC, and I am not going to pin down which one, maybe it is both of you, is not handling these agreements as expeditiously as it might.

Mr. HALL. Mr. Holifield, I think that in this particular case you have another party and that is the Brazilian Government—aside from what derelictions the AEC and the State Department might have. Bureaucratic problems do occur as you well know——

Chairman HOLIFIELD. You certainly are not responsible, let us say, for something new that has come up, if it is new. However, we could have had the agreement submitted here earlier and then referred to their legislature. As I understand it, this bilateral will expire on August 2.

Mr. HALL. That is right.

Chairman HOLIFIELD. It must be approved in Brazil. We don't know how long it will take their legislature to work.

Mr. HALL. That is right. I was quite concerned about this and talked to Mr. Palfrey yesterday. I called our Embassy in Rio de Janeiro yesterday afternoon and I said we seem to have a difficult problem. We were told in the spring that the agreement would go to the Brazilian Congress but not for ratification.

What has happened is that the Embassy told me at 10:30 this morning that the Foreign Office had decided that this agreement did have to go to the Brazilian Congress. Now, in reference to the period of time, a part of that time unfortunately was a little out of our control because we were waiting and pressing the Brazilian Foreign Office to allow us to go forward, you see.

The general point I am sure is well taken, Mr. Holifield. You can be sure we are going to——

Chairman HOLIFIELD. Do you think my request is a reasonable request? It would avoid always being on the brink, you might say, of expiration. It would provide the committee some time to review the matter.

Mr. PALFREY. I think your point is that in each case—there always have been reasons and some of them have not been within our control—but your point is well taken that we should anticipate the reasons that are not within our control and try to take care of them.

Chairman HOLIFIELD. I only bring this up because of a desire to help to keep these agreements in effect. If we think they are worth keeping in effect we ought to keep them in effect on a regular basis and not on the basis of these emergency, patchwork notes and letters, to provide some kind of surveillance of this material and these facilities during the time that we don't have them under agreement.

It will become more important, I think, as we get into the IAEA safeguard procedures to have our own house in order so that the International Atomic Energy Agency can rely upon the authority that is contained in these bilaterals for their inspection purposes.

Mr. POLLACK. I would second Commissioner Palfrey's statement that you have a point in the comment you are making. I think to the extent that it is possible for us to move these things along, everybody would be well advised to do so and the whole process, I think, would benefit as a consequence if we could.

I think that is a separate point from the particular problem here. Even had we had this up earlier we would still have encountered this particular problem. It would not, I don't think, in this case have helped the situation that we have.

Mr. CONWAY. You would have found out about it much sooner.

Mr. POLLACK. Possibly. We don't know this. In any case the merit lies with speed.

Chairman HOLIFIELD. Are there any questions, Mr. Price?

BRAZILIAN POWER REACTOR FEASIBILITY STUDY

Representative PRICE. Mr. Palfrey, have the Brazilians shown any inclination to go along with the programs suggested some time ago of cooperating with us on a power reactor program?

Mr. PALFREY. One of the purposes of Mr. Staebler's visit was to have a chance to talk with the members who were engaged in a power study. Perhaps he would want to say something about that.

Mr. STAEBLER. I am afraid not directly on the cooperative program, but I can report briefly on how they stand on the power reactor interest.

The President of Brazil issued a directive for them to reactivate a study on power reactors feasibility in January and called for a report in 120 days which would have been about the end of May. So, the report should have been issued now, but it has not to the best of my knowledge.

During the conversation there it appeared as though the report would be several months behind the date prescribed by the President's directive; actually, what was contemplated was a series of reports. Nevertheless, they do have very active work going on at three centers,

Rio de Janeiro, São Paulo, and Belo Horizonte, on nuclear power feasibility and economics.

It does appear that within the next 2 or 3 years there would be a reasonably good case for starting a nuclear power project for some 250 megawatts or so. In fact, there was a report issued by the State of São Paulo last year, 1964, which recommended that thermal power stations of 500 megawatts total, including one 250-megawatt nuclear station and one 250-megawatt coal station, be built in the São Paulo area to provide additional backup to the hydro stations which are actually remote from the consumption areas so that these would be in operation by the early seventies.

It does appear that their low-cost hydro resource would be exhausted by about 1980. So, in any case, it appears that in the mid-1980's they should be looking toward rather extensive use of nuclear power which suggests that there should be some beginnings much before that. I would not be at all surprised to see some fairly concrete steps in the nuclear power project direction in the next 2 or 3 years.

Chairman HOLIFIELD. Did we propose an agreement with the Brazilian Government some years ago—sometime around 1957—on cooperation in the nuclear power area?

Mr. HALL. Yes, in 1958 I believe we did negotiate a power bilateral. What has happened is that since that time you have had, I believe, 3 or 4 changes of government which have affected the implementation of the agreement and have also affected leadership of the Brazilian Atomic Energy Commission. They have had three or 4 different chairmen.

To answer your question, the power arrangement has really never been implemented, principally because of uncertainties and their own examination of the problem; and second, new personalities, new chairmen, and new governments. Mr. Staebler has suggested to us that for the first time in some years you are really having a reasonable examination of the energy problem in Brazil. I predict, as Mr. Staebler predicts, that in the next few years you may have a need for close cooperation in the power field between the United States and Brazil.

NUCLEAR INSTITUTES IN BRAZIL

Representative PRICE. How many nuclear institutes are there in Brazil?

Mr. HALL. The major one is at São Paulo. While it is linked with the Brazilian Atomic Energy Commission, it has a great deal of autonomy. The largest research institute is located there and is contiguous to the University of São Paulo. I would expect that the largest group of technicians work there.

Then you have the institute at the University Belo Horizonte. I don't recall the number of people at Belo Horizonte, but I would expect fewer people. There is where you have the Triga research reactor and then at Rio de Janeiro you have the Argonaut reactor. Then there are the associated institutes, chemistry, and physics, that have links with the Atomic Energy Commission.

All in all, as I recall around 1,500 to 2,000 are directly engaged in this work as professionals.

Representative PRICE. What would be the manpower at São Paulo?

Mr. HALL. At São Paulo I think we were given a figure of 30 to 40 directly engaged in work at the reactor, but in addition to that you probably have several hundred who indirectly use the reactor.

Representative PRICE. Are they open to foreign students?

Mr. HALL. Yes.

Representative PRICE. Particularly for South American nations?

Mr. HALL. There are a few; yes. I don't know if we have any figures with us but we can supply them for the record. But they do allow—well, as a matter of fact, they allow many nationalities to work with them. I don't recall precisely but at São Paulo you had a few from other countries, which, incidentally, is also true in Argentina. There seems to be an open door policy in receiving their Latin American colleagues. You have a few French, as I recall, at both São Paulo and also Buenos Aires.

(The following letter was submitted subsequent to the hearing:)

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., August 8, 1965.

Mr. JOHN T. CONWAY,
Executive Director, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. CONWAY: During our testimony on the agreement for cooperation with Brazil on July 27, 1965, Congressman Price inquired if the 5-megawatt research reactor at São Paulo was open to foreign students, particularly from South American nations. We responded that there were a few students from other Latin American countries at the research reactor center and that we would supply the figures for the record.

The São Paulo research reactor has been used for experiments in nuclear and reactor physics which are conducted regularly in connection with postgraduate courses forming part of Brazil's program in nuclear education. Brazilian authorities have reported that as of May 1964 about 140 students from Brazil and other Latin American countries had taken part in these experiments.

Sincerely yours,

JOHN A. HALL,
Assistant General Manager for International Activities.

Representative PRICE. You said a minute ago that the agreement that we were talking about in relation to power reactors was never implemented. Did we get so far as to have the signatures of both nations to the agreement?

Mr. HALL. It was never ratified, sir. It never went into effect.

Representative PRICE. That is all I have, Mr. Chairman.

Mr. TROSTEN. Wasn't that agreement actually submitted to the Joint Committee?

Mr. HALL. Yes. We completed our process but they never completed theirs. I would have to look at the history. There probably was a change of government just about that time and they withheld.

Chairman HOLIFIELD. In the event a nation fails to act like that under our agreements do we have the right to recover the material?

Mr. HALL. If the nation fails to act the agreement is not in effect and we will not transfer material.

Mr. CONWAY. What about this case right now in which we are willing to extend the agreement but apparently there is more action to be taken in Brazil, including action by their legislative branch? Suppose they refuse to go ahead.

Mr. HALL. We do have rights to recover through normal diplomatic action.

LEGALITY OF HIATUS BETWEEN AGREEMENTS

Mr. CONWAY. The agreement will have terminated and you will not have recovered the material.

I am raising a question which goes to the legality of your proposed exchange of notes. Your existing agreement, which will expire August 2, I believe, has a requirement that they return the material to you at the expiration of the agreement. We will find ourselves with the agreement having expired, and they will not have complied with the requirement that they return it to you.

In the meantime we are waiting for some kind of action on their part. This goes to Mr. Holifield's question: Suppose they don't act? We have a hiatus in which they have not complied with the agreement, and they have the material. There is a real legal question.

STATEMENT OF JOSEPH F. HENNESSEY, GENERAL COUNSEL, ATOMIC ENERGY COMMISSION

Mr. HENNESSEY. May I answer that? The agreement does provide for the return of the material upon expiration. Obviously this is something that cannot be done until, first, the agreement has expired and under the circumstances where material is in an irradiated hot form, probably still in a reactor on the final day of effectiveness of the agreement, then I think that the agreement has to be interpreted that there is a reasonable time allowed.

Now the further question is: Are the safeguards applicable during this extended period? We have consistently taken the position that insofar as the safeguards provisions of these agreements are concerned that they do have continuing effectiveness after the expiration of the agreement.

I don't know of any question which has ever been raised when this problem has risen in other agreements. We have always found the other country in accord with our interpretation of the continuing effectiveness.

Mr. CONWAY. Mr. Hennessey, let me ask you this question: Is it the Commission's contention that they can extend the period of time past the expiration of a bilateral, during which another country can hold or maintain irradiated or other fuel elements or enriched nuclear material from the United States? If so, how long a time do you feel AEC can do so under the act?

Mr. HENNESSEY. I don't think that we can agree that they retain the material for an extended period of time, but I think that their obligation is to return the material as soon as reasonably practical upon our demand on expiration of the agreement.

What is reasonable is something for the parties to determine.

Representative HOSMER. You interpose a demand situation before the time starts to toll on the reasonableness of the return; is that correct?

Mr. HENNESSEY. In some cases I think there is a provision that it will be returned on demand. In other agreements it is simply an obligation to return on expiration.

Representative HOSMER. Is demand implicit in those situations?

Mr. HENNESSEY. Actually, where the agreement is a lease as it is in the case of Brazil, the lease agreement requires its return. It provides for the expiration of the lease and return immediately of the leased material.

Representative HOSMER. So in this particular situation, with your lease expired, you are down to a point where it is only a matter of wrapping up and returning the material and that has to be done in a reasonable time.

Mr. HENNESSEY. That is right, Mr. Hosmer.

REVISED IAEA SAFEGUARDS SYSTEM

Representative HOSMER. Now as long as you are up here, Mr. Hennessey, I would like to ask you a few questions relating to this IAEA inspection.

First, what is the new setup that is being established?

Mr. HENNESSEY. I am afraid that is something I am not familiar with, Mr. Hosmer.

Mr. HALL. Mr. Hosmer, the method for transferring the safeguard guarantees from the bilateral to the IAEA is done on a trilateral basis. What has been referred to in the testimony is the development of a new trilateral which reflects a revised and updated inspection document which was approved by the Board of Governors last February.

Representative HOSMER. What does all that mean? What is this new revised thing? What difference is there from the old unrevised one and so forth?

Mr. HALL. If I could introduce the subject I will ask Mr. Kratzer to comment on it. The last document approved by the Board of Governors, which I believe was in 1961, among other provisions provided for a review of the document after several years had passed.

Last year a working group composed of all members of the Board of Governors sat for a series of meetings in Vienna to see if they could clarify, and in certain cases make some of the procedures conform to existing facts, bearing in mind that the 1961 document was negotiated over several years and there were points that had to be clarified.

Representative HOSMER. Yes, but what has all this got to do with the inability on the part of Brazil to sign something with the IAEA. Everything has to come to a halt here until Brazil is able to pick up and execute a new multilateral agreement.

Mr. HALL. I misunderstood your question. We had discussed with Brazil in the spring the so-called old trilateral arrangement. If that were approved by the Board of Governors, it could have been in June, then it would have meant subsequently having a new trilateral placed before the Board of Governors.

The Brazilian Government decided they would prefer to use the new version of the trilateral which is presently being reviewed by the Brazilian Government.

Representative HOSMER. Couldn't you just provide that when the new one comes in it takes effect, and substitute its terms for the one that is underway?

Mr. HALL. Yes, as far as we are concerned.

Representative HOSMER. What was the trouble with the Brazilians? Were they afraid we were going to be too tough?

Mr. HALL. No. I think they concluded they preferred to use the one that would be used in the next few years rather than the old one.

Representative HOSMER. Why could it not be negotiated subject to substitution of the new trilateral provisions when they were finalized by the IAEA?

Mr. HALL. This could have been done. I am simply expressing the preference of the Brazilians on this one.

As a matter of fact, this was our thinking earlier. I think the State Department earlier felt that the simplest thing to do was to use the old trilateral.

Representative HOSMER. Now when you go along with people like that, realizing that there is going to be a hiatus—and all of these questions of what is going to happen when one agreement expires and another one does not take effect, come into being—do you really press those points on them, mention that the Joint Committee on Atomic Energy is going to be raising Ned with you and screaming about it?

Mr. POLLACK. We had not anticipated a hiatus, sir, until the last 48 hours.

Representative HOSMER. Apparently the new multilateral has not been formalized yet by IAEA.

Mr. HALL. Mr. Hosmer, we had planned to place it before the Board of Governors at the next meeting which would be the 17th of September.

Representative HOSMER. But that leaves you from the 17th of September back to the 2d of August where you don't have an international safeguards agreement, so you knew there was going to be a hiatus.

Mr. PALFREY. The bilaterals continue in effect as I understand it. There is no gap.

Mr. HALL. The bilateral covers the material, the trilateral covers the safeguard.

Representative HOSMER. You mean the expired bilateral that we have with Brazil or the bilateral with somebody else.

Mr. PALFREY. The point is that the agreements for cooperation having been extended the bilateral safeguards between the United States and Brazil will continue in effect until the trilateral arrangement comes into effect. There is no gap in that sense in reference to safeguards.

Representative HOSMER. It extends until after the expiration of the date. We all understand that. But we are still talking about a hiatus period when we don't have an existing agreement with the country, where we cannot ship a new core and they have the money to pay for it, and so on down the line.

Mr. HALL. If the trilateral had gone into effect in June we still would not have been able to ship the material because the bilateral—unhappily we have a hiatus here.

Representative HOSMER. We are not getting any place. Let me ask another line of questioning.

In the letter to Mr. Holifield of July 1 you said the agreement provides that the IAEA will be requested "to assume responsibility for applying safeguards to materials and facilities subject to the safeguards under the agreement."

What I am trying to ascertain here now is whether or not the IAEA will be acting as a principal and applying IAEA safeguards and inspection or will be acting as an agent applying the safeguards that are specified in this particular bilateral between the two countries? What is the legal situation?

STATEMENT OF CHARLES W. THOMAS, OFFICER IN CHARGE, ATOMIC ENERGY AFFAIRS, OFFICE OF INTERNATIONAL SCIENTIFIC AFFAIRS, DEPARTMENT OF STATE

Mr. THOMAS. Mr. Hosmer, the trilateral agreement with the IAEA normally includes the wording that the IAEA will apply the safeguards provided for under the bilateral agreement. It so happens that the IAEA system and the U.S. bilateral system of safeguards are in fact identical and therefore although in one instance the AEC has been applying those safeguards, when the safeguards function is transferred to the IAEA they are applying almost the same system of safeguards.

Representative HOSMER. In the legal concept are they applying them as a principal on their own or are they applying them as an agent of the U.S. Government and of the Brazilian Government?

Mr. THOMAS. The U.S. Government and the Brazilian Government have requested the IAEA to apply international safeguards to the materials transferred under this bilateral agreement.

Representative HOSMER. In other words, the IAEA is acting as a principal and not as an agent, is that right?

Mr. THOMAS. It is a trilateral agreement signed between three equal partners. I am not a lawyer, it would be difficult for me to make the judgment as to what their function would be.

Mr. KRATZER. Perhaps I may comment. I think without any question the agency is a principal in this arrangement and I think that the basis for that statement is that the guarantee that the Brazilian Government gives that it will use the materials and the equipment only for peaceful purposes runs directly to the Agency as well as to the United States under our bilateral agreement.

In other words, if a violation were to occur that would be a violation of Brazil's obligations to the Agency as well as a violation of its obligations to us.

Representative HOSMER. Assuming that the Agency then for one reason or another is not applying the safeguards, can the United States step back into the picture and do its own job?

Mr. THOMAS. Yes, sir. The U.S. safeguards are explicity suspended under the terms of the trilateral agreement, suspended during the term that the IAEA is applying its safeguards.

Representative HOSMER. Who makes the decision if the IAEA is inadequately doing its job, that the U.S. safeguards are reinstated.

Mr. THOMAS. The Board of Governors of the IAEA under the trilateral agreement can inform the United States or any other government that they are not in a position to apply safeguards.

Representative HOSMER. What if the United States gets its information from some place else and does not like what the IAEA is doing?

Mr. THOMAS. Under the IAEA system the United States is a powerful member of the IAEA Board of Governors and would immediately become aware of this and would presumably take steps either to correct the problem or to terminate the IAEA agreement which it can do on a 6-month notification.

Chairman HOLIFIELD. Before we adjourn—there is a rollcall pending—I would like to ask Mr. Thomas or maybe I should ask Mr. Pollack and Mr. Palfrey to submit to me responsive letters to my letters of June 28 in regard to gaps in the effective dates of bilateral. I don't know how long it takes you fellows to get around to answer your letters.

Mr. PALFREY. Try me this time.

(The correspondence referred to and the replies thereto are set forth in app. 3, p. 89.)

Chairman HOLIFIELD. If I took that long a time to answer letters of my constituents I would not be around to harass you fellows.

Thank you for your testimony today.

(Whereupon, at 3 p.m., Tuesday, July 27, 1965, the hearing was concluded.)

APPENDIXES

APPENDIX 1

PROPOSED AGREEMENTS FOR COOPERATION, WITH SUPPORTING CORRESPONDENCE

A. GOVERNMENT OF ISRAEL

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., April 2, 1965.

Hon. CHET HOLIFIELD,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. HOLIFIELD: Pursuant to section 123c of the Atomic Energy Act of 1954, as amended, there are submitted with this letter:

(*a*) An executed "Amendment to the Agreement for Cooperation Between the Government of the United States of America and the Government of Israel Concerning the Civil Uses of Atomic Energy";

(*b*) A copy of a letter from the Commission to the President recommending approval of the amendment; and

(*c*) A copy of a letter from the President to the Commission containing his determination that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and approving the amendment and authorizing its execution.

I regret that this agreement is reaching the Joint Committee at a date which will not allow the full 30-day waiting period to elapse before the present agreement with Israel expires. The reasons for this delay have been communicated to the staff of the Joint Committee.

The proposed amendment, which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, amends and extends the agreement for cooperation with the Government of Israel which was signed at Washington on July 12, 1955, as amended by agreements signed at Washington on August 20, 1959, June 11, 1960, June 22, 1962, and August 19, 1964.

It will be recalled that, at the request of the Israeli Government, the 1964 amendment to the agreement for cooperation provided only for a 9-month extension of the agreement with the understanding that at the expiration of that period the agreement would expire and Israel would obtain its future requirements for special nuclear material through the IAEA. However, as was discussed with members of the staff of the Joint Committee by representatives of the Atomic Energy Commission and Department of State on March 13, 1965, and as outlined in the letter of March 15, 1965, from Mr. Hall to Mr. Conway, the Government of Israel subsequently requested that the agreement for cooperation be continued so that they could continue to obtain their materials requirements on a bilateral basis but agreed to accept the prompt application of Agency safeguards to materials and facilities received under the agreement. This would be in accord with our policy for prompt transfer of safeguards to the Agency. Accordingly, article I of the proposed amendment provides that the International Atomic Energy Agency will be promptly requested by the parties to assume responsibility for applying safeguards to materials and facilities subject to safeguards under the agreement. The transfer of this responsibility to the Agency would be effected without further modification of the agreement by means of a trilateral agreement to be negotiated between the Government of the United States, the Government of Israel, and the Agency.

Article II of the proposed amendment provides for a 10-year extension of the agreement beyond its expiration date of April 11, 1965.

The proposed amendment will enter into force when the two governments have exchanged written notifications that their respective statutory and constitutional requirements have been fulfilled.

Cordially,

JOHN G. PALFREY,
Acting Chairman.

(Enclosures: (1) Amendment to agreement for cooperation with the Government of Israel (3); (2) letter from the Commission to the President (3); and (3) letter from the President to the Commission (3).)

AMENDMENT TO AGREEMENT FOR COOPERATION BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF ISRAEL CONCERNING CIVIL USES OF ATOMIC ENERGY

The Government of the United States of America and the Government of Israel,

Desiring to amend the Agreement for Cooperation between the Government of the United States of America and the Government of Israel Concerning Civil Uses of Atomic Energy, signed at Washington on July 12, 1955 (hereinafter referred to as the "Agreement for Cooperation"), as amended by the Agreements signed at Washington on August 20, 1959, June 11, 1960, June 22, 1962, and August 19, 1964;

Agree as follows:

ARTICLE I

Article VI bis of the Agreement for Cooperation as amended is further amended to read as follows:

"A. The Government of the United States of America and the Government of Israel, recognizing the desirability of making use of the facilities and services of the International Atomic Energy Agency, agree that the Agency will be promptly requested to assume responsibility for applying safeguards to materials and facilities subject to safeguards under this Agreement for Cooperation. It is contemplated that the necessary arrangements will be effected without modification of this Agreement, through an agreement to be negotiated between the Parties and the Agency which may include provisions for suspension of the safeguard rights accorded the Commission by Article VI of this Agreement during the time and to the extent that the Agency's safeguards apply to such materials and facilities.

"B. In the event the Parties do not reach a mutually satisfactory agreement on the terms of the trilateral arrangement envisaged in paragraph A of this Article, either Party may by notification terminate this Agreement. In the event of termination by either Party, the Government of Israel shall, at the request of the Government of the United States of America, return to the Government of the United States of America all special nuclear material received pursuant to this Agreement and in its possession or in the possession of persons under its jurisdiction. The Government of the United States of America will compensate the Government of Israel for such returned material at the current United States Commission's schedule of prices then in effect domestically."

ARTICLE II

Article VIII of the Agreement for Cooperation, as amended, is further amended by deleting the date "April 11, 1965" and substituting in lieu thereof the date "April 11, 1975".

ARTICLE III

This Amendment shall enter into force on the date on which each Government shall have received from the other Government written notification that it has complied with all statutory and constitutional requirements for the entry into force of such Amendment and shall remain in force for the period of the Agreement for Cooperation, as hereby amended.

IN WITNESS WHEREOF, the undersigned, duly authorized, have signed this Amendment.

DONE at Washington, in duplicate, this second day of April 1965.

For the Government of the United States of America:

JOHN D. JERNEGAN
Deputy Assistant Secretary
Near Eastern and South Asian Affairs
Department of State

JOHN G. PALFREY
Acting Chairman
U.S. Atomic Energy Commission

For the Government of Israel:

AVRAHAM HARMAN
Ambassador
Embassy of Israel

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., March 24, 1965.

THE PRESIDENT,
The White House.

DEAR MR. PRESIDENT: The Atomic Energy Commission recommends that you approve the enclosed proposed "Amendment to the Agreement for Cooperation Between the Government of the United States of America and the Government of Israel Concerning the Civil Uses of Atomic Energy," determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution. The Department of State supports the Commission's recommendation.

The proposed amendment which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, would revise and extend the agreement between the United States of America and Israel which was signed at Washington on July 12, 1955, as amended by agreements signed at Washington on August 20, 1959, June 11, 1960, June 22, 1962, and August 19, 1964.

It will be recalled that, at the request of the Israeli Government, the 1964 amendment to the agreement for cooperation provided only for a 9-month extension of the agreement with the understanding that at the expiration of that period the agreement would expire and Israel would obtain its future requirements for special nuclear material for its research program through the IAEA. However, the Government of Israel subsequently requested that the agreement for cooperation be continued so that they could continue to obtain their materials requirements on a bilateral basis and agreed to accept application of International Atomic Energy Agency safeguards to materials and facilities received under the agreement. Accordingly, in keeping with current U.S. policy calling for the prompt transfer of safeguards to the International Atomic Energy Agency, provision has been made in article I of the proposed amendment that the Agency will be promptly requested to assume responsibility for applying safeguards to materials and facilities subject to safeguards under the agreement. The transfer of this responsibility to the Agency would be effected without further modification of the agreement by means of a trilateral agreement to be negotiated between the Government of the United States of America, the Government of Israel, and the Agency.

Article II of the proposed amendment provides for the extension of the agreement for a 10-year period beyond the expiration date of April 11, 1965.

Following your consideration, approval and authorization, the proposed amendment will be formally executed by appropriate authorities of the Government of the United States of America and the Government of Israel. In compliance with section 123c of the Atomic Energy Act of 1954, as amended, the amendment will then be placed before the Joint Committee on Atomic Energy.

Respectfully yours,

GLENN T. SEABORG, *Chairman.*

(Enclosure: Proposed "Amendment to the Agreement for Cooperation Between the Government of the United States of America and the Government of Israel.")

THE WHITE HOUSE,
Washington, March 31, 1965.

Hon. GLENN T. SEABORG,
Atomic Energy Commission,
Washington.

DEAR DR. SEABORG: In accordance with section 123a of the Atomic Energy Act of 1954, as amended, the Atomic Energy Commission has submitted to me by letter dated March 24, 1965, a proposed "Amendment to the Agreement for Cooperation Between the Government of the United States of America and the Government of Israel Concerning the Civil Uses of Atomic Energy" and has recommended that I approve the proposed amendment, determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution.

Pursuant to the provisions of 123b of the Atomic Energy Act of 1954, as amended, and upon the recommendation of the Atomic Energy Commission, I hereby—

(*a*) approve the proposed amendment and determine that the performance of the agreement as amended will promote and will not constitute an unreasonable risk to the common defense and security of the United States of America;

(*b*) authorize the execution of the proposed amendment on behalf of the Government of the United States of America by appropriate authorities of the Department of State and the Atomic Energy Commission.

Sincerely,

LYNDON B. JOHNSON.

B. GOVERNMENT OF THE TURKISH REPUBLIC

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., May 8, 1965.

Hon. CHET HOLIFIELD,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. HOLIFIELD: Pursuant to section 123c of the Atomic Energy Act of 1954, as amended, there are submitted with this letter:

(*a*) An executed "Amendment to the Agreement for Cooperation Between the Government of the United States of America and the Government of the Turkish Republic Concerning the Civil Uses of Atomic Energy," as amended;

(*b*) A copy of a letter from the Commission to the President recommending approval of the Amendment; and

(*c*) A copy of a letter from the President to the Commission containing his determination that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and approving the amendment and authorizing its execution.

The amendment, which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, modifies and extends for 1 year to June 9, 1966, the agreement for cooperation with the Turkish Republic which was signed at Washington on June 10, 1955, and amended by the agreement signed at Washington on April 27, 1961.

Article I of the proposed amendment provides that the parties will initiate negotiations promptly for transfer of safeguards to the International Atomic Energy Agency, and it obligates the Government of Turkey to furnish us with its decision by January 31, 1966, as to whether the transfer arrangements are acceptable. In a separate communication, the United States has informed the Government of Turkey that we do not intend to extend the agreement beyond the expiration of this 1-year extension if arrangements for the transfer of safeguards to the IAEA have not been completed.

The Government of Turkey has requested this additional period of complete its consideration of the transfer of safeguards to the IAEA in order to comply with its constitutional procedures which require parliamentary consideration of such questions. In this connection, I should like to observe that the present agreement for cooperation with Turkey, unlike other research agreements of this type which had initial terms of 5 years, was originally entered into for a period of 10 years. Thus, the present amendment represents the first extension of this

agreement. In other cases where we have effected a transfer of safeguards to the IAEA, there have been one or more short extensions of the agreements to allow the other countries involved to complete their consideration of and preparation for a transfer of safeguards to the Agency. This 1-year extension of the Turkish agreement is consistent with that practice. While we are confident that mutually satisfactory arrrangements for transfer of safeguards will be completed by the end of this extension, our notification to Turkey that no further extension will be made in the absence of such agreement insures, as in the case of the short extensions of the Brazilian and Israeli agreements last year, that the U.S. policy of transfer of safeguards to the IAEA is fulfilled.

The amendment will enter into force when the two Governments have exchanged written notifications that their respective statutory and constitutional requirements have been fulfilled.

Cordially,

GLENN T. SEABORG, *Chairman.*

(Enclosures: 1. Amendment to agreement for cooperation with the Turkish Republic (3) ; 2. letter from the Commission to the President (3) ; 3. letter from the President to the Commission (3).)

AMENDMENT TO AGREEMENT FOR COOPERATION BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE TURKISH REPUBLIC CONCERNING CIVIL USES OF ATOMIC ENERGY

The Government of the United States of America and the Government of the Turkish Republic,

Desiring to amend the Agreement for Cooperation Between the Government of the United States of America and the Government of the Turkish Republic Concerning Civil Uses of Atomic Energy, signed at Washington on June 10, 1955 (hereinafter referred to as the "Agreement for Cooperation"), as amended by the Agreement signed at Washington on April 27, 1961, and

Recognizing that consultation with regard to the assumption of responsibility by the International Atomic Energy Agency for the application of safeguards to materials and facilities subject to safeguards under the Agreement for Cooperation has been initiated in accordance with Article VI bis of the Agreement for Cooperation but that the Government of the Turkish Republic needs, under its statutory and constitutional requirements, additional time beyond the present date of expiration of the Agreement for Cooperation to arrive at its decision concerning the application of safeguards by the International Atomic Energy Agency to the Agreement for Cooperation,

Agree as follows:

ARTICLE I

The following sentences are added at the end of subparagraph (a) of Article VI bis of the Agreement for Cooperation:

"In fact, the Parties have already initiated consultation with respect to the assumption of responsibility by the International Atomic Energy Agency for the application of safeguards to materials and facilities subject to safeguards under this Agreement. It is contemplated that necessary arrangements to this end will be effected through an Agreement to be negotiated between the Parties and the Agency without further modification of this Agreement. The Government of the Turkish Republic undertakes to initiate such trilateral negotiations promptly and to furnish its decision to the Government of the United States of America not later than January 31, 1966, on whether the Government of the Turkish Republic finds the negotiated arrangements for safeguards to be acceptable."

ARTICLE II

Article VIII of the Agreement for Cooperation is amended by deleting the date "June 9, 1965", and inserting in lieu thereof the date "June 9, 1966".

ARTICLE III

This Amendment shall enter into force on the date on which each Government shall have received from the other Government written notification that it has complied with all statutory and constitutional requirements for the entry into

force of such Amendment and shall remain in force for the period of the Agreement for Cooperation, as hereby amended.

IN WITNESS WHEREOF, the undersigned, duly authorized, have signed this Amendment.

DONE at Washington, in duplicate, this [1] —— day of 1965.

For the Government of the United States of America:

C.W.T.
Charles W. Thomas
Officer-in-Charge
Atomic Energy Affairs
International Scientific Affairs
Department of State

E.W.C.
Earle W. Cook
Foreign Affairs Officer
Division of International Affairs
Atomic Energy Commission

For the Government of the Turkish Republic:

Akay
Mr. Erdil Akay
Second Secretary
Embassy of the Republic of Turkey

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., May 3, 1965.

THE PRESIDENT,
The White House.

DEAR MR. PRESIDENT: The Atomic Energy Commission recommends that you approve the enclosed proposed "Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Turkish Republic Concerning the Civil Uses of Atomic Energy," determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution. The Department of State supports the Commission's recommendation.

The proposed amendment which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, would revise and extend for 1 year to June 9, 1966, the agreement between the United States of America and Turkey which was signed at Washington on June 10, 1955, as amended by the agreement signed at Washington on April 27, 1961.

Article I of the proposed amendment provides that the parties will initiate negotiations promptly on the transfer of safeguards to the International Atomic Energy Agency. In this regard, the Government of Turkey will inform us not later than January 31, 1966, as to whether the terms and arrangements developed for the transfer of safeguards are acceptable. While we have every reason to expect that the transfer of safeguards will be worked out on the time scale envisaged, we have informed the Government of Turkey that we do not propose to extend the agreement further without explicit provisions for the transfer of safeguards to the Agency.

Following your determination, approval, and authorization, the proposed amendment will be formally executed by appropriate authorities of the Government of the United States of America and the Government of the Turkish

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[1] The proposed amendment to the agreement for cooperation between the United States and the Turkish Republic reprinted above, although initialed by the two Governments and approved by the President, was not at the time of its submission to the Joint Committee on Atomic Energy signed by the parties or dated. Subsequently the Joint Committee was furnished with copies of the fully executed amendment, signed on June 3, 1965, by Glenn T. Seaborg, Chairman, U.S. Atomic Energy Commission, and John D. Jernegan, Deputy Assistant Secretary, Bureau of Near Eastern and South Asian Affairs, U.S. Department of State, for the United States, and Turgut Menemencioglu, Ambassador, for the Republic of Turkey.

Republic. In compliance with section 123c of the Atomic Energy Act of 1954, as amended, the amendment will then be placed before the Joint Committee on Atomic Energy.

Respectfully yours,

GLENN T. SEABORG, *Chairman.*

(Enclosure: Proposed "Amendment to the Agreement for Cooperation Between the Government of the United States of America and the Government of the Turkish Republic.)

THE WHITE HOUSE,
Washington, May 7, 1965.

HON. GLENN T. SEABORG,
U.S. Atomic Energy Commission,
Washington.

DEAR DR. SEABORG: In accordance with section 123a of the Atomic Energy Act of 1954, as amended, the Atomic Energy Commission has submitted to me certain proposed amendments to existing agreements and has recommended that I approve each such proposed amendment, determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution. The amendments so submitted are listed below:

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Turkish Republic Concerning the Civil Uses of Atomic Energy."

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Austria Concerning the Civil Uses of Atomic Energy."

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Korea Concerning the Civil Uses of Atomic Energy."

Pursuant to the provisions of 123b of the Atomic Energy Act of 1954, as amended, and upon the recommendation of the Atomic Energy Commission, I hereby—

(*a*) approve each of the proposed amendments listed above, and determine that the performance of each of these agreements as amended will promote and will not constitute an unreasonable risk to the common defense and security of the United States of America;

(*b*) authorize the execution of each of the proposed amendments on behalf of the Government of the United States of America by appropriate authorities of the Department of State and the Atomic Energy Commission.

Sincerely,

LYNDON B. JOHNSON.

C. GOVERNMENT OF THE REPUBLIC OF KOREA

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., May 27, 1965.

HON. CHET HOLIFIELD,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. HOLIFIELD: Pursuant to section 123c of the Atomic Energy Act of 1954, as amended, there are submitted with this letter:

(*a*) An executed "Amendment to the Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Korea Concerning the Civil Uses of Atomic Enegry";

(*b*) A copy of a letter from the Commission to the President recommending approval of the amendment; and

(*c*) A copy of a letter from the President to the Commission containing his determination that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and approving the amendment and authorizing its execution.

The amendment, which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, modifies and extends for 10 years to February 2, 1976, the agreement

for cooperation with the Republic of Korea which was signed on February 3, 1956, as amended by the agreement signed at Washington on March 14, 1958.

Under articles I and II of the amendment, the word "lease" as it appears in article II A and D of the agreement is changed to the word "transfer," and in article VI C of the agreement the word "leased" is changed to the word "transferred" in order to permit either the lease or sale of enriched uranium for fueling defined research reactors. There is no immediate intent on the part of the Commission to change its policy of leasing fuel for research reactors. This change, however, will permit the Commission flexibility to lease or sell such fuel should unforeseen circumstances require a change in that policy during the 10-year extension of the agreement.

Article I of the amendment modifies article II of the agreement to make provision for the reprocessing of source or special nuclear material received from the United States to be performed in other than Commission facilities and adds to article II of the agreement provisions with respect to rights in special nuclear material produced as a result of the irradiation processes. These same provisions are contained in agreements for cooperation with other countries.

Article III of the amendment provides for the Government of the United States of America and the Government of the Republic of Korea promptly to request the International Atomic Energy Agency to assume responsibility for applying safeguards to materials and facilities subject to safeguards under the agreement. The transfer of this responsibility to the Agency would be accomplished without further modification of the agreement by means of a trilateral agreement to be negotiated between the Government of the United States of America, the Government of the Republic of Korea, and the Agency.

The amendment will enter into force when the two Governments have exchanged written notifications that their respective statutory and constitutional requirements have been fulfilled.

Cordially,

GLENN T. SEABORG, *Chairman.*

(Enclosures: (1) Amendment to agreement for cooperation with the Republic of Korea (3); (2) letter from the Commission to the President (3); (3) letter from the President to the Commission (3).)

AMENDMENT TO AGREEMENT FOR COOPERATION BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE REPUBLIC OF KOREA CONCERNING CIVIL USES OF ATOMIC ENERGY

The Government of the United States of America and the Government of the Republic of Korea,

Desiring to amend the Agreement for Cooperation between the Government of the United States of America and the Government of the Republic of Korea Concerning Civil Uses of Atomic Energy, signed at Washington on February 3, 1956 (hereinafter referred to as the "Agreement for Cooperation"), as amended by the Agreement signed at Washington on March 14, 1958,

Agree as follows:

ARTICLE I

Article II of the Agreement for Cooperation is amended as follows:

a. Substitute the word "transfer" for the word "lease" wherever said word appears in paragraphs A and D.

b. Paragraph C is deleted in its entirety and the following substituted therefor:

"C. It is agreed that when any source or special nuclear material received from the United States of America requires reprocessing, such reprocessing shall be performed at the discretion of the Commission in either Commission facilities or facilities acceptable to the Commission, on terms and conditions to be later agreed; and it is understood, except as may be otherwise agreed, that the form and content of any irradiated fuel shall not be altered after its removal from the reactor and prior to delivery to the Commission or the facilities acceptable to the Commission for reprocessing."

c. The following new paragraphs E and F are added to Article II:

"E. Special nuclear material produced in any part of fuel leased hereunder as a result of irradiation processes shall be for the account of the Government of the Republic of Korea and, after reprocessing as provided in paragraph C of this

Article, shall be returned to the Government of the Republic of Korea, at which time title to such material shall be transferred to that Government, unless the Government of the United States of America shall exercise the option, which is hereby granted, to retain, with appropriate credit to the Government of the Republic of Korea, any such special nuclear material which is in excess of the needs of Korea for such material in its program for the peaceful uses of atomic energy.

"F. With respect to any special nuclear material not subject to the option referred to in paragraph E of this Article and produced in reactors fueled with materials obtained from the United States of America which is in excess of the needs of Korea for such material in its program for the peaceful uses of atomic energy, the Government of the United States of America shall have and is hereby granted (a) a first option to purchase such material at prices then prevailing in the United States of America for special nuclear material produced in reactors which are fueled pursuant to the terms of an Agreement for Cooperation with the Government of the United States of America, and (b) the right to approve the transfer of such material to any other nation or group of nations in the event the option to purchase is not exercised."

ARTICLE II

Article VI, paragraph C of the Agreement for Cooperation is amended by deleting the word "leased" and substituting in lieu thereof the word "transferred".

ARTICLE III

The following new Article is added directly after Article VII of the Agreement for Cooperation.

"ARTICLE VII (A)

"A. The Government of the United States of America and the Government of the Republic of Korea, recognizing the desirability of making use of the facilities and services of the International Atomic Energy Agency, agree that the Agency will be promptly requested to assume responsibility for applying safeguards to materials and facilities subject to safeguards under this Agreement for Cooperation. It is contemplated that the necessary arrangements will be effected without modification of this Agreement, through an Agreement to be negotiated between the Parties and the Agency which may include provisions for suspension of the safeguard rights accorded the Commission by Article VI of this Agreement during the time and to the extent that the Agency's safeguards apply to such materials and facilities.

"B. In the event the Parties do not reach a mutually satisfactory agreement on the terms of the trilateral arrangement envisaged in paragraph A of this Article, either Party may by notification terminate this Agreement. In the event of termination by either Party, the Government of the Republic of Korea shall, at the request of the Government of the United States of America, return to the Government of the United States of America all special nuclear material received pursuant to this Agreement and in its possession or in the possession of persons under its jurisdiction. The Government of the United States of America will compensate the Government of the Republic of Korea for such returned material at the current United States Commission's schedule of prices then in effect domestically."

ARTICLE IV

The first sentence of Article VIII of the Agreement for Cooperation is amended by deleting the date "February 2, 1966" and substituted in lieu thereof the date "February 2, 1976".

ARTICLE V

This Amendment shall enter into force on the date on which each Government shall have received from the other Government written notification that it has complied with all statutory and constitutional requirements for the entry into force of such Amendment and shall remain in force for the period of the Agreement for Cooperation, as hereby amended.

IN WITNESS WHEREOF, the undersigned, duly authorized, have signed this Amendment.

DONE at Washington, in duplicate, this [1] —— day of 1965.
For the Government of the United States of America:
C.W.T.
Charles W. Thomas
Officer-in-Charge
Atomic Energy Affairs
Office of International Scientific Affairs

E.W.C.
Earle W. Cook
Foreign Affairs Officer
Division of International Affairs
U.S. Atomic Energy Commission

For the Government of the Republic of Korea:
S.Y.
Suk Heun Yun
Minister
Embassy of Korea

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., May 3, 1965.

THE PRESIDENT,
The White House.

DEAR MR. PRESIDENT: The Atomic Energy Commission recommends that you approve the enclosed proposed "Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Korea Concerning the Civil Uses of Atomic Energy," determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution. The Department of State supports the Commission's recommendation.

The proposed amendment which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, would revise and extend for 10 years to February 2, 1976, the agreement between the United States of America and the Republic of Korea which was signed on February 3, 1956, as amended by the agreement signed at Washington on March 14, 1958.

The present agreement with Korea now contains a provision in article II that the Commission will lease uranium enriched in the isotope U^{235} to Korea for fueling defined research reactors. While there is no immediate intent to change Commission policy of leasing fuel for research reactors, it is believed that, in view of the proposed 10-year extension of the agreement, flexibility to lease or sell this material should be provided. Accordingly, article I of the proposed amendment would substitute the word "transfer" for the word "lease" in article II A and D of the agreement and article II of the proposed amendment would substitute the word "transferred" for the word "leased" in article VI C of the agreement.

In addition, article I of the proposed amendment modifies article II of the agreement to make provision for the reprocessing at the discretion of the Commission of source or special nuclear material received from the United States to be performed in other than Commission facilities and adds to article II of the agreement provisions with respect to rights in special nuclear material produced as a result of the irradiation processes. These same provisions are contained in agreeemnts for cooperation with other countries.

In keeping with U.S. policy that it is timely for us to arrive at an explicit understanding with those countries with which we have agreements as to the transfer of safeguards to the International Atomic Energy Agency, provision has been made in article III of the proposed amendment that the agency

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[1] The proposed amendment to the agreement for cooperation between the United States and the Republic of Korea reprinted above, although initialed by the two Governments and approved by the President, was not at the time of its submission to the Joint Committee on Atomic Energy signed by the parties or dated. Subsequently the Joint Committee was furnished with copies of the fully executed amendment, signed on July 30, 1965, by Glenn T. Seaborg, Chairman, U.S. Atomic Energy Commission, and Samuel D. Berger, Deputy Assistant Secretary, Bureau of Far Eastern Affairs, U.S. Department of State, for the United States, and Hyun Chul Kim, Ambassador, for the Republic of Korea.

will be promptly requested to assume responsibility for applying safeguards to materials and facilities subject to safeguards under the agreement. The transfer of this responsibility to the Agency would be effected without further modification of the agreement by means of a trilateral agreement to be negotiated between the Government of the United States of America, the Government of the Republic of Korea, and the Agency.

Following your determination, approval, and authorization, the proposed amendment will be formally executed by appropriate authorities of the Government of the United States of America and the Government of the Republic of Korea. In compliance with section 123c of the Atomic Energy Act of 1954, as amended, the proposed amendment will then be placed before the Joint Committee on Atomic Energy.

Respectfully yours,

GLENN T. SEABORG, *Chairman.*

(Enclosure: Proposed "Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Korea.")

THE WHITE HOUSE,
Washington, May 7, 1965.

Hon. GLENN T. SEABORG,
U.S. Atomic Energy Commission,
Washington.

DEAR DR. SEABORG: In accordance with section 123a of the Atomic Energy Act of 1954, as amended, the Atomic Energy Commission has submitted to me certain proposed amendments to existing agreements and has recommended that I approve each such proposed amendment, determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution. The amendments so submitted are listed below:

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Turkish Republic Concerning the Civil Uses of Atomic Energy."

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Austria concerning the Civil Uses of Atomic Energy."

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Korea Concerning the Civil Uses of Atomic Energy."

Pursuant to the provisions of 123b of the Atomic Energy Act of 1954, as amended, and upon the recommendation of the Atomic Energy Commission, I hereby—

(*a*) approve each of the proposed amendments listed above, and determine that the performance of each of these agreements as amended will promote and will not constitute an unreasonable risk to the common defense and security of the United States of America;

(*b*) authorize the execution of each of the proposed amendments on behalf of the Government of the United States of America by appropriate authorities of the Department of State and the Atomic Energy Commission.

Sincerely,

LYNDON B. JOHNSON.

D. GOVERNMENT OF THE REPUBLIC OF AUSTRIA

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., May 27, 1965.

Hon. CHET HOLIFIELD,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. HOLIFIELD: Pursuant to section 123c of the Atomic Energy Act of 1954, as amended, there are submitted with this letter:

(*a*) An executed "Amendment to the Agreement for Cooperation Concerning the Civil Uses of Atomic Energy Between the Government of the United States of America and the Government of the Republic of Austria";

(*b*) A copy of a letter from the Commission to the President recommending approval of the amendment; and

(c) A copy of the letter from the President to the Commission containing his determination that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and approving the amendment and authorizing its execution.

The amendment, which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, would revise the agreement for cooperation between the Government of the United States of America and the Government of the Republic of Austria which was signed at Washington on July 22, 1959.

The Government of Austria has requested an amendment to the agreement which would permit uranium enriched to more than 90 percent in the isotope U^{235} to be transferred to Austria for those uses which now qualify under the agreement for material enriched up to 90 percent. Accordingly, article I of the amendment provides that the Commission will, upon request and at its discretion transfer material enriched to more than 20 percent in the isotope U^{235} for use in research and materials testing reactors and reactor experiments each capable of operating with a fuel load not to exceed 8 kilograms of U^{235} contained in uranium.

In addition, provision has been made in article I of the amendment which would permit the transfer of special nuclear material for performance in Austria of conversion or fabrication services, or both, and subsequent transfer to another nation or group of nations with which the United States has an agreement for cooperation within the scope of which the subsequent transfer would fall. This provision, which was requested by Austria, is in accordance with established Commission policy and is the same as that used in other of our agreements for cooperation.

The amendment will enter into force on the day on which each Government shall have received from the other Government written notification that it has complied with all statutory and constitutional requirements for the entry into force of this amendment.

Cordially,

GLENN T. SEABORG, *Chairman.*

(Attachments: (1) Amendment to agreement for cooperation with the Government of the Republic of Austria (3); (2) letter from the Commission to the President (3); (3) letter from the President to the Commission (3).)

AMENDMENT TO THE AGREEMENT FOR COOPERATION CONCERNING CIVIL USES OF ATOMIC ENERGY BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE REPUBLIC OF AUSTRIA

The Government of the United States of America and the Government of the Republic of Austria,

Desiring to amend the Agreement for Cooperation concerning Civil Uses of Atomic Energy between the Government of the United States of America and the Government of the Republic of Austria, signed at Washington on July 22, 1959 (hereinafter referred to as the "Agreement for Cooperation"),

Agree as follows:

ARTICLE I

Article IV of the Agreement for Cooperation is amended as follows:

a. Paragraph C is deleted in its entirety and the following substituted therefor:

"C. The Commission may, upon request and in its discretion, make available all or a portion of the enriched uranium supplied hereunder as material enriched to more than twenty percent (20%) in the isotope U^{235} for use in research or materials testing reactors and reactor experiments each capable of operating with a fuel load not to exceed eight (8) kilograms of isotope U^{235} contained in such uranium."

b. The following paragraph I is added to Article IV of the Agreement:

"I. In addition to transfers for the purposes provided under Article V and paragraphs A and C of this Article, the Commission may transfer to the Government of the Republic of Austria under such terms and conditions as may be agreed by the Parties, and within the limit of the amounts authorized in paragraph A of this Article, special nuclear material for the performance in the Republic of Austria of conversion or fabrication services, or both, and sub-

sequent transfer to a nation or group of nations with which the Government of the United States of America has an Agreement for Cooperation within the scope of which such subsequent transfer falls. It is understood that the net amount concept described in paragraph A of this Article is also applicable to such transfers for conversion or fabrication services."

ARTICLE II

This Amendment shall enter into force on the date on which each Government shall have received from the other Government written notification that it has complied with all statutory and constitutional requirements for the entry into force of such Amendment and shall remain in force for the period of the Agreement for Cooperation as hereby amended.

IN WITNESS WHEREOF, the undersigned, duly authorized, have signed this Amendment.

DONE at Washington, in duplicate, this [1] —— day of 1965.

For the Government of the United States of America:

C.W.T.
Charles W. Thomas
Officer-in-Charge
Atomic Energy Affairs
Office of International Scientific Affairs

E.W.C.
Earle W. Cook
Foreign Affairs Officer
Division of International Affairs
Atomic Energy Commission

For the Government of the Republic of Austria:

P.L.
Wilfried Platzer
Ambassador
Embassy of Austria

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., May 3, 1965.

THE PRESIDENT,
The White House.

DEAR MR. PRESIDENT: The Atomic Energy Commission recommends that you approve the enclosed proposed "Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Austria Concerning the Civil Uses of Atomic Energy," determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution. The Department of State supports the Commission's recommendation.

The proposed amendment which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, would revise the agreement between the United States of America and the Republic of Austria which was signed on July 22, 1959, and which entered into force for a period of 10 years on January 25, 1960.

First, the present agreement with Austria contains a provision in article IV that the Commission will, upon request and in its discretion, make special nuclear material available as uranium enriched up to 90 percent in the isotope U^{235} for use in research and materials testing reactors each capable of operating with a fuel load not to exceed 8 kilograms of contained U^{235} in uranium. The Government of Austria has requested that the agreement be amended so as to permit material enriched to more than 90 percent to be transferred to Austria for uses which have heretofore qualified under the agreement for material en-

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[1] The proposed amendment to the agreement for cooperation between the United States and the Austrian Republic reprinted above, although initialed by the two Governments and approved by the President, was not at the time of its submission to the Joint Committee on Atomic Energy signed by the parties or dated. Subsequently the Joint Committee was furnished with copies of the fully executed amendment, signed on June 11, 1965, by Glenn T. Seaborg, Chairman, U.S. Atomic Energy Commission, and Robert C. Creel, Deputy Assistant Secretary, Bureau of European Affairs, U.S. Department of State, for the United States, and Wilfried Platzer, Ambassador, for the Republic of Austria.

riched up to 90 percent. Such an amendment would be in accordance with our current policy with respect to the transfer of highly enriched uranium. Accordingly, article I of the proposed amendment would revise article IV of the agreement to provide that the Commission, upon request and in its discretion, may make available material enriched to more than 20 percent in the isotope U^{235} for use in research or materials testing reactors and reactor experiments each capable of operating with a fuel load not to exceed 8 kilograms of contained U^{235} in uranium. Second, Austria desires to have the opportunity to gain a limited experience in converting and fabricating enriched uranium received from the United States for use in research reactors located in third countries with whom we have agreements. Article I of the amendment, therefore, would add a new provision to article IV of the agreement which would permit transfer of special nuclear material for performance in the Republic of Austria of conversion or fabrication services, or both, and subsequent transfer to another nation or group of nations with which the Government of the United States of America has an agreement for cooperation within the scope of which such subsequent transfer falls. You will recall that a number of our other agreements have been modified to accord countries similar opportunities.

Following your determination, approval, and authorization, the proposed amendment will be formally executed by appropriate authorities of the Government of the United States of America and the Government of the Republic of Austria. In compliance with section 123c of the Atomic Energy Act of 1954, as amended, the amendment will then be placed before the Joint Committee on Atomic Energy.

Respectfully yours,

GLENN T. SEABORG, *Chairman.*

(Enclosure: Amendment to the Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Austria.)

THE WHITE HOUSE,
Washington, May 7, 1965.

Hon. GLENN T. SEABORG,
U.S. Atomic Energy Commission,
Washington.

DEAR DR. SEABORG: In accordance with section 123a of the Atomic Energy Act of 1954, as amended, the Atomic Energy Commission has submitted to me certain proposed amendments to existing agreements and has recommended that I approve each such proposed amendment, determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution. The amendments so submitted are listed below:

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Turkish Republic Concerning the Civil Uses of Atomic Energy."

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Austria Concerning the Civil Uses of Atomic Energy."

"Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the Republic of Korea Concerning the Civil Uses of Atomic Energy."

Pursuant to the provisions of 123b of the Atomic Energy Act of 1954, as amended, and upon the recommendation of the Atomic Energy Commission, I hereby—

(*a*) approve each of the proposed amendments listed above, and determine that the performance of each of these agreements as amended will promote and will not constitute an unreasonable risk to the common defense and security of the United States of America;

(*b*) authorize the execution of each of the proposed amendments on behalf of the Government of the United States of America by appropriate authorities of the Department of State and the Atomic Energy Commission.

Sincerely,

LYNDON B. JOHNSON.

E. GOVERNMENT OF THE UNITED STATES OF BRAZIL

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., July 1, 1965.

HON. CHET HOLIFIELD,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. HOLIFIELD: Pursuant to section 123c of the Atomic Energy Act of 1954, as amended, there are submitted with this letter:

(*a*) An executed "Agreement for Cooperation Between the Government of the United States of America and the Government of the United States of Brazil Concerning the Civil Uses of Atomic Energy";

(*b*) A copy of a letter from the Commission to the President recommending approval of the agreement; and

(*c*) A copy of a letter from the President to the Commission containing his determination that its performance will promote and will not constitute an unreaosnable risk to the common defense and security, and approving the agreement and authorizing its execution.

The proposed agreement, which has been negotiated by the Atomic Energy Commissoin and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, would take the place of the agreement for cooperation with the United States of Brazil which was signed on August 3, 1955, as amended by agreements signed on July 9, 1958, June 11, 1960, May 28, 1962, and September 1, 1964. The proposed agreement maintains all of the provisions of the present agreement and adds several standard modifications as indicated below which are designed to recognize conditions that have developed since the present agreement was last modified substantively.

Article II of the present agreement provides that the Commission will lease uranium enriched up to 20 percent in the isotope U^{235} to Brazil for fueling defuel elements for their 5-megawatt research reactor at São Paulo to be fabricated "transfer" is used in lieu of the word "lease" so as to permit the Commission flexibility to lease or sell fuel should a change in the Commission's policy of leasing fuel for such reactors be required during the 10-year term of the agreement.

Additionally, provision has been made in article II of the proposed agreement for the Commission, upon request and in its discretion, to make all or a portion of the enriched uranium supplied under the agreement available as material enriched to more than 20 percent in the isotope U^{235}. This modification is being made in order to accommodate a request by the Government of Brazil for new fuel elements for their 5-megawatt research reactor at São Paulo to be fabricated from material enriched to 93 percent in the isotope U^{235}. A similar provision has been incorporated in our agreements with several other countries.

As a result of the two modifications mentioned above, standard provisions with respect to rights in special nuclear material produced as a result of the irradiation processes and with respect to the reprocessing of source or special nuclear material received from the United States have been added in article II of the proposed agreement.

Article VI of the proposed agreement provides for the extension of comprehensive safeguards to materials and facilities made available to Brazil under the agreement in lieu of the minimal safeguards provided in article VI of the present agreement. The change in safeguards is required because of the increase in the enrichment of the uranium which may be supplied to Brazil under the agreement.

Article VII(A) of the proposed agreement provides that the International Atomic Energy Agency will be requested to assume responsibility for applying safeguards to materials and facilities subject to safeguards under the agreement. As the committee is aware, the 1-year extension of the present agreement to August 2, 1965, was based on the understanding that Brazil would, by that date, complete trilateral arrangements for the transfer of safeguards to the Agency. However, as a consequence of the recent review of the Agency's safeguards system by the Agency Board of Governors, a new trilateral arrangement reflecting the agreed upon simplifications and improvements in the Agency system is being drafted by the United States and the Agency. While every effort is being made to complete the trilateral agreement on a timely basis, it is felt that Brazil should be relieved of the August 2, 1965, date for transfer of safeguards should it not be possible to complete the development of the new trilateral agreement by that date, since Brazil was one of the countries which ascribed the greatest im-

portance to having the Agency's system simplified and improved. Accordingly, article VII(A) of the proposed agreement reflects that the transfer of safeguards will be made by August 2, 1965, or as soon thereafter as the trilateral arrangements reflecting the newly revised Agency system can be completed.

The agreement will enter into force when the two Governments have exchanged written notifications that their respective statutory and constitutional requirements have been fulfilled.

Cordially,

GLENN T. SEABORG, *Chairman.*

(Enclosures: (1) Proposed agreement for cooperation with the Government of Brazil (3); (2) letter from the Commission to the President (3); (3) letter from the President to the Commission (3).

AGREEMENT FOR COOPERATION BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE UNITED STATES OF BRAZIL CONCERNING CIVIL USES OF ATOMIC ENERGY

Whereas the peaceful uses of atomic energy hold great promise for all mankind; and

Whereas the Government of the United States of America and the Government of the United States of Brazil desire to cooperate with each other in the development of such peaceful uses of atomic energy; and

Whereas there is well advanced the design and development of several types of research reactors (as defined in Article IX of this Agreement); and

Whereas research reactors are useful in the production of research quantities of radioisotopes, in medical therapy and in numerous other research activities and at the same time are a means of affording valuable training and experience in nuclear science and engineering useful in the development of other peaceful uses of atomic energy including civilian nuclear power; and

Whereas the Government of the United States of Brazil desires to pursue a research and development program looking toward the realization of the peaceful and humanitarian uses of atomic energy and desires to obtain assistance from the Government of the United States of America and United States industry with respect to this program; and

Whereas the Government of the United States of America, represented by the United States Atomic Energy Commission (hereinafter referred to as the "Commission"), desires to assist the Government of the United States of Brazil in such a program;

The Parties therefore agree as follows:

ARTICLE I

A. Subject to the limitations of Article V the Parties hereto will exchange information in the following fields:

1. Design, construction and operation of research reactors and their use as research, development, and engineering tools and in medical therapy.
2. Health and safety problems related to the operation and use of research reactors.
3. The use of radioactive isotopes in physical and biological research, medical therapy, agriculture, and industry.

B. The application or use of any information or data of any kind whatsoever, including design drawings and specifications, exchanged under this Agreement shall be the responsibility of the Party which receives and uses such information or data, and it is understood that the other cooperating Party does not warrant the accuracy, completeness, or suitability of such information or data for any particular use or application.

ARTICLE II

A. The Commission will transfer to the Government of the United States of Brazil uranium enriched in the isotope U-235, subject to the terms and conditions provided herein, as may be required as initial and replacement fuel in the operation of research reactors which the Government of the United States of Brazil, in consultation with the Commission, decides to construct and as required in agreed experiments related thereto. Also, the Commission will transfer to

the Government of the United States of Brazil uranium enriched in the isotope U–235, subject to the terms and conditions provided herein, as may be required as initial and replacement fuel in the operation of such research reactors as the Government of the United States of Brazil may, in consultation with the Commission, decide to authorize private individuals or private organizations under its jurisdiction to construct and operate, provided the Government of the United States of Brazil shall at all times maintain sufficient control of the material and the operation of the reactor to enable the Government of the United States of Brazil to comply with the provisions of this Agreement and the applicable provisions of the transfer arrangement.

B. The quantity of uranium enriched in the isotope U–235 transferred by the Commission under this Article and in the custody of the Government of the United States of Brazil shall not at any time be in excess of fifteen (15) kilograms of contained U–235 in uranium enriched up to a maximum of twenty percent (20%) U–235, plus such additional quantity as, in the opinion of the Commission, is necessary to permit the efficient and continuous operation of the reactor or reactors while replaced fuel elements are radioactively cooling in Brazil or while fuel elements are in transit, it being the intent of the Commission to make possible the maximum usefulness of the fifteen (15) kilograms of said material.

C. The Commission may, upon request and in its discretion, make available all or a portion of the enriched uranium supplied hereunder as material enriched to more than twenty percent (20%) in the isotope U–235 for use in research reactors capable of operating with a fuel load not to exceed eight (8) kilograms of the isotope U–235 contained in such uranium.

D. The transfer of uranium enriched in the isotope U–235 under this Article shall be at such charges and on such terms and conditions with respect to shipment and delivery as may be mutually agreed and under the conditions stated in Articles VI and VII.

E. It is agreed that when any source or special nuclear material received from the United States of America requires reprocessing, such reprocessing shall be performed at the discretion of the Commission in either Commission facilities or facilities acceptable to the Commission, on terms and conditions to be later agreed; and it is understood, except as may be otherwise agreed, that the form and content of any irradiated fuel shall not be altered after its removal from the reactor and prior to delivery to the Commission or the facilities acceptable to the Commission for reprocessing.

F. Special nuclear material produced in any part of fuel leased hereunder as a result of irradiation processes shall be for the account of the Government of the United States of Brazil and, after reprocessing as provided in paragraph E of this Article, shall be returned to the Government of the Untied States of Brazil, at which time title to such material shall be transferred to that Government, unless the Government of the United States of America shall exercise the option, which is hereby granted, to retain, with appropriate credit to the Government of the United States of Brazil, any such special nuclear material which is in excess of the needs of Brazil for such material in its program for the peaceful uses of atomic energy.

G. With respect to any special nuclear material not subject to the option referred to in paragraph F of this Article and produced in reactors fueled with materials obtained from the United States of America which is in excess of the needs of Brazil for such material in its program for the peaceful uses of atomic energy, the Government of the United States of America shall have and is hereby granted: (a) a first option to purchase such material at prices then prevailing in the United States of America for special nuclear material produced in reactors which are fueled pursuant to the terms of an Agreement for Cooperation with the Government of the United States of America, and (b) the right to approve the transfer of such material to any other nation or group of nations in the event the option to purchase is not exercised.

H. Some atomic energy materials which the Commission may provide in accordance with this Agreement are harmful to persons and property unless handled and used carefully. After delivery of such materials to the Government of the United States of Brazil, the Government of the United States of Brazil shall bear all responsibility, insofar as the Government of the United States of America is concerned, for the safe handling and use of such materials. With respect to any source or special nuclear material or other reactor materials which the Commission may, pursuant to this Agreement, lease to the Govern-

ment of the United States of Brazil or to any private individual or private organization under its jurisdiction, the Government of the United States of Brazil shall indemnify and save harmless the Government of the United States of America against any and all liability (including third party liability) for any cause whatsoever arising out of the production or fabrication, the ownership, the lease, and the possession and use of such source or special nuclear material or other reactor materials after delivery by the Commission to the Government of the United States of Brazil or to any authorized private individual or private organization under its jurisdiction.

ARTICLE III

Subject to the availability of supply and as may be mutually agreed, the Commission will sell or lease through such means as it deems appropriate, to the Government of the United States of Brazil or authorized persons under its jurisdiction such reactor materials, other than special nuclear materials, as are not obtainable on the commercial market and which are required in the construction and operation of research reactors in Brazil. The sale or lease of these materials shall be on such terms as may be agreed.

ARTICLE III (A)

Materials of interest in connection with defined research projects related to the peaceful uses of atomic energy undertaken by the Government of the United States of Brazil, or persons under its jurisdiction, including source materials, special nuclear materials, by-product material, other radioisotopes, and stable isotopes, will be sold or otherwise transferred to the Government of the United States of Brazil by the Commission for research purposes in such quantities and under such terms and conditions as may be agreed when such materials are not available commercially. In no case, however, shall the quantity of special nuclear materials under the jurisdiction of the Government of the United States of Brazil, by reason of transfer under this Article, be, at any one time, in excess of 100 grams of contained U^{235}, 10 grams of U^{233}, 250 grams of plutonium in the form of fabricated foils and sources, and 10 grams of plutonium in other forms.

ARTICLE IV

It is contemplated that, as provided in this Article, private individuals and private organizations in either the United States or Brazil may deal directly with private individuals and private organizations in the other country. Accordingly, with respect to the subjects of agreed exchange of information as provided in Article I, the Government of the United States of America will permit persons under its jurisdiction to transfer and export materials, including equipment and devices, to, and perform services for, the Government of the United States of Brazil and such persons under its jurisdiction as are authorized by the Government of the United States of Brazil to receive and possess such materials and utilize such services subject to:

A. Limitations in Article V.

B. Applicable laws, regulations and license requirements of the Government of the United States of America and the Government of the United States of Brazil.

ARTICLE V

Restricted Data shall not be communicated under this Agreement, and no materials or equipment and devices shall be transferred and no services shall be furnished under this Agreement to the Government of the United States of Brazil or authorized persons under its jurisdiction if the transfer of any such materials or equipment and devices or the furnishing of any such services involves the communication of Restricted Data.

ARTICLE VI

A. The Government of the United States of America and the Government of the United States of Brazil emphasize their common interest in ensuring that any material, equipment, or device made available to the Government of the United States of Brazil pursuant to this Agreement shall be used solely for civil purposes.

B. Except to the extent that the safeguards provided for in this Agreement are supplanted, as provided in Article VII (A), by safeguards of the International Atomic Energy Agency, the Government of the United States of America, notwithstanding any other provisions of this Agreement, shall have the following rights:

(1.) With the objective of ensuring design and operation for civil purposes and permitting effective application of safeguards, to review the design of any

(a) reactor and

(b) other equipment and devices the design of which the Commission determines to be relevant to the effective application of safeguards,

which are to be made available to the Government of the United States of Brazil or persons under its jurisdiction by the Government of the United States of America or any person under its jurisdiction, or which are to use, fabricate, or process any of the following materials so made available: source material, special nuclear material, moderator material, or other material designated by the Commission;

(2.) With respect to any source or special nuclear material made available to the Government of the United States of Brazil or any person under its jurisdiction and any source or special nuclear material utilized in, recovered from, or produced as a result of the use of any of the following materials, equipment, or devices so made available:

(a) source material, special nuclear material, moderator material, or other material designated by the Commission,

(b) reactors,

(c) any other equipment or device designated by the Commission as an item to be made available on the condition that the provision of this subparagraph B(2) will apply,

(i) to require the maintenance and production of operating records and to request and receive reports for the purpose of assisting in ensuring accountability for such material; and

(ii) to require that any such material in the custody of the Government of the United States of Brazil or any person under its jurisdiction be subject to all of the safeguards provided for in this Article and the guaranties set forth in Article VII,

(3.) To require the deposit in storage facilities designated by the Commission of any of the special nuclear material referred to in subparagraph B(2) of this Article which is not currently utilized for civil purposes in Brazil and which is not purchased or retained by the Government of the United States of America pursuant to Article II, paragraph F and paragraph G(a) of this Agreement, transferred pursuant to Article II, paragraph G(b) of this Agreement, or otherwise disposed of pursuant to an arrangement mutually acceptable to the Parties;

(4.) To designate, after consultation with the Government of the United States of Brazil, personnel who, accompanied, if either Party so requests, by personnel designated by the Government of the United States of Brazil, shall have access in Brazil to all places and data necessary to account for the source and special nuclear materials which are subject to subparagraph B(2) of this Article to determine whether there is compliance with this Agreement and to make such independent measurements as may be deemed necessary;

(5.) In the event of non-compliance with the provisions of this Article, or the guaranties set forth in Article VII, and the failure of the Government of the United States of Brazil to carry out the provisions of this Article within a reasonable time, to suspend or terminate this Agreement and require the return of any materials, equipment, and devices referred to in subparagraph B(2) of this Article;

(6.) To consult with the Government of the United States of Brazil in the matter of health and safety.

C. The Government of the United States of Brazil undertakes to facilitate the application of the safeguards provided for in this Article.

ARTICLE VII

GUARANTIES PRESCRIBED BY THE UNITED STATES ATOMIC ENERGY ACT OF 1954

The Government of the United States of Brazil guarantees that:

A. Safeguards provided in Article VI shall be maintained.

B. No material, including equipment and devices, transferred to the Government of the United States of Brazil or authorized persons under its jurisdiction, pursuant to this Agreement, by lease, sale, or otherwise will be used for atomic weapons or for research on or development of atomic weapons or for any other military purposes, and that no such material, including equipment and devices, will be transferred to unauthorized persons or beyond the jurisdiction of the Government of the United States of Brazil except as the Commission may agree to such transfer to another nation and then only if in the opinion of the Commission such transfer falls within the scope of an agreement for cooperation between the United States of America and the other nation.

ARTICLE VII (A)

A. The Government of the United States of America and the Government of the United States of Brazil, recognizing the desirability of making use of the facilities and services of the International Atomic Energy Agency, agree that the Agency will be requested to assume responsibility for applying safeguards to materials and facilities subject to safeguards under this Agreement for Cooperation. It is agreed that the necessary arrangements will be effected without modification of this Agreement, through an agreement to be concluded between the Parties and the Agency by August 2, 1965, or as soon thereafter as the Parties and the Agency are in a position to enter into an agreement reflecting the revised Agency safeguards system provisionally approved by the Agency Board of Governors on February 24, 1965. The agreement may include provisions for suspension of the safeguard rights accorded the Commission by Article VI, paragraph B, of this Agreement during the time and to the extent that the Agency's safeguards apply to such materials and facilities.

B. In the event the Parties do not reach a mutually satisfactory agreement on the terms of the trilateral arrangement envisaged in paragraph A of this Article, either Party may by notification terminate this Agreement. In the event of termination by either Party, the Government of the United States of Brazil shall, at the request of the Government of the United States of America, return to the Government of the United States of America all special nuclear material received pursuant to this Agreement and in its possession or in the possession of persons under its jurisdiction. The Government of the United States of America will compensate the Government of the United States of Brazil for such returned material at the current United States Commission's schedule of prices then in effect domestically.

ARTICLE VIII

This Agreement shall enter into force on the date on which each Government shall have received from the other Government written notification that it has complied with all statutory and constitutional requirements for the entry into force of such Agreement and shall remain in force until August 2, 1975, and shall be subject to renewal as may be mutually agreed.

At the expiration of this Agreement or an extension thereof the Government of the United States of Brazil shall deliver to the United States of America all fuel elements containing reactor fuels leased by the Commission and any other fuel material leased by the Commission. Such fuel elements and such fuel materials shall be delivered to the Commission at a site in the United States of America designated by the Commission at the expense of the Government of the United States of Brazil, and such delivery shall be made under appropriate safeguards against radiation hazards while in transit.

ARTICLE IX

For the purposes of this Agreement:

A. "Commission" means the United States Atomic Energy Commission or its duly authorized representatives.

B. "Equipment and devices" means any instrument or apparatus, and includes research reactors, as defined herein, and their component parts.

C. "Research reactor" means a reactor which is designed for the production of neutrons and other radiations for general research and development purposes, medical therapy, or training in nuclear science and engineering. The term does not cover power reactors, power demonstration reactors, or reactors designed primarily for the production of special nuclear materials.

D. The terms "Restricted Data", "atomic weapons", and "special nuclear material" are used in this Agreement as defined in the United States Atomic Energy Act of 1954.

IN WITNESS WHEREOF, the undersigned, duly authorized, have signed this Agreement.

DONE at Washington, in duplicate, this [1] —— day of 1965.

For the Government of the United States of America:

C. W. T.
Charles W. Thomas

J. G. P.
John G. Palfrey

For the Government of the United States of Brazil:

C. B.
Antonio Borges Leal Castello Branco Filho

L. C. P.
Luiz Cintra do Prado

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., June 3, 1965.

THE PRESIDENT,
The White House.

DEAR MR. PRESIDENT: The Atomic Energy Commission recommends that you approve the enclosed proposed "Agreement for Cooperation Between the Government of the United States of America and the Government of the United States of Brazil Concerning the Civil Uses of Atomic Energy," determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security, and authorize its execution. The Department of State supports the Commission's recommendation.

The proposed agreement which has been negotiated by the Atomic Energy Commission and the Department of State pursuant to the Atomic Energy Act of 1954, as amended, would take the place of the agreement between the United States of America and Brazil which was signed on August 3, 1955, as amended by agreements signed on July 9, 1958, June 11, 1960, May 28, 1962, and September 1, 1964. The proposed agreement maintains all of the provisions of the present agreement and adds several standard modifications which are discussed below. These modifications are designed to recognize conditions which have developed since the present agreement was last modified substantively.

The present agreement with Brazil provides that the Commission will lease uranium enriched up to 20 percent in the isotope U^{235} to Brazil for fueling defined research reactors. In the proposed agreement, the word "transfer" is substituted for the word "lease" so as to permit the Commission flexibility to either lease or sell fuel should a change in the Commission's policy of leasing fuel for research reactors be required during the 10-year term of the agreement. There is no intent at present, however, to change the Commission's policy of leasing fuel for research reactors.

The Government of Brazil is arranging for the return of the fuel elements from the 5-megawatt research reactor to the United States for reprocessing and has requested that the replacement elements contain material enriched to 93 percent in the isotope U^{235}. In order to accommodate this request, the proposed agreement provides that the Commission, upon request and at its discretion, may make material enriched to more than 20 percent in the isotope U^{235} available. A similar provision has been incorporated in our agreements with several other countries.

As a result of the two modifications mentioned above, a standard provision with respect to rights in special nuclear material produced as a result of the irradia-

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[1] The proposed agreement for cooperation between the United States and Brazil reprinted above, although initialed by the two Governments and approved by the President, was not at the time of its submission to the Joint Committee on Atomic Energy signed by the parties or dated. Subsequently the Joint Committee was furnished with copies of the fully executed agreement, signed on July 8, 1965, by Glenn T. Seaborg, Chairman, U.S. Atomic Energy Commission, and Robert M. Sayre, Acting Assistant Secretary, Inter-American Affairs, U.S. Department of State, for the United States, and Juracy M. Magalhaes, Ambassador, for the Government of Brazil.

tion process has been added to the proposed agreement. The minimal safeguards provisions of the present agreement have been replaced by comprehensive safeguards provisions.

The 1-year extension of the present agreement which was granted in 1964 was based on the understanding that Brazil would, by August 2, 1965, complete trilateral arrangements for the transfer of safeguards to the International Atomic Energy Agency. However, as a consequence of the recent revision of the Agency safeguards system by the Agency Board of Governors, a new trilateral agreement reflecting agreed upon simplifications and improvements in the Agency system is being drafted by the United States and the Agency. While every effort is being made to complete the trilateral agreement on a timely basis, it is felt that Brazil should be relieved of the August 2, 1965, date for transfer of safeguards should it not be possible to complete the development of the new trilateral agreement by that date. Accordingly, the proposed agreement reflects that the transfer of safeguards will be made by August 2, 1965, or as soon thereafter as the trilateral arrangements reflecting the revised Agency system can be completed.

Following your determination, approval, and authorization, the proposed agreement will be formally executed by appropriate authorities of the Government of the United States of America and the Government of the United States of Brazil. In compliance with section 123c of the Atomic Energy Act of 1954, as amended, the proposed amendment will then be placed before the Joint Committee on Atomic Energy.

Respectfully yours,

GLENN T. SEABORG, *Chairman.*

(Enclosure: Proposed "Agreement for Cooperation Between the Government of the United States of America and the Government of the United States of Brazil.")

THE WHITE HOUSE,
Washington, June 29, 1965.

Hon. GLENN T. SEABORG,
U.S. Atomic Energy Commission,
Washington.

DEAR DR. SEABORG: In accordance with section 123a of the Atomic Energy Act of 1954, as amended, the Atomic Energy Commission has submitted to me by letter of June 3, 1965, a proposed "Amendment to Agreement for Cooperation Between the Government of the United States of America and the Government of the United States of Brazil Concerning Civil Uses of Atomic Energy," which proposed agreement would take the place of the present agreement originally signed on August 3, 1955, and most recently amended on September 1, 1964. The Atomic Energy Commission has recommended that I approve this proposed agreement in accordance with the provisions of the Atomic Energy Act of 1954, as amended.

Therefore, pursuant to the provisions of 123b of the above act, I hereby—

(*a*) approve the proposed agreement, and determine that its performance will promote and will not constitute an unreasonable risk to the common defense and security of the United States of America;

(*b*) authorize the execution of the proposed agreement on behalf of the Government of the United States of America by appropriate authorities of the Department of State and the Atomic Energy Commission.

Sincerely,

LYNDON B. JOHNSON.

APPENDIX 2

Revised Safeguards System of the International Atomic Energy Agency

[Text of revised safeguards system provisionally approved by IAEA Board of Governors on February 25, 1965*]

THE AGENCY'S REVISED SAFEGUARDS SYSTEM

1. General Considerations

A. THE PURPOSE OF THIS DOCUMENT

1. Pursuant to Article II of its Statute the Agency has the task of seeking "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world". Inasmuch as the technology of nuclear energy for peaceful purposes is closely coupled with that for the production of materials for nuclear weapons, the same Article of the Statute provides that the Agency "shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose."

2. The principal purpose of the present document is to establish a system of controls to enable the Agency to comply with this statutory obligation with respect to the activities of Member States in the field of the peaceful uses of nuclear energy, as provided in the Statute. The authority to establish such a system is provided by Article III.A.5 of the Statute, which authorizes the Agency "to establish and administer safeguards designed to ensure that special fissionable and other materials, services, equipment, facilities and information made available by the Agency or at its request or under its supervision or control are not used in such a way as to further any military purpose". This Article further authorizes the Agency "to apply safeguards, at the request of the parties, to any bilateral or multilateral arrangement, or at the request of a State, to any of that State's activities in the field of atomic energy." Article XII.A sets forth the rights and responsibilities that the Agency is to have, to the extent relevant, with respect to any project or arrangement which it is to safeguard.

3. The principles set forth in this document and the procedures for which it provides are established for the information of Member States, to enable them to determine in advance the circumstances and manner in which the Agency would administer safeguards, and for the guidance of the organs of the Agency itself, to enable the Board and the Director General to determine readily what provisions should be included in agreements relating to safeguards and how to interpret such provisions.

4. Provisions of this document that are relevant to a particular project, arrangement or activity in the field of nuclear energy will only become legally binding upon the entry into force of a *safeguards agreement*[1] and to the extent that they are incorporated therein. Such incorporation may be made by reference.

5. Appropriate provisions of this document may also be incorporated in bilateral or multilateral arrangements between Member States, including all those

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[1] The use of italic indicates that a term has a specialized meaning in this document and is defined in Part IV.

*Pursuant to the Board of Governors' resolution provisionally approving the revised safeguards system, and in accordance with the statute of the International Atomic Energy Agency, the revised safeguards system was submitted to the Ninth General Conference of the IAEA which met in Tokyo, Japan, from September 21 to 28, 1965. The revised system was approved by the General Conference and put into effect by the IAEA Board of Governors on Sept. 28, 1965.

that provide for the transfer to the Agency of responsibility for administering safeguards The Agency will not assume such responsibility unless the principles of the safeguards and the procedures to be used are essentially consistent with those set forth in this document.

6. Agreements incorporating provisions from the earlier version of the Agency's safeguards system [2] will continue to be administered in accordance with such provisions, unless all States parties thereto request the Agency to substitute the provisions of the present document.

7. Provisions relating to types of *principal nuclear facilities*, other than *reactors* which may produce, process or use safeguarded *nuclear material* will be developed as necessary.

8. The principles and procedures set forth in this document shall be subject to periodic review in the light of the further experience gained by the Agency as well as of technological developments.

B. GENERAL PRINCIPLES OF THE AGENCY'S SAFEGUARDS

The Agency's obligations

9. Bearing in mind Article II of the Statute, the Agency shall implement safeguards in a manner designed to avoid hampering a State's economic or technological development.

10. The safeguards procedures set forth in this document shall be implemented in a manner designed to be consistent with prudent management practices required for the economic and safe conduct of nuclear activities.

11. In no case shall the Agency request a State to stop the construction or operation of any *principal nuclear facility* to which the Agency's safeguards procedures extend, except by explicit decision of the Board.

12. The State or States concerned and the Director General shall hold consultations regarding the application of the provisions of the present document.

13. In implementing safeguards, the Agency shall take every precaution to protect commercial and industrial secrets. No member of the Agency's staff shall disclose, except to the Director General and to such other members of the staff as the Director General may authorize to have such information by reason of their official duties in connection with safeguards, any commercial or industrial secret or any other confidential information coming to his knowledge by reason of the implementation of safeguards by the Agency.

14. The Agency shall not publish or communicate to any State, organization or person any information obtained by it in connection with the implementation of safeguards, except that:

(*a*) Specific information relating to such implementation in a State may be given to the Board and to such Agency staff members as require such knowledge by reason of their official duties in connection with safeguards, but only to the extent necessary for the Agency to fulfill its safeguards responsibilities;

(*b*) Summarized lists of items being safeguarded by the Agency may be published upon decision of the Board; and

(c) Additional information may be published upon decision of the Board and if all States directly concerned agree.

Principles of implementation

15. The Agency shall implement safeguards in a State if:

(a) The Agency has concluded with the State a *project agreement* under which materials, services, equipment, facilities or information are supplied, and such agreement provides for the application of safeguards; or

(b) The State is a party to a bilateral or multilateral arrangement under which materials, services, equipment, facilities or information are supplied or otherwise transferred; and:

(i) All the parties to the arrangement have requested the Agency to administer safeguards; and

(ii) The Agency has concluded the necessary *safeguards agreement* with the State; or

(c) The Agency has been requested by the State to safeguard certain nuclear activities under the latter's jurisdiction, and the Agency has concluded the necessary *safeguards agreement* with the State.

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[2] Set forth in documents INFCIRC/26 and Add. 1.

16. In the light of Article XII.A.5 of the Statute, it is desirable that *safeguards agreements* should provide for the continuation of safeguards, subject to the provisions of this document, with respect to produced special fissionable material and to any materials substituted therefor.

17. The principal factors to be considered by the Board in determining the relevance of particular provisions of this document to various types of materials and facilities shall be the form, scope, and amount of the assistant supplied, the character of each individual project and the degree to which such assistance could further any military purpose. The related *safeguards agreement* shall take account of all pertinent circumstances at the time of its conclusion.

18. In the event of any non-compliance by a State with a *safeguard agreement*, the Agency may take the measures set forth in Articles XII.A.7 and XII.C of the Statute.

II. Circumstances Requiring Safeguards

A. NUCLEAR MATERIALS SUBJECT TO SAFEGUARDS

19. Except as provided in paragraphs 21–28, *nuclear material* shall be subject to the Agency's safeguards if it is being or has been:

(a) Supplied under a *project agreement*; or

(b) Submitted to safeguards under a *safeguards agreement* by the parties to a bilateral or multilateral arrangement; or

(c) *Unilaterally submitted* to safeguards under a *safeguards agreement:* or

(d) Produced, processed or used in a *principal nuclear facility* which has been:

(i) Supplied wholly or substantially under a *project agreement;* or

(ii) Submitted to safeguards under a *safeguards agreement* by the parties to a bilateral or multilateral arrangement; or

(iii) *Unilaterally submitted* to safeguards under a *safeguards agreements;* or

(e) Produced in or by the use of safeguarded *nuclear material;* or

(f) Substituted, pursuant to paragraph 26(d), for safeguarded *nuclear material.*

20. A *principal nuclear facility* shall be considered as substantially supplied under a *project agreement* if the Board has so determined.

B. EXEMPTIONS FROM SAFEGUARDS

General exemptions

21. *Nuclear material* that would otherwise be subject to safeguards shall be exempted from safeguards at the request of the State concerned, provided that the materials so exempted in that State may not at any time exceed :

(a) 1 kilogram in total of special fissionable material, which may consist of one or more of the following:

(i) Plutonium;

(ii) Uranium with an *enrichment* of 0.2 (20%) and above, taken account of by multiplying its weight by its *enrichment;*

(iii) Uranium with an *enrichment* below 0.2 (20%) and above that of natural uranium, taken account of by multiplying its weight by five times the square of its *enrichment:*

(b) 10 metric tons in total of natural uranium and depleted uranium with an *enrichment* above 0.005 (0.5%) ;

(c) 20 metric tons of depleted uranium with an *enrichment* of 0.005 (0.5%) or below; and

(d) 20 meteric tons of thorium.

Exemptions related to reactors

22. Produced or used *nuclear material* that would otherwise be subject to safeguards pursuant to paragraph 19 (d) or (e) shall be exempted from safeguards if:

(a) It is plutonium produced in the fuel of a *reactor* whose rate of production does not exceed 100 grams of plutonium per year; or

(b) It is produced in a *reactor* determined by the Agency to have a maximum calculated power for continuous operation of less than 3 thermal megawatts or is used in such a *reactor* and would not be subject to safeguards

except for such use, provided that the total power of the *reactors* with respect to which these exemptions apply in any State may not exceed 6 thermal megawatts.

23. Produced special fissionable material that would otherwise be subject to safeguards pursuant only to paragraph 19(e) shall in part be exempted from safeguards *nuclear material* to all fissionable isotopes is less than 0.3 (calculated each time any change is made in the loading of the *reactor* and assumed to be maintained until the next such change). Such fraction of the produced material as corresponds to the calculated ratio shall be subject to safeguards.

C. SUSPENSION OF SAFEGUARDS

24. Safeguards with respect to *nuclear material* may be suspended while the material is transferred, under an arrangement or agreement approved by the Agency, for the purpose of processing, reprocessing, testing, research or development, within the State concerned or to any other Member State or to an international organization, provided that the quantities of *nuclear material* with respect to which safeguards are thus suspended in a State may not at any time exceed:

(a) 1 *effective kilogram* of special fissionable material;

(b) 10 metric tons in total of natural uranium and depleted uranium with an *enrichment* above 0.005 (0.5%);

(c) 20 metric tons of depleted uranium with an *enrichment* of 0.005 (0.5%) or below; and

(d) 20 metric tons of thorium.

25. Safeguards with respect to *nuclear material* in irradiated fuel which is transferred for the purpose of reprocessing may also be suspended if the State or States concerned have, with the agreement of the Agency, placed under safeguards substitute *nuclear material* in accordance with paragraph 26(d) for the period of suspension. In addition, safeguards with respect to plutonium contained in irradiated fuel which is transferred for the purpose of reprocessing may be suspended for a period not to exceed six months if the State or States concerned have, with the agreement of the Agency, placed under safeguards a quantity of uranium whose *enrichment* in the isotope uranium-235 is not less than 0.9 (90%) and the uranium-235 content of which is equal in weight to such plutonium. Upon expiration of the said six months or the completion of reprocessing, whichever is earlier, safeguards shall, with the agreement of the Agency, be applied to such plutonium and shall cease to apply to the uranium substituted therefor.

D. TERMINATION OF SAFEGUARDS

26. *Nuclear material* shall no longer be subject to safeguards after:

(a) It has been returned to the State that originally supplied it (whether directly or through the Agency), if it was subject to safeguards only by reason of such supply and if:

(i) It was not *improved* while under safeguards; or

(ii) Any special fissionable material that was produced in it under safeguards has been separated out, or safeguards with respect to such produced material have been terminated; or

(b) The Agency has determined that:

(i) It was subject to safeguards only by reason of its use in a *principal nuclear facility* specified in paragraph 19(d);

(ii) It has been removed from such facility; and

(iii) Any special fissionable material that was produced in it under safeguards has been separated out, or safeguards with respect to such produced material have been terminated; or

(c) The Agency has determined that it has been consumed, or has been diluted in such a way that it is no longer usable for any nuclear activity relevant from the point of view of safeguards, or has become practicably irrecoverable; or

(d) The State or States concerned have, with the agreement of the Agency, placed under safeguards, as a substitute, such amount of the same element, not otherwise subject to safeguards, as the Agency has determined contains fissionable isotopes:

(i) Whose weight (with due allowance for processing losses) is equal to or greater than the weight of the fissionable isotopes of the material with respect to which safeguards are to terminate; and

(ii) Whose ratio by weight to the total substituted elements is similar to or greater than the ratio by weight of the fissionable isotopes of the material with respect to which safeguards are to terminate to the total weight of such material;

Provided that the Agency may agree to the substitution of plutonium for uranium-235 contained in uranium whose *enrichment* is not greater than 0.05 (5.0%); or

(e) It has been transferred out of the State under paragraph 28(d), provided that such material shall again be subject to safeguards if it is returned to the State in which the Agency had safeguarded it; or

(f) The conditions specified in the *safeguards agreement*, pursuant to which it was subject to Agency safeguards, no longer apply, by expiration of the agreement or otherwise.

27. If a State wishes to use safeguarded source material for non-nuclear purposes, such as the production of alloys or ceramics, it shall agree with the Agency on the circumstances under which the safeguards on such material may be terminated.

E. TRANSFER OF SAFEGUARDED NUCLEAR MATERIAL OUT OF THE STATE

28. No safeguarded *nuclear material* shall be transferred outside the jurisdiction of the State in which it is being safeguarded until the Agency has satisfied itself that one or more of the following conditions apply:

(a) The material is being returned, under the conditions specified in paragraph 26(a), to the State that originally supplied it; or

(b) The material is being transferred subject to the provisions of paragraph 24 or 25; or

(c) Arrangements have been made by the Agency to safeguard the material in accordance with this document in the State to which it is being transferred; or

(d) The material was not subject to safeguards pursuant to a *project agreement* and will be subject, in the State to which it is being transferred, to safeguards other than those of the Agency but generally consistent with such safeguards and accepted by the Agency.

III. Safeguards Procedures

A. GENERAL PROCEDURES

Introduction

29. The safeguards procedures set forth below shall be followed, as far as relevant, with respect to safeguarded *nuclear materials*, whether they are being produced, processed or used in any *principal nuclear facility* or are outside any such facility. These procedures also extend to facilities containing or to contain such materials, including *principal nuclear facilities* to which the criteria in paragraph 19(d) apply.

Design review

30. The Agency shall review the design of *principal nuclear facilities*, for the sole purpose of satisfying itself that a facility will permit the effective application of safeguards.

31. The design review of a *principal nuclear facility* shall take place at as early a stage as possible. In particular, such review shall be carried out in the case of:

(a) An Agency project, before the project is approved;

(b) A bilateral or multilateral arrangement under which the responsibility for administering safeguards is to be transferred to the Agency, or an activity *unilaterally submitted* by a State, before the Agency assumes safeguards responsibilities with respect to the facility;

(c) A transfer of safeguarded *nuclear material* to a *principal nuclear facility* whose design has not previously been reviewed, before such transfer takes place; and

(d) A significant modification of a *principal nuclear facility* whose design has previously been reviewed, before such modification is undertaken.

32. To enable the Agency to perform the required design review, the State shall submit to it relevant design information sufficient for the purpose, including information on such basic characteristics of the *principal nuclear facility* as may bear on the Agency's safeguards procedures. The Agency shall require only

the minimum amount of information and data consistent with carrying out its responsibility under this section. It shall complete the review promptly after the submission of this information by the State and shall notify the latter of its conclusions without delay.

Records

33. The State shall arrange for the keeping of records with respect to *principal nuclear facilities* and also with respect to all safeguarded *nuclear material* outside such facilities. For this purpose the State and the Agency shall agree on a system of records with respect to each facility and also with respect to such material, on the basis of proposals to be submitted by the State in sufficient time to allow the Agency to review them before the records need to be kept.

34. If the records are not kept in one of the working languages of the Board, the State shall make arrangements to facilitate their examination by inspectors.

35. The records shall consist, as appropriate, of:

(a) Accounting records of all safeguarded *nuclear material;* and

(b) Operating records for *principal nuclear facilities.*

36. All records shall be retained for at least two years.

Reports

General requirements

37. The State shall submit to the Agency reports with respect to the production, processing and use of safeguarded *nuclear material* in or outside *principal nuclear facilities.* For this purpose the State and the Agency shall agree on a system of reports with respect to each facility and also with respect to safeguarded *nuclear material* outside such facilities, on the basis of proposals to be submitted by the State in sufficient time to allow the Agency to review them before the reports need to be submitted. The reports need include only such information as is relevant for the purpose of safeguards.

38. Unless otherwise provided in the applicable *safeguards agreement,* reports shall be submitted in one of the working languages of the Board.

Routine reports

39. Routine reports shall be based on the records compiled in accordance with paragraphs 33–36 and shall consist, as appropriate, of:

(a) Accounting reports showing the receipt, transfer out, inventory and use of all safeguarded *nuclear material.* The inventory shall indicate the nuclear and chemical composition and physical form of all material and its location on the date of the report; and

(b) Operating reports showing the use that has been made of each *principal nuclear facility* since the last report and, as far as possible, the programme of future work in the period until the next routine report is expected to reach the Agency.

40. The first routine report shall be submitted as soon as:

(a) There is any safeguarded *nuclear material* to be accounted for; or

(b) The *principal nuclear facility* to which it relates is in a condition to operate.

Progress in construction

41. The Agency may, if so provided in a *safeguards agreement,* request information as to when particular stages in the construction of a *principal nuclear facility* have been or are to be reached.

Special reports

42. The State shall report to the Agency without delay:

(a) If any unusual incident occurs involving actual or potential loss or destruction of, or damage to, any safeguarded *nuclear material* or *principal nuclear facility;* or

(b) If there is good reason to believe that safeguarded *nuclear material* is lost or unaccounted for in quantities that exceed the normal operating and handling losses that have been accepted by the Agency as characteristic of the facility.

43. The State shall report to the Agency, as soon as possible, and in any case within two weeks, any transfer not requiring advance notification that will result in a significant change (to be defined by the Agency in agreement with the State) in the quantity of safeguarded *nuclear material* in a facility, or in a complex of facilities considered as a unit for this purpose by agreement with the Agency.

Such report shall indicate the amount and nature of the material and its intended use.

Amplification of reports

44. At the Agency's request the State shall submit amplifications or clarifications of any report, insofar as relevant for the purpose of safeguards.

Inspections

General procedures

45. The Agency may inspect safeguarded *nuclear materials* and *principal nuclear facilities.*

46. The purpose of safeguards inspections shall be to verify compliance with *safeguards agreements* and to assist States in complying with such agreements and in resolving any questions arising out of the implementation of safeguards.

47. The number, duration and intensity of inspections actually carried out shall be kept to the minimum consistent with the effective implementation of safeguards, and if the Agency considers that the authorized inspections are not all required, fewer shall be carried out.

48. Inspectors shall neither operate any facility themselves nor direct the staff of a facility to carry out any particular operation.

Routine inspections

49. Routine inspections may include, as appropriate:

(a) Audit of records and reports;

(b) Verification of the amount of safeguarded *nuclear material* by physical inspection, measurement and sampling;

(c) Examination of *principal nuclear facilities*, including a check of their measuring instruments and operating characteristics; and

(d) Check of the operations carried out at *principal nuclear facilities* and at *research and development facilities* containing safeguarded *nuclear material.*

50. Whenever the Agency has the right of access to a *principal nuclear facility* at all times,[3] it may perform inspections of which notice as required by paragraph 4 of the *Inspectors Document* need not to be given, in so far as this is necessary for the effective application of safeguards. The actual procedures to implement these provisions shall be agreed upon between the parties concerned in the *safeguards agreement.*

Initial inspections of principal nuclear facilities

51. To verify that the construction of a *principal nuclear facility* is in accordance with the design reviewed by the Agency, an initial inspection or inspections of the facility may be carried out, if so provided in a *safeguards agreement*:

(a) As soon as possible after the facility has come under Agency safeguards, in the case of a facility already in operation; or

(b) Before the facility starts to operate, in other cases.

52. The measuring instruments and operating characteristics of the facility shall be reviewed to the extent necessary for the purpose of implementing safeguards. Instruments that will be used to obtain data on the *nuclear materials* in the facility may be tested to determine their satisfactory functioning. Such testing may include the observation by inspectors of commissioning or routine tests by the staff of the facility, but shall not hamper or delay the construction, commissioning or normal operation of the facility.

Special inspections

53. The Agency may carry out special inspections if:

(a) The study of a report indicates that such an inspection is desirable; or

(b) Any unforeseen circumstance requires immediate action.

The Board shall subsequently be informed of the reasons for and the results of each such inspection.

54. The Agency may also carry out special inspections of substantial amounts of safeguarded *nuclear material* that are to be transferred outside the jurisdiction of the State in which it is being safeguarded, for which purpose the State shall give the Agency sufficient advance notice of any such proposed transfer.

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[3] See para. 57.

B. SPECIAL PROCEDURES FOR REACTORS

Reports

55. The frequency of submission of routine reports shall be agreed between the Agency and the State, taking into account the frequency established for routine inspections. However, at least two such reports shall be submitted each year and in no case shall more than 12 such reports be required in any year.

Inspections

56. One of the initial inspections of a *reactor* shall if possible be made just before the reactor first reaches criticality.

57. The maximum frequency of routine inspections of a *reactor* and of the safeguarded *nuclear material* in it shall be determined from the following table:

Whichever is the largest of— (a) Facility inventory (including loading); (b) Annual *throughput*; (c) Maximum potential annual production of special fissionable material (*Effective kilograms of nuclear material*)	Maximum number of routine inspections annually
Up to 1	0
More than 1 and up to 5	1
More than 5 and up to 10	2
More than 10 and up to 15	3
More than 15 and up to 20	4
More than 20 and up to 25	5
More than 25 and up to 30	6
More than 30 and up to 35	7
More than 35 and up to 40	8
More than 40 and up to 45	9
More than 45 and up to 50	10
More than 50 and up to 55	11
More than 55 and up to 60	12
More than 60	Right of access at all times

58. The actual frequency of inspection of a *reactor* shall take account of:

(a) Whether the State possesses irradiated-fuel reprocessing facilities;

(b) The nature of the *reactor;* and

(c) The nature and amount of the *nuclear material* produced or used in the *reactor.*

C. SPECIAL PROCEDURES RELATING TO SAFEGUARDED NUCLEAR MATERIAL OUTSIDE PRINCIPAL NUCLEAR FACILITIES

Nuclear material in research and development facilities

Routine reports

59. Only accounting reports need be submitted in respect of *nuclear material* in *research and development facilities.* The frequency of submission of such routine reports shall be agreed between the Agency and the State, taking into account the frequency established for routine inspections; however, at least one such report shall be submitted each year and in no case shall more than 12 such reports be required in any year.

Routine inspections

60. The maximum frequency of routine inspections of safeguarded *nuclear material* in a *research and development facility* shall be that specified in the table in paragraph 57 for the total amount of material in the facility.

Source material in sealed storage

61. The following simplified procedures for safeguarding stockpiled source material shall be applied if a State undertakes to store such material in a sealed storage facility and not to remove it therefrom without previously informing the Agency.

Design of storage facilities

62. The State shall submit to the Agency information on the design of each sealed storage facility and agree with the Agency on the method and procedure for sealing it.

Routine reports

63. Two routine accounting reports in respect of source material in sealed storage shall be submitted each year.

Routine inspections

64. The Agency may perform one routine inspection of each sealed storage facility annually.

Removal of material

65. The State may remove safeguarded source material from a sealed storage facility after informing the Agency of the amount, type and intended use of the material to be removed, and providing sufficient other data in time to enable the Agency to continue safeguarding the material after it has been removed.

Nuclear material in other locations

66. Except to the extent that safeguarded *nuclear material* outside of *principal nuclear facilities* is covered by any of the provisions set forth in paragraphs 59–65, the following procedures shall be applied with respect to such material (for example, source material stored elsewhere than in a sealed storage facility, or special fissionable material used in a sealed neutron source in the field).

Routine reports

67. Routine accounting reports in respect of all safeguarded *nuclear material* in this category shall be submitted periodically. The frequency of submission of such reports shall be agreed between the Agency and the State, taking into account the frequency established for routine inspections; however, at least one such report shall be submitted each year and in no case shall more than 12 such reports be required in any year.

Routine inspections

68. The maximum frequency of routine inspections of safeguarded *nuclear material* in this category shall be one inspection annually if the total amount of such material does not exceed five *effective kilograms*, and shall be determined from the table in paragraph 57 if the amount is greater.

IV. Definitions

69. "Agency" means the International Atomic Energy Agency.
70. "Board" means the Board of Governors of the Agency.
71. "Director General" means the Director General of the Agency.
72. "Effective kilograms" means:
(a) In the case of plutonium, its weight in kilograms;
(b) In the case of uranium with an *enrichment* of 0.01 (1%) and above, its weight in kilograms multiplied by the square of its *enrichment*;
(c) In the case of uranium with an *enrichment* below 0.01 (1%) and above 0.005 (0.5%), its weight in kilograms multiplied by 0.0001; and
(d) In the case of depleted uranium with an *enrichment* of 0.005 (0.5%) or below, and in the case of thorium, its weight in kilograms multiplied by 0.00005.
73. "Enrichment" means the ratio of the combined weight of the isotopes uranium–233 and uranium–235 to that of the total uranium in question.
74. "Improved" means, with respect to *nuclear material*, that either:
(a) The concentration of fissionable isotopes in it has been increased; or
(b) The amount of chemically separable fissionable isotopes in it has been increased; or
(c) Its chemical or physical form has been changed so as to facilitate further use or processing.
75. "Inspector" means an Agency official designated in accordance with the *Inspectors Document*.
76. "Inspectors Document" means the Annex to the Agency's document GC(V)/INF/39.
77. "Nuclear material" means any source or special fissionable material as defined in Article XX of the Statute.
78. "Principal nuclear facility" means a *reactor*, a plant for processing *nuclear material* irradiated in a *reactor*, a plant for separating the isotopes of a *nuclear material*, a plant for processing or fabricating *nuclear material* (excepting a mine or ore-processing plant) or a facility or plant of such other type as may

be designated by the Board from time to time, including associated storage facilities.

79. "Project agreement" means a *safeguards agreement* relating to an Agency project and containing provisions as foreseen in Article XI.F.4(b) of the Statute.

80. "Reactor" means any device in which a controlled, self-sustaining fission chain-reaction can be maintained.

81. "Research and development facility" means a facility, other than a *principal nuclear facility*, used for research or development in the field of nuclear energy.

82. "Safeguards agreement" means an agreement between the Agency and one or more Member States which contains an undertaking by one or more of those States not to use certain items in such a way as to further any military purpose and which gives the Agency the right to observe compliance with such undertaking. Such an agreement may concern:

(a) An Agency project;

(b) A bilateral or multilateral arrangement in the field of nuclear energy under which the Agency may be asked to administer safeguards; or

(c) Any of a State's nuclear activities *unilaterally submitted* to Agency safeguards.

83. "Statute" means the Statute of the Agency.

84. "Throughput" means the rate at which *nuclear material* is introduced into a facility operating at full capacity.

85. "Unilaterally submitted" means submitted by a State to Agency safeguards, pursuant to a *safeguards agreement*.

APPENDIX 3

Correspondence Relating to Submission of Agreements for Cooperation to Joint Committee on Atomic Energy

Joint Committee on Atomic Energy,
Congress of the United States,
April 7, 1965.

Hon. Glenn T. Seaborg,
Chairman, U.S. Atomic Energy Commission,
Washington, D.C.

Dear Dr. Seaborg: Confirming our telephone conversation today, I wish to reiterate my concern over the timing of submission to the Joint Committee of the proposed amendment and extension of the Israeli agreement for cooperation.

Last year, the AEC submitted an extension to the Israeli bilateral after the agreement had expired. At that time we questioned the legality of continuing cooperation with Israel during the interim period before the new agreement took effect. The problem created by this hiatus was emphasized by the discovery of an inadvertent shipment of a small amount of U^{235} to Israel during the intervening period.

In AEC's letter of September 4, 1964, on this subject, the Joint Committee was assured that it has been the AEC's "consistent policy to make strenuous efforts to avoid the occurrence of a hiatus between the date of expiration of agreements for cooperation and the effective date of amendments for their extension." On March 3, 1965, we again called AEC's attention to the undesirability of allowing gaps to exist between the effective dates of agreements for cooperation.

Notwithstanding this history, the proposed extension received by the Joint Committee on April 2 was not submitted on a timely basis. Given the importance attached to these agreements by Congress and the executive branch, it is a disorderly procedure to allow these gaps to be created.

Since it is not possible for the amended agreement to take effect on time and still allow for the full statutory waiting period, the AEC should take immediate steps to obtain from the Israeli Government a written assurance that during the interim period all safeguard obligations and guarantees set forth in this agreement will be complied with.

Sincerely yours,

Chet Holifield, *Chairman.*

Joint Committee on Atomic Energy,
Congress of the United States,
June 28, 1965.

Hon. Glenn T. Seaborg,
Chairman, U.S. Atomic Energy Commission,
Washington, D.C.

Dear Dr. Seaborg: During the executive meeting of the Joint Committee on June 17, 1965, the Commission and State Department representatives discussed the proposed amendment and extension of the agreement for cooperation in the civil uses of atomic energy between the United States and the United Kingdom. At that time, several members of the committee expressed the position that the Commission and the State Department should review with the British the subject of applying IAEA safeguards to this agreement in accordance with the policy of the United States concerning other bilaterals.

I note that the existing civil agreement for cooperation with the United Kingdom expires on July 20, 1965. We are again faced with the same problem that prompted my letter to you of April 7, 1965. As I stated in that letter, proposed extensions to agreements for cooperation should be submitted to the Joint Committee sufficiently in advance of their expiration so that there will not be gaps

between the effective dates of these agreements. It seems to me that a good working rule might be to submit proposed extensions of these agreements at least 2 to 3 months in advance of their expiration.

I further request that the Commission or the State Department inform the Joint Committee when negotiations of extensions of agreements for cooperation are commenced, as was done in the AEC's letter of January 28, 1965, relative to negotiations with the British.

In addition, to minimize possible later delays and misunderstandings I believe it is desirable that the Commission and the State Department keep the Joint Committee currently and fully informed as the negotiations proceed, and particularly of significant differences or disagreements between our representatives and those of the other nation during the negotiations.

A similar letter is being sent to the Secretary of State.

Sincerely yours,

CHET HOLIFIELD, *Chairman.*

JOINT COMMITTEE ON ATOMIC ENERGY,
CONGRESS OF THE UNITED STATES,
June 28, 1965.

Hon. DEAN RUSK,
The Secretary of State,
Washington, D.C.

DEAR MR. SECRETARY: During the executive meeting of the Joint Committee on June 17, 1965, the Atomic Energy Commission and State Department representatives discussed the proposed amendment and extension of the agreement for cooperation in the civil uses of atomic energy between the United States and the United Kingdom. At that time, several members of the committee expressed the position that the Commission and the State Department should review with the British the subject of applying IAEA safeguards to this agreement in accordance with the policy of the United States concerning other bilaterals.

I note that the existing civil agreement for cooperation with the United Kingdom expires on July 20, 1965. We are again faced with the same problem that prompted my letter to the Chairman of the Atomic Energy Commission of April 7, 1965, a copy of which is enclosed. As I stated in that letter, proposed extensions to agreements for cooperation should be submitted to the Joint Committee sufficiently in advance of their expiration so that there will not be gaps between the effective dates of these agreements. It seems to me that a good working rule might be to submit proposed extensions of these agreements at least 2 to 3 months in advance of their expiration.

I further request that the Commission or the State Department inform the Joint Committee when negotiations of extensions of agreements for cooperation are commenced, as was done in the AEC's letter of January 28, 1965, relative to negotiations with the British.

In addition, to minimize possible later delays and misunderstandings, I believe it is desirable that the Commission and the State Department keep the Joint Committee currently and fully informed as the negotiations proceed, and particularly of significant differences or disagreements between our representatives and those of the other nation during the negotiations.

A similar letter is being sent to the Chairman of the Atomic Energy Commission.

Sincerely yours,

CHET HOLIFIELD, *Chairman.*

DEPARTMENT OF STATE,
Washington, D.C., July 27, 1965.

Hon. CHET HOLIFIELD,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. CHAIRMAN: Thank you for your letter on the extension of agreements for cooperation in the civil uses of atomic energy.

The Department of State shares your desire to maintain a close and cordial working relationship with the Joint Committee. Indeed, this is essential if our

mutual objectives are to be achieved. I can assure you that in its handling of the international aspects of atomic energy the Department of State will keep your suggestions carefully in mind and endeavor to be responsive to them.

With warm regards,

Sincerely yours,

DOUGLAS MACARTHUR II,
Assistant Secretary for Congressional Relations
(For the Secretary of State).

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., August 3, 1965.

Hon. CHET HOLIFIELD,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. HOLIFIELD: This is in response to your letter in which you discussed the proposed amendment and extension of the Agreement for Cooperation in the Civil Uses of Atomic Energy Between the United States and the United Kingdom.

You stated the proposed extensions to agreements for cooperation should be submitted to the Joint Committee sufficiently in advance of their expiration so that there will be no gaps between the effective dates of the agreement and that a good working rule might be to submit proposed extensions of these agreements at least 2 to 3 months in advance of their expiration. We share your concern and have made every effort to complete negotiations of such amendments and to submit them to the Joint Committee in sufficient time to avoid the undersirable gaps to which you refer. We think your suggestion that the proposed amendments to these agreements be submitted to the Joint Committee at least 2 to 3 months in advance of the expiration is a good one, and we will endeavor to accomplish this. We also would be pleased to notify the Joint Committee when negotiations of extensions of agreements are commenced and, as you requested, we will keep the committee informed.

I might add that as we transfer our agreements to the International Atomic Energy Agency there will no longer exist the necessity of limiting these extensions to 1 to 2 years as there has in the past and these longer term extensions, in themselves, will help to alleviate the problem.

Cordially,

GLENN T. SEABORG, *Chairman.*

JOINT COMMITTEE ON ATOMIC ENERGY,
CONGRESS OF THE UNITED STATES,
August 16, 1965.

Hon. DEAN RUSK,
The Secretary of State,
Washington, D.C.

DEAR MR. SECRETARY: In my letter to you of June 28 I made several suggestions and requests in connection with future amendments to, or extensions of, civilian agreements for cooperation in the peaceful uses of atomic energy. I have read the State Department's letter of July 27, 1965, from the Office of the Assistant Secretary for Congressional Relations and I do not consider it responsive.

The Department of State letter of June 28 was delivered subsequent to the Joint Committee's hearing on a proposed extension of our agreement for cooperation with Brazil. At this hearing, it was stated by State Department and Atomic Energy Commission representatives that there might be a gap between the effective dates of the Brazilian agreement. We understand such a gap does, in fact, exist. This is another example of the type of problem which originally prompted my letter and which might well be solved if my suggestions were followed.

I would appreciate it if the State Department, at its earliest convenience, would specifically respond to each of the suggestions and requests that I made in my letter of June 28.

Sincerely yours,

CHET HOLIFIELD, *Chairman.*

DEPARTMENT OF STATE,
Washington, August 27, 1965.

Hon. CHET HOLIFIELD,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. CHAIRMAN: Thank you for your letter of August 16 in which you refer to your letter of June 28 making several suggestions and requests in connection with future amendments to, or extensions of civil agreements for cooperation in the peaceful uses of atomic energy.

We have once more examined carefully your letter of June 28 and wish to amplify our letter of July 27, 1965. The Department fully agrees with your request that proposed extensions or amendments to agreements for cooperation should be presented to the Joint Committee well in advance of their expiration dates so that there will be sufficient time to insure that there will be no gap between the expiration of one and the coming into force of the other. The Department plans to provide these agreements to the committee as far as possible in advance of their expiration. In most cases, we are hoping that this will be a period of 2 to 3 months. You realize I am sure that, despite our best efforts, difficulties beyond the control of the U.S. Government may sometimes arise in the negotiation of an international agreement which might make it impossible in every instance to present agreements to the committee this soon. I can, however, assure you that we will undertake to present the agreements to the committee as far in advance of their expiration date as is possible.

With reference to your request that the Department of State or the AEC inform the Joint Committee when negotiations of extensions or amendments to agreements for cooperation are commenced, I agree that this is desirable and I assure you that we will be pleased to do that.

With regard to your suggestion that the Joint Committee be kept informed as negotiations proceed, the Department believes that it is desirable to inform the committee of meaningful developments in the negotiations and will endeavor to do so.

With warm regards.

Sincerely yours,

DOUGLAS MACARTHUR II,
Assistant Secretary for Congressional Relations
(For the Secretary of State).

APPENDIX 4

Foreign Reactors Built, Being Built, or Planned as of June 30, 1965 [1]

World Reactors—Other Than the United States

Country and designation	Type	Site	Output	Criticality
Argentina:				
Operating:				
RA-1	Argonaut	Buenos Aires	30 KWt	Jan. 20, 1958
Being built:				
RAEP-1 (RA-3)	Argonaut	Ezezia Center, nr. Buenos Aires	5 MW	1965
	Power	Nr. Buenos Aires	300 MWe	
Australia:				
Operating:				
HIFAR	UTR-10	Lucas Heights, Sidney	10 MWt	Jan. 26, 1956
MOATA	Argonaut	Lucas Heights, Sidney	10 KWt	Apr. 12, 1961
Planned:				
HTGR				
Austria:				
Operating:				
ASTRA	Pool	Siebersdorf	5 MWt	Sept. 25, 1960
Prater Triga	Triga Mk II	Prater Park, Vienna	100 KWt	Mar. 21, 1962
SAR-3	Argonaut	University of Graz	1 KW	1964
Planned	Power		5–20 MWt	
Belgium:				
Operating:				
BR-1	Natural uranium graphite	Mol	4–10 MWt	May 11, 1956
BR-2	Tank	Mol	50 MWt	July 1961
BR-3	Prototype pressurized water power	Mol	10.5 MWe	Aug. 30, 1962
RR-BN-1	Pool	University of Ghent, Ghent	15–100 KWt	Sept. 1963
Planned:				
Vulcain	Spectral shift land-based power reactor	University of Liege	30–50 MWt	1967
Brazil:				
Operating:				
IEAR-1	Pool	Sao Paulo (Institute of Atomic Energy).	5 MWt	Sept. 1957
UMG	Triga Mk I	Cidade Universitaria, Belo Horizonte	100 KWt	Nov. 1960
	Research	Sao José dos Campos		
IDEN	Argonaut	University of Brazil, Rio de Janeiro	10 KW	Feb. 19, 1965
Planned	Power, natural uranium gas-cooled	South Central region nr. Guanabara	300 MWe	1969
	Power, natural uranium boiling water	Southern region nr. Tapes, Rio Grande do Sul.	100 MWe	1970
	Power, boiling water	Northern region	50 MWe	
Canada:				
Operating:				
McMaster	Pool	Hamilton, Ontario	1 MWt	1959
NPD	Power, nautral uranium heavy water moderated	Rolphton, Ontario	20 MWe	Apr. 11, 1962
NRU	Enriched uranium, heavy water moderated	Chalk River, Ontario	60 MWt	Nov. 3, 1957
NRX	Natural uranium, heavy water moderated	Chalk River, Ontario	40 MWt	July 22, 1947
PTR	Enriched uranium	Chalk River, Ontario	10 KWt	Nov. 1957
ZED-II	Natural uranium, heavy water moderated	Chalk River, Ontario	100 w	Sept. 7, 1960
ZEEP-1	Natural uranium, heavy water moderated	Chalk River, Ontario	10 w	1945

[1] Information furnished by the Division of International Affairs, U.S. Atomic Energy Commission.

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WORLD REACTORS—OTHER THAN THE UNITED STATES—Continued

Country and designation	Type	Site	Output	Criticality
Canada—Continued				
Being built:				
CANDU	Natural uranium, heavy water	Douglas Point	200 MWe	1965
WR-1	Organic cooled	Whiteshell Nuclear Research Center, Manitoba.	40 MWt	1965
Planned	Power, pressurized heavy water	Nr. Toronto	1000 MWe	1970–71
	Power, boiling light water	Nr. Quebec	250 MWe	
Republic of China:				
Operating:				
THOR (Tsing Hua Open-pool Reactor)	Pool	Hsin-Chu, Taiwan	1.6 MWt	Apr. 15, 1961
Planned	Power		300 MWe	1971–72
Colombia:				
Operating	Modified Argonaut	Nr. Bogotá	10 KWt	Jan. 20, 1965
Congo (Léopoldville):				
Operating:				
Trico	Triga Mk II	Lovanium University, Léopoldville	50 KWt	June 1959
Denmark:				
Operating:				
DR-1	Homogeneous boiling water	Risoe	500 w	Aug. 15, 1957
DR-2	Tank	Risoe	5 MWt	Dec. 19, 1958
DR-3	Pluto	Risoe	10 MWt	Jan. 17, 1960
Finland:				
Operating:				
FIR-1	Triga Mk II	Helsinki (Otaneimi)	100 KWt	Mar. 27, 1962
France:				
Operating:				
Alecto I	Critical assembly	Saclay	0	Nov. 8, 1961
Alecto II	Critical assembly, U-235 fueled	Saclay	0	Dec. 28, 1962
Alizé	Light water moderated, enriched uranium	Saclay	1 w	June 18, 1959
Aquilon	Heavy water, natural uranium	Saclay	100 w	Aug. 11, 1956
Azur	Enriched uranium	Cadarache	0	Apr. 9, 1962
Cabri	Enriched uranium	Cadarache	Low	Dec. 21, 1963
Cesar	Natural uranium graphite	Cadarache	100 KWt	Dec. 19, 1964
EDF-1	Natural uranium graphite, power	Chinon	70 MWe	Sept. 16, 1962
EDF-2	Natural uranium graphite	Chinon	170 MWe	Aug. 17, 1964
EL-1 (Zoe)	Natural uranium, heavy water moderated	Fontenay-aux-Roses	150 KWt	Dec. 15, 1948
EL-2	Natural uranium, heavy water, tank	Saclay	2.5 MWt	Oct. 21, 1952
EL-3	Enriched uranium, heavy water	Saclay	17.5 MWt	July 4, 1957
G-1	Natural uranium, graphite, power	Marcoule	5 MWe	Jan. 7, 1956
G-2	Natural uranium, graphite power	Marcoule	37 MWe	June 21, 1958
G-3	Natural uranium, graphite power	Marcoule	37 MWe	June 11, 1959
Marius	Natural uranium critical assembly	Marcoule	100 w	Jan. 8, 1960
Melusine I	Pool, enriched uranium	Grenoble	2 MWt	July 1, 1958
Melusine II	Pool	Grenoble	low	May 23, 1962

Minerve	Enriched uranium, pool	Fontenay-aux-Roses	100 w	Sept. 29, 1959
Pegase	Enriched uranium	Cadarache	30 MWt	Apr. 4, 1963
Peggy	Enriched uranium critical assembly	Cadarache	1 KW	Feb. 2, 1961
Proserpine	Homogeneous	Saclay	1 w	Mar. 17, 1958
Rachel	Critical assembly, plutonium studies on fast neutrons.	Movable	0	April 1961
Siloe	Enriched uranium	Grenoble	10 MWt	Mar. 18, 1963
Siloette	Pool	Grenoble	0	May 5, 1964
Triton	Pool, enriched uranium	Fontenay-aux-Roses	1.2 MWt	June 30, 1959
Submarine Proto (PAT) (Prototype a Terre).	Enriched uranium	Cadarache		Aug. 14, 1964
Ulysse	Enriched uranium	Saclay	100 KWt	July 23, 1961
Being built:				
EDF-3	Power, natural uranium graphite	Chinon	375 MWe	1965
EDF-4	Power, natural uranium gas-cooled, graphite moderated.	St. Laurent des Eaux, Brittany	500 MWe	1968
EL-4	Natural uranium, heavy water, gas-cooled	Brennilis	80 MWe	1967
EOLE	Heavy water, enriched U	Cadarache	1 KW	1965
Harmonie	Critical assembly, fast neutron studies	Cadarache	2 KWt	
Masurca	Cricical assembly for fast neutron studies	Cadarache		1966
Rapsodie	Fast neutron breeder	Cadarache	20 MWt	1965
SENA (joint Franco-Belgian project)	Power, pressurized water	Chooz	266 MWe	1966
Planned:				
BRENDA	Research	Cadarache	12–17 MWt	
EDF-5	Power, natural uranium, gas-cooled	Nr. Lyons	500 MWe	1968
EDF-6	Power, natural uranium, gas-cooled	St. Laurent des Eaux	500 MWe	1970
Rapsodie II	Fast breeder	Cadarache	100–150 MWe	1969
Rebecca	Triga design		250 MWt	
REMS	Research	Saclay	30 MWt	1966
Germany (West):				
Operating:				
AEGPR-10	Argonaut	Grosswelzheim	0.1 w	Jan. 27, 1961
BER	Aqueous homogeneous	W. Berlin-Wansee	50 KWt	July 24, 1958
FR-2	Heavy water cooled and moderated	Karlsruhe	12 MWt	Mar. 7, 1961
FRF	Aqueous homogeneous	Frankfurt	50–100 KWt	Jan. 10, 1958
FRG	Pool	Geestacht	5 MWt	Oct. 23, 1958
FRJ-1	Pool, 80% enriched uranium	Julich	5 KWt	Feb. 23, 1962
FRJ-2 DIDO	Enriched uranium, heavy water moderated	Julich	10 MWt	Nov. 15, 1962
FRM	Pool, light water moderated percent cooled uranium enriched to 20%.	Garching (Munich Technical Institute).	1 MWt	Oct. 31, 1957
	Enriched uranium	Berlin—Charlottenburg	0.1 w	July 17, 1963
RWE	Power, boiling water, enriched uranium	Kahl am Main	15 MWe	Nov. 13, 1960
SAR-1	Argonaut, enriched uranium	Garching	10 KWt	June 23, 1959
STARK (former SAR-2)	Argonaut, heterogenous, enriched uranium	Karlsruhe	10 KWt	June 24, 1964
SUR100	Solid homogeneous	Berlin	1 w	Feb. 28, 1962
SUR100	Solid homogeneous	Berlin	1 w	July 1963
SUR100	Solid homogeneous	Darmstadt	1 w	Sept. 1963
SUR100	Solid homogeneous	Stuttgart	1 w	Oct. 1964
SUR100	Solid homogeneous	Hamburg	1 w	Jan. 1965

WORLD REACTORS—OTHER THAN THE UNITED STATES—Continued

Country and designation	Type	Site	Output	Criticality
Germany—Continued				
Being built:				
AVR	Power, high temperature, enriched uranium	Julich	15 MWe	1965
FRG	Enriched uranium	Braunschweig	1 MW	1965
FRG	Enriched uranium	Darmstadt		1965
KRB	Power, boiling water enriched uranium	Gundremmingen	237 MWe	May 1966
MZFR (multi-purpose research)	D_2O cooled & moderated, natural uranium	Karlsruhe	200 MWt and 50 MWe	1965
FRMZ	20% enriched uranium	University of Mainz	100 KWt	1965
GKSS (ship)	Pressurized water, ship "Otto Hahn"	Kiel	38 MW	1965–66
SNEAK	Fast, critical assembly	Karlsruhe		Early 1966
SUR100	Solid homogeneous	Aachen	1 w	1965
SUR100	Solid homogeneous	Ulm	1 w	1965
SUR100	Solid homogeneous	Kiel	1 w	1965
SUR100	Solid homogeneous	Bremen	1 w	1965
PTB	Tank	Braunschweig	1 MW	1965
SWR	Enriched uranium	Stuttgart College of Technology	0.1 w	1965
VEW or KWL	Power, boiling water	Lingen	160 MWe and 90 MWe conv. superheat.	1968
Planned:				
AEG Superheat	Boiling water with nuclear superheat	Grosswelzheim	25 MWe	1968
KBWP Project	Power	Obrigheim on the Neckar	240 MWe	1968
KWN	Power, CO_2 cooled, heavy water, pressure tube	Niederaichbach	100 MWe	1968–69
KNK	Compact, sodium cooled, 6% enriched uranium fueled.	Karlsruhe	20 MWe	1968–69
AKB	Heavy water power		100 MWe	1969
HDR	Superheat	Kahl	25 MWe	1968
Ghana:				
Planned:				
IRT		Legon, Ghana		1968
Greece:				
Operating:				
Democritus	Pool	Athens	1 MWt	July 27, 1961
India:				
Operating:				
Apsara	Pool	Trombay	1 MWt	Aug. 4, 1956
CIR	Natural uranium heavy water	Trombay	40 MWt	July 1960
Zerlina	Critical assembly	Trombay	100 W	Jan. 14, 1961
Planned:				
Tarapur	Power, boiling water	Tarapur, North of Bombay	380 MWe	1967
Rajasthan	CANDU, natural uranium heavy water	Rana Pratap Sagar, Rajasthan	400 MWe	1967
Madras	Swedish-Indian, natural uranium	Kalpakkam, Madras	400 MWe	1967–68
Indonesia:				
Operating:				
IRT-1000	Pool-subcritical assembly	University of Gadjah Mada, Jogdjakarta.	0	Nov. 1961

	Triga Mk II	Bandung	250 KWt	Oct. 18, 1964
Being built:				
IRT–2000	Pool	Serpong, nr. Djakarta	2 MWt	1967
Planned	Power	Djakarta	180 MWe	1970's
Iran:				
Being built	Pool	Nr. Tehran	5 MWt	1968
Iraq:				
Being built:				
IRT–2000	Pool	Salman Pak, nr. Baghdad	2 MWt	1966
Israel:				
Operating:				
IRR–1	Pool	Nahal Sorek	1–5 MWt	June 16, 1960
Being built:				
Dimona	Natural uranium, heavy water	Nr. Beersheba	24–26 MWt	1965
Planned	Research	Haifa (Technion)		
	Power/desalting		200–1500 MWe	
Italy:				
Operating:				
AGIP	Argonaut	Bologna (San Donato)	5 MWt	1963
CAMEN	Pool	Leghorn	5 MWt	1963
CESNEF	L–54 aqueous homogeneous 20% enriched uranium.	Milan, University of Palermo	50 KWt	Nov. 27, 1959
Costanza	AGN–201, enriched uranium	University of Palermo	0.1–5 W	Feb. 12, 1960
ECO	Heavy water moderated, organic cooled, natural uranium.	Ispra	1 KWt	1963
ISPRA	Tank, enriched uranium, heavy water moderated.	Ispra	5 MWt	Mar. 24, 1959
RANA	Pool, light water moderated 20% enriched uranium.	Casaccia	10 KWt	Jan. 1964
RB–1	UO_2 pellets, graphite moderated	Montecuccolino (University of Bologna).	0	July 30, 1962
RB–2	Argonaut, 20% enriched uranium	Montecuccolino (University of Bologna).	10 KW	May 28, 1963
RC–1 (CNEN)	Triga Md II, enriched uranium to 20%	Casaccia	100 KWt	June 10, 1960
ROSPO	Organic experimental	Casaccia (CNEN Laboratory)	0	June 11, 1963
RS–1 Avogadro	Pool, enriched uranium heavy water moderated	Saluggia	5 MWt	Sept. 9, 1962
RTS–2	Pool, 20% enriched uranium	Nr. Pisa (San Piero Grado)	5 MWt	1962
SELNI	Power, pressurized water	Trino Vercellese	257 MWe	June 21, 1964
SENN (Euratom Joint R&D Program)	Power, boiling water, enriched uranium	Punta Fiume	150 MWe	June 5, 1963
SIMEA	Power, natural uranium graphite	Latina	200 MWe	Dec. 27, 1962
SITEN	Training	University of Cagliari		
Being built:				
CNEN	Training	University of Padua	Negligible	1965
ESSOR	Test, heavy water moderated, 90% enriched uranium.	Ispra	30 MWt	1965
Planned:				
SORA	Pulsed	Ispra	32 MWt	
Triga Mk II	Enriched uranium, light water moderated	University of Pavia	250 KW	1965
CIRENE	Natural uranium or lightly enriched uranium		20 MWe	1969
Japan:				
Operating:				
Hitachi	Pool, enriched uranium	Kawasaki City	100 KWt	Oct. 1962
JRR–1	Boiling water, enriched uranium	Tokai Mura	50 KWt	Aug. 27, 1957

WORLD REACTORS—OTHER THAN THE UNITED STATES—Continued

Country and designation	Type	Site	Output	Criticality
Japan—Continued				
Operating—Continued				
JRR-2	Heavy water, enriched uranium	Tokai Mura	10 MWt	Oct. 1, 1960
JRR-3	Heavy water, natural uranium	Tokai Mura	10 MWt	Sept. 12, 1962
JRR-4	Pool, enriched uranium	Tokai Mura	1 MWt	Jan. 28, 1965
JPDR	Power, boiling water, enriched uranium	Tokai Mura	12.5 MWe	Aug. 22, 1963
Kinki RR	UTR, heterogeneous, enriched uranium	Osaka	0.1 W	Nov. 9, 1961
Musashi RR	Triga Mk II, enriched uranium, critical facility	Kawasaki City	100 KWt	Jan. 30, 1963
Rikkyo University RR	Triga Mk II	Yokosuka City, St. Paul's University	100 KWt	Dec. 8, 1961
Toshiba RR	Pool, enriched uranium	Kawasaki City	30–100 KWt	Mar. 13, 1962
University of Kyoto (also Kansai Research Reactor).	Pool, enriched uranium	Kumatori, Osaka	1 MWt	June 25, 1964
JAPCO No. 1	Power, CO_2 cooled, natural uranium	Tokai Mura	169 MWe	May 4, 1965
Planned:				
Chubu Electric Co	Power	Nr. Owase-Mei-ken	250 MWe	Oct. 1970
Hokkaido Electric	Power		200–300 MWe	1975
Hokuriku Electric Power Co	Power		200 MWe	1975
Japan Nuclear Ship Development Agency	Ship propulsion, light water cooled, enriched uranium.		35 MWt	1969
JAPCO No. 2	Power, CO_2 cooled, enriched uranium	Tsuruga Peninsula	250–300 MWe	Oct. 1968
Kansai Electric Co. (3)	Power	Tsuruga Peninsula	300 MWe	1970
Kyushu Electric Power Co	Power		350 MWe	1974
Mitsubishi	Tank, light water, enriched uranium	Tokai Mura	30 KWt	Apr. 1965
Shikoku Electric Power Co	Power		300 MWe	1974
Tokyo Electric Power Co	Power	Ohkuma Village Fataba-gun	350 MWe	Oct. 1970
Korea:				
Operating:				
KRR	Triga Mk–II	Seoul	100 KWt	Mar. 19, 1962
Planned	Power		150–250 MWe	1971–75
Mexico:				
Planned	Triga Mk III	Mexico City	1,000 KWt	
	Power/desalting	On Gulf of California		
The Netherlands:				
Operating:				
BARN	Pool	Wageningen	100 KWt	Apr. 1963
HFR	Tank, high flux, enriched U	Petten	20 MWt	Nov. 9, 1961
HOR	Pool, 90% enriched uranium	Delft	100 KWt	Apr. 1963
JASON (LFR)	Argonaut, 90% enriched U	Petten	10 KWt	Sept. 27, 1960
KRITO	Pool, critical assembly	Petten	Low	Mar. 28, 1963
SUSPOP	Homogeneous-suspension, pulsed critical assembly.	Arnhem	0	1959
Being built:				
Eindhoven Athene	Argonaut	Eindhoven	10 KWt	1965

Planned:				
SEP	Power, boiling water	Doodewaard	50 MWe	
KSTR	Suspension of UO_2 and ThO_2 in light water	Arnhem	250 KWt	
Norway:				
Operating:				
HBWR	Boiling, heavy water	Halden	20 MWt	June 26, 1959
JEEP-1	Natural uranium, heavy water	Kjeller	450 KWt	June 1951
NORA	Natural uranium, pool	Kjeller	100 W	June 9, 1961
Being built:				
JEEP-2	Spectral shift	Kjeller	2 MWt	1965
Pakistan:				
Being built	Pool	Rawalpindi	5 MWt	1965–66
Planned	Power	Rooppur, East Pakistan	50 MWe	
	Power, heavy water	Karachi, West Pakistan	132 MWe	
Philippines:				
Operating:				
PRR-1	Pool	Quezon City	1 MWt	Aug. 26, 1963
Planned	Power	On Luzon		1970's
Portugal:				
Operating	Pool	Sacavem	1 MWt	Apr. 25, 1961
South Africa:				
Operating:				
Safari I	Tank, heterogeneous enriched uranium	Pelindaba	20 MWt	Mar. 18, 1965
Spain:				
Operating:				
ARBI	Argonaut	Bilbao	10 KWt	Jan. 14, 1962
ARGOS	Argonaut	Barcelona	10 KWt	Sept. 1961
JEN-1	Pool	Moncloa	3 MWt	Oct. 9, 1958
Being built:				
UEM	Power, pressurized water	Zorita de los Canes, Guadalajara	153 MWe	1967
NUCLENOR	Power	Sobrin Dam at the Ebro River	250–300 MWe	1968
Planned:				
CENUSA	Power	Castrejon Dam nr. Madrid	250 MWe	1968
DON	Power, organic cooled, heavy water moderated	Madrid	30 MWe	
Hidroelectrica Espanola	Power	Castellon de la Plana	250 MWe	1973
Sevillana	Power	South of Sevilla on the Guadalquivir River.	250 MWe	
FECSA (French-Spanish)	Natural uranium fueled	Catalonia, nr. French border	500 MWe	
Sweden:				
Operating:				
FR-0	Research	Studsvik	0	Feb. 11, 1964
R0	Natural U, heavy water	Studsvik	50 W	Sept. 25, 1959
R1	Natural U, heavy water	Stockholm	1,000 KWt	July 13, 1954
R2	Tank	Studsvik	30 MWt	Nov. 24, 1961
R2-0	Pool	Studsvik	100 KWt	June 20, 1960
R-3 (Agesta)	Power, heavy water, natural uranium	Agesta	65 MWt	July 17, 1963
Planned:				
Bashful	Boiling heavy water		400–500 MWe	1972
Homogenized Reactor PHWR	Pressurized water		400 MWe	1972
R-4 (Eva)	Power, pressurized water	Marviken	200 MWe	1968
SIMPEVARP	Power, boiling water	Kalmar County	50–60 MWe	1967

WORLD REACTORS—OTHER THAN THE UNITED STATES—Continued

Country and designation	Type	Site	Output	Criticality
Switzerland:				
Operating:				
AGN-211	AGN-211	University of Basel	1 KWt	1959
Aladin	AGN-201	University of Geneva	1 KWt	Sept. 1958
Diorit	Natural uranium, heavy water	Wurenlingen	20 MWt	Aug. 15, 1960
Saphire	Pool	Wurenlingen	1 MWt	May 1957
Planned:				
ENUSA	Power, boiling water	Lucens	5 MWe	1966
Project Consortium	Natural uranium, heavy water	Wurenlingen	30 MWt	
	Power	Willigen	50 MWt	1966
NOK (Northeast Swiss Power Co.)	Power, boiling water or pressurized water	On the Aare River at its juncture w/Rhine.	250 MWe	
Thailand:				
Operating:				
Thailand RR	Pool, heterogeneous enriched uranium	Bangkok	1 MWt	Oct. 27, 1962
Tunisia:				
Planned	Power/desalting	South Tunisia	Approximately 300 MWe.	1968
Turkey:				
Operating:				
TR-1	Pool	Cekmece, nr. Istanbul	1 MWt	Jan. 6, 1962
United Arab Republic:				
Operating:				
VVR-S	Tank	Inchass	2 MW	July 29, 1961
Planned	Power/desalting	Borg-el-Arab	150 MWe	
United Kingdom:				
Operating:				
AGR	Prototype CO_2-cooled, graphite moderated, enriched U-oxide.	Windscale, Cumberland	35 MWe	Aug. 1962
BEPO	Graphite moderated, natural-U	Harwell, Berkshire	6 MWt	July 1948
Berkeley No. 1	Power, CO_2-cooled, graphite moderated, natural-U.	Gloucestershire	145 MWe	Aug. 1961
Berkeley No. 2	Power, CO_2-cooled, graphite moderated, natural-U.	Gloucestershire	145 MWe	Aug. 1962
Bradwell No. 1	Power, CO_2-cooled, graphite moderated, natural-U.	Essex	160 MWe	Aug. 1961
Bradwell No. 2	Power, CO_2-cooled, graphite moderated, natural-U.	Essex	160 MWe	Apr. 1962
Calder Hall A (2)	Pu production and power, CO_2-cooled, graphite moderated, natural-U.	Calderbridge, Cumberland	45 MWe each	1956
Calder Hall B (2)	Pu production and power, CO_2-cooled, graphite moderated, natural-U.	Calderbridge, Cumberland	45 MWe each	1958, 1959
Chapelcross (4)	Pu production and power, CO_2-cooled, graphite moderated, natural-U.	Dumfriesshire, Scotland	45 MWe each	1959

Consort	Modified Argonaut	Imperial College of Science & Technology, Surrey.	100 KWt	Apr.	1964
DAPHNE	Heavy water moderated, highly enriched uranium, research.	Harwell, Berkshire	100 Wt	Feb.	1962
DIDO	Heavy water moderated, highly enriched uranium.	Harwell, Berkshire	15 MWt	Nov.	1956
DIMPLE	Research, light or heavy water or organic moderated.	Winfrith, Dorset	100 Wt	June	1962
DMTR	Heavy water moderated, highly enriched uranium.	Dounreay, Caithness	13 MWt	May	1958
Dounreay Fast Reactor	Enriched uranium, fast breeder	Dounreay, Caithness	60 MWt	Nov.	1959
Dragon	High temperature, He-cooled graphite moderated, enriched U.	Winfrith, Dorset	20 MWt	Aug.	1964
Dungeness No. 1	Power, CO_2-cooled, graphite moderated, natural uranium.	Kent	275 MWe	June	16, 1965
GLEEP	Graphite moderated, research	Harwell, Berkshire	3 KWt	Aug.	1947
Herald	Light water moderated, highly enriched uranium.	Aldermaston, Berkshire	5 MWt	Sept.	1959
Hero	Graphite moderated, enriched uranium-oxide	Windscale, Cumberland	3 KWt	Feb.	1962
Hector	Heated reactivity experimental	Winfrith, Dorset	100 Wt	Mar.	1963
Hinkley Plint No. 1	Power, CO_2-cooled, graphite moderated, natural uranium.	Somerset	250 MWe	May	1964
Hinkley Point No. 2	Power, CO_2-cooled, graphite moderated	Somerset	250 MWe	Nov.	1964
HMS Dreadnaught	Submarine (Skipjack Class)			Nov.	1962
Horace	Light water moderated, highly enriched uranium	Aldermaston, Berkshire	10 Wt	May	1958
Hunterston No. 1	Power, CO_2-cooled graphite moderated, natural uranium.	Androssan, Scotland	150 MWe	Sept.	1963
Hunterston No. 2	Power, CO_2-cooled, graphite moderated, natural uranium.	Androssan, Scotland	150 MWe	Apr.	1964
Jason	Training	Royal Naval College	Low power	Nov.	1962
Juno (formerly Nero)	Water moderated experimental	Winfrith, Dorset	100 Wt	Apr.	1964
Lido	Light water moderated, tank	Harwell, Berkshire	100 KWt	Sept.	1956
Neptune (Rolls Royce)	Zero energy experimental	Derby	100 Wt	Feb.	1963
Nestor	Neutron source thermal	Winfrith, Dorset	30 KWt	Sept.	1961
Northern Universities	Research, graphite moderated, water-cooled	Risley, Lancashire	100 KWt	June	1964
Pluto	Heavy water moderated, highly enriched uranium.	Harwell, Berkshire	15 MWt	Oct.	1957
Queen Mary College	UTR design, critical assembly	Queen Mary College, London	A few watts	Aug.	1964
Scottish Universities	Research, UTR 100	East Kilbride, Scotland	100 KWt	June	1963
Submarine Reactor	Land-based prototype	Dounreay, Caithness		Jan.	1965
Trawsfynydd No. 1	Power, CO_2-cooled, graphite moderated, natural uranium.	Merionethshire, Wales	250 MWe	Sept.	1964
Trawsfynydd No. 2	Power, CO_2-cooled, graphite moderated, natural uranium.	Marionethshire, Wales	250 MWe	Dec.	1964
Vera	Highly enriched uranium, fast reactor research	Aldermaston, Berkshire	100 Wt	Feb.	1961
Zebra	Zero power fast reactor	Winfrith, Dorset	100 Wt	Dec.	1962
Zenith	Zero power high temperature, gas-cooled	Winfrith, Dorset	100 Wt	Dec.	1959
Being built:					
Dungeness No. 2	Power, CO_2-cooled, graphite moderated, natural uranium.	Kent	275 MWe	Sept.	1965
Oldbury No. 1	Poewr, CO_2-cooled, graphite moderated, natural uranium.	Gloucestershire	300 MWe	Sept.	1966

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WORLD REACTORS—OTHER THAN THE UNITED STATES—Continued

Country and designation	Type	Site	Output	Criticality
United Kingdom—Continued				
Operating—Continued				
Oldbury No. 2	Power, CO_2-cooled, graphite moderated, natural uranium.	Gloucestershire	300 MWe	Dec. 1966
HMS Renown	Polaris submarine	Birkenhead, Cheshire		1968–69
HMS Resolution	Polaris submarine	Barrow-in-Furness		July 1968
SGHW	Heavy water moderated light, water cooled, enriched U.	Winfrith, Dorset	100 MWe	Nov. 1967
Sizewell No. 1	Power, CO_2-cooled, graphite moderated, natural U.	Suffolk	290 MWe	Sept. 1965
Sizewell No. 2	Power, CO_2-cooled, graphite moderated, natural U.	Suffolk	290 MWe	Dec. 1965
HMS Valiant	Submarine (hunter-killer)	Barrow-in-Furness		1965
HMS Warspite	Submarine Propulsion (hunter-killer)	Barrow-in-Furness		1965
Wylfa Head No. 1	Power, CO_2-cooled, graphite moderated, natural U.	Anglesey	590 MWe	May 1968
Wylfa Head No. 2	Power, CO_2-cooled, graphite moderated, natural U.	Anglesey	590 MWe	Feb. 1969
Planned:				
Dungeness B (2)	Power, AGR type, CO_2-cooled, graphite moderated, enriched uranium-oxide.	Kent	1,200 MWe	1970
Hinkley Point B	Power (type not determined)	Somerset	500–1,000 MWe	1970–71
PFR	Prototype fast reactor	Not announced		
HMS Repulse	Polaris submarine	Barrow-in-Furness		
HMS Revenge	Polaris submarine	Birkenhead, Cheshire		
Venezuela:				
Operating:				
RV–1	Pool	Caracas	3 MWt	July 12, 1960
Veitnam:				
Operating:				
Triga Mk II	Reserach, pool	Dalat	250 KWt	Feb. 26, 1963
Yugoslavia:				
Operating:				
RA	Heterogeneous heavy water	Vinca	7–10 MWt	Dec. 28, 1959
RB	Heterogeneous heavy water	Vinca	0	April 1958
Being built	Triga Mk II	Ljubljana	100 KW	1965
Planned	Power	Northern Croatia	350 MWe	
Soviet bloc:				
Bulgaria:				
Operating:				
IRT–1000	Pool	Institute of Physics, nr. Sofia	1 MWt	Nov. 16, 1961
Red China:				
Operating:				
TVR–S	Heavy water	Peking	7–10 MWt	1958

Planned	Research	Chungking		
	Research	Sizan		
	Research	Sungpan		
	Research	Tientsin		
Czechoslovakia:				
Operating:				
WWR–C	Pool	Rez	2 MWt	Sept 1957
Being built:				
KS–150	Power	Bohunice	150 MWe	1965
East Germany:				
Operating:				
WWR–C	Tank	Fresden	2 MWt	Dec. 1957
	Research	Rossendorf	10 KWt	Dec. 1962
	Research	Rossendorf		Dec. 1062
Being built	Power, heavy water	Neuglobsow	70 MWe	
Hungary:				
Operating:				
WWR–C	Tank	Nr. Budapest	2 MWt	Mar. 1959
Latvia:				
Operating:				
IRT–C	Research, light water, 10% enriched uranium	Salaspils	2 MWt	Oct. 1961
Poland:				
Operating:				
ANNA	Research, U–235 fueled, graphite, light water	Swierk	0	Mar. 1963
EWA	Tank, light water moderated fueled w/10% enriched U.	Swierk	2 MWt	Jan. 1958
Maryla	Swimming pool	Swierk	1–10 KWt	1963
Planned	Research, high flux	Swierk	30 MWt	
	Power	Pomeric	200 MWe	1975
Romania:				
Operating:				
WWR–C	Tank	Bucharest	2 MWt	July 1957
U.S.S.R.:				
Operating:				
AM–1	Power, graphite moderated	Obninsk	5 MWe	1954
AMB–1	Power, 1.5 % enriched U-oxide	Beloyarsk (Urals Atomic Power Stations).	100 MWe	Sept. 25, 1963
AMB–2	Power, boiling water, graphite moderated	Beloyarsk	200 MWe	1963
APS	Graphite moderated	Obninsk	30 MW	May 1954
APS–1	Package power	Obninsk	50 MWe	1961
ARBUS	Liquid, organic moderated and cooled	New Melekess, Ulyanovsk	0.75 MWe	Sept. 1963
Siberian nuclear power plant (6)	Power, graphite, natural U	Troitsk	100 MWe	1st, 1958
BR–1	Plutonium oxide, research	Obninsk		Early 1955
BR–5 (formerly BR–2)	Sodium, fast reactor	Obninsk	5 MWt	June 1959
Fursov Pile	Graphite	Moscow Institute of AE	500 KW	1946
IBR	Uncooled, fast neutron pulse	Dubna	1 KWt	June 1960
IR	Water		50 MWt	1951–52
IRT–A	10% enriched uranium	Moscow Institute of Phys. Eng	2 MWt	1962
IRT–E	Light water, pool type, 10% enriched uranium	Sverdlovak	1 MWt	1962
IRT (rebuilt)	Light water, tank type, 36 % enriched uranium	Moscow Atomic Energy Institute	4 MWt	Late 1963

WORLD REACTORS—OTHER THAN THE UNITED STATES—Continued

Country and destination	Type	Site	Output	Criticality
Soviet bloc—Continued				
U.S.S.R.—Continued				
Operating—Continued				
IRT–B	Light water, 10 % enriched U	Toilisi	2 MWt	Nov. 1959
IRT–2000	Light water, 10 % enriched U	Minsk	1 MWt	May 1962
IRT–D	Light water, 10 % enriched U	Tomak	1 MWt	May 1962
LENIN (3) (Icebreaker)	Ship propulsion			1962
Nuclear Submarines (26 according to "Jane's Fighting Ships").	Propulsion			
OR	Organic, 10 % enriched uranium	Moscow Institute of AE	300 KWt	May 1960
Romanshka	Compact thermoelectric prototype		500–800 w	Tested in 1964
RPT III	Light water cooled, tank, graphite mod., 90% enriched U.	Moscow Atomic Energy Institute	20 MWt	Late 1963
SM–50	Light water	Melekess, nr. Ulyanovsk	50 MWt	1961
TVR (rebuilt)	Heavy water, 2% enriched U	Moscow	2.5 MWt	June 1957
WWR–2 (rebuilt)	Light water	Moscow Atomic Energy Institute	3 MWt	1955
WWR–M	Light water, tank, 20% enriched U	Leningrad	10 MWt	Dec. 1959
WWR–M	Light water, tank, 20% enriched U	Kiev	10 MWt	Feb. 1960
WWR–C	Light water, tank, enriched U	Moscow State University	2 MWt	1954
WWR–C	Light water, tank, enriched U	Tashkent	2 MWt	Sept. 1959
WWPR–1 (1 of 2)	Power	Novo Voronezh	210 MWe	Dec. 17, 1963
SM–2	Tank, water, 90% enriched UO_2	Melekess Institute, nr. Ulyanovsk	50 MWt	Oct. 1961
Being built:				
AMB–2 (2 of 2)	Power, pressurized water	Beloyarsk	200 MWe	1965
BN–50	Power, boiling water	Ulyanovsk	50 MWe	
IRT–E	Research, pool	Sverdlovsk	2 MWt	1965
IRT–A	Light water	Moscow	2 MWt	1965
MTR	Materials weapons training, 90% enriched uranium.	Melekess	75 MWt	1965
Nuclear submarines	Several known to be under construction.			
	Package power plant for Arctic regions	New Melekess	750 KWe	
WWR–K	Light water	Alma-Ata, Kazakh	10–20 MWt	1965
WWR–M	Light water	Moscow	10 MWt	
	Power	Nr. Sverdlovsk	1,000 MWe	1965
WWPR–2 (2 of 2)	Power, pressurized water	Novovoronezh	360 MWe	1965
Planned:				
	Chemical radiation research	Obninsk	10 MWe	
BN–250	Power, fast breeder	Ulyanovsk	250 MWe	Postponed
	Power, fast neutron breeder	Novovoronezh	500 MWe	
	Research	Dubna	10 MWt	
	Power, boiling water, with nuclear superheat	Melekess		
BN–350	Power/desalting	Shevchinko, on Caspian Sea	300 MWe	
Nuclear icebreakers	Pressurized water			1971

APPENDIX 5

AEC Letter Concerning Equipment Grants to IAEA for 1965

U.S. Atomic Energy Commission,
Washington, D.C., September 28, 1965.

Mr. John Conway,
Executive Director, Joint Committee on Atomic Energy, Congress of the United States, Washington, D.C.

Dear Mr. Conway: This is to inform the Joint Committee that the AEC and the Department of State have approved an offer to provide equipment grants estimated at a total value of $55,000 to the International Atomic Energy Agency for technical assistance projects approved by the Agency under its 1965 program in the following countries:

Country	Equipment	Estimated cost
1. Brazil	Plant growth chamber and hygrothermograph	$8,500
2. Chile	Some components for a spin resonance spectrometer	10,000
3. China	Medical scintillation scanning system	12,000
4. Colombia	Actigraph, paper electrophoresis sytem, and vacuum distilling apparatus.	6,100
5. Philippines	Laboratory monitors, survey meters, analysis unit kit, ionization meter, and miscellaneous radiochemical accessories.	4,200
6. Rhodesia [1]	Two portable scaler ratemeters with scintillation detectors and strip chart recorders.	5,200
7. Thailand	Hygrothermograph, low-temperature cabinets, moisture testers, laboratory counters, vacuum-pressure pump, and other accessories.	6,500
8. Uruguay	Carborne scintillometer assembly for uranium prospecting	2,500

[1] Request for assistance submitted by the United Kingdom on behalf of Rhodesia (not a member of IAEA) for a hydrology project being undertaken by the Agriculture Research Council of Central Africa.

As in previous years, these grants will be funded from funds made available under the Agency for International Development appropriation for providing voluntary contributions in kind to the Agency. The equipment will be procured by our New York operations office. A request for equipment for a scientific documentation project in East Pakistan is still under consideration, due to remaining discrepancies in the specifications of some of the items requested, which may require a few more weeks to clarify. However, since the Agency was most anxious to know at the earliest possible date which projects we intended to support in order to proceed with other projects in its program, we concluded that it was preferable not to delay the entire grant any longer because of one project. Accordingly, in informing the Agency of these grants, we have advised them that a decision on the project in East Pakistan will be forthcoming in the near future.

Sincerely yours,

Dwight Ink,
Assistant General Manager.

APPENDIX 6

Address by Senator Albert Gore Before American Nuclear Society, June 22, 1965

International Agreements for Cooperation in the Peaceful Uses of Atomic Energy

Ladies and gentlemen, I wish to compliment you for your selection of Gatlinburg as the site for this meeting of the society. The Great Smoky Mountains area is always an attractive setting. The location seems particularly fitting and appropriate, moreover, when one considers that this national meeting of the American Nuclear Society is being held less than 2 hours' drive from the home of the atom—Oak Ridge, Tenn.

I should like to express my gratitude and that of my colleagues in Congress for the wonderful role that the people gathered in this hall have played in bringing this country's nuclear program such a very great distance in a relatively short time. You can be justly proud of the contributions the society's membership has made in securing America's preeminent position in nuclear energy.

My long membership on the Joint Committee on Atomic Energy—I have been a member of the committee for 11 years—and my abiding interest in foreign affairs have given me the opportunity to learn at first hand the potential for worldwide good that is bound up in the atom. Our mastery of the atom and our intellectual and material resources, properly used, can produce inestimable benefits for the world, particularly those nations of the world much less fortunate than our own. Such developments have an important bearing on our world position in relation to that of the Soviet Union.

Tonight I would like to discuss with you some of the things that have been and are being done by the United States in this area.

Until the early 1950's world conditions, the state of our nuclear arsenal and the explicit terms of the Atomic Energy Act of 1946 restricted development of peaceful uses of the atom. In 1953, however, the conjunction of a precarious peace, an unmatched nuclear capability, and the end of the U.S. monopoly of atomic weapons permitted this Nation seriously to consider devoting a portion of our nuclear capacity to purposes other than armament and eliminating some of the secrecy in which our atomic program was enshrouded. These circumstances also allowed the Congress to consider relaxing the provisions contained in the Atomic Energy Act of 1946 on the exchange of peaceful nuclear data with our friends abroad.

The result was the enactment by Congress of the Atomic Energy Act of 1954. This act considerably liberalized the provision of the earlier act relating to private participation in the domestic program. In addition, the 1954 act went far toward removing the exclusivism in atomic energy matters manifested in the 1946 act, by providing an affirmative basis for widespread cooperation by the United States with other nations in fostering the benign uses of atomic energy.

The act authorizes the negotiation of agreements with foreign nations under which the Atomic Energy Commission may transfer and exchange atomic information dealing with industrial, nonmilitary uses of atomic energy. The Commission may also under this authority transfer to another nation atomic materials in quantities needed for the development or utilization of atomic energy for nonmilitary and research purposes. American manufacturers, meanwhile, were permitted by this legislation to transfer to countries having such an agreement with the U.S. Government certain equipment and materials, including reactors and reactor components, not otherwise exportable.

Most of the foreign activities carried on by the United States in the field of civilian nuclear uses are required to be conducted within the framework of an agreement for cooperation. An agreement for cooperation is a bilateral agree-

ment between the United States and another nation. Proceeding on the side of caution, Congress established some rather stringent procedural requirements that must be adhered to by the AEC before a proposed agreement for cooperation can come into force.

The Atomic Energy Act required that the AEC first submit the proposed agreement to the President, together with its recommendations concerning the terms, conditions, duration, nature, and scope of the cooperation. The agreement must contain each of the following:

First, a guarantee by the cooperating nation that security safeguards and standards as set forth in the agreement will be maintained;

Second, a guarantee by the cooperating nation that material transferred pursuant to the agreement will not be used for military purposes; and

Third, a guarantee by the cooperating nation that material or restricted data transferred pursuant to the agreement will not be transferred to unauthorized persons or beyond the jurisdiction of the cooperating party, except as specified in the agreement.

Notwithstanding all of these safeguards, the President, before he can give his approval to the agreement and authorize its execution, must make an affirmative determination in writing that performance of the agreement will promote and will not constitute an unreasonable risk to the common defense and security.

Once these obstacles have been overcome, the Atomic Energy Commission must submit the proposed agreement to the Joint Committee on Atomic Energy. There it must lie for a period of 30 days while Congress is in session before it can take effect. During these 30 days the Joint Committee has the opportunity—and believe me, it takes the opportunity—to subject the proposed agreement to the closest scrutiny. Each proposed agreement, and each proposed amendment to an existing agreement, is usually the subject of a public hearing. Occasionally in these hearings it is unavoidably necessary to tread upon diplomatic sensibilities in order to get the information we desire. Normally, however, we get the answers we are looking for, in which case the 30-day waiting period is allowed to expire without more. With this accomplished, the agreement may take effect.

While the range of activities that can be undertaken under these bilateral agreements is not unlimited, it is sufficient to permit this country to be of some real assistance to nations less advanced in the nuclear art than our own. Under these agreements the Atomic Energy Commission has been able to supply friendly foreign nations with nuclear materials for use in fueling reactors and for application in the fields of medicine, agriculture, industry, and basic research; to exchange technical information; to provide training to selected foreign nations; and to cooperate with other nations and international organizations in designated areas of research and development.

One needn't look very far to find the reasons which motivate these pursuits. One, of course, is the entirely human tendency to want to assist those less fortunate than ourselves. A certain amount of self-interest plays a part in this too, however.

We are engaged in a worldwide struggle for the allegiance of those people not yet firmly committed to either of the major competing ideologies. Healthy, happy, well-fed, and well-clothed peoples have little reason to cast their lot with an ideology bent upon revolution.

To make the world safer, then, it is incumbent upon us to assist those nations whose standards of living are inadequate, and I can think of no more rapid way to help breach the gap between the have and have-not nations than through the use of the peaceful atom. In helping others to help themselves to the benefits of atomic energy, therefore, we are drawing nearer the day when there will be little room for an ideology based on the violent overthrow of the existing order.

An important byproduct of our Government's activity in these enterprises has been the opening up of new sales outlets for American industry. As I indicated earlier, American manufacturers of reactors, reactor components, and certain other equipment are permitted by the Atomic Energy Act of 1954 to export these products to countries or to enter into licensing arrangements with foreign countries with which the United States has an agreement for cooperation. These new business opportunities have proved a rather substantial source of income for a number of companies, and at the same time have had a beneficial impact on this Nation's balance of payments.

At this time bilateral agreements are in effect with 37 countries, under which, through 1964, we have sold or leased special nuclear material valued at $117.5

million. Through these agreements five U.S.-built power reactors have been exported and are now operable. Another 55 U.S.-built research and test reactors have been built or are in the planning and construction stage. Reactor grant payments of $350,000 each have been made to 20 of the 26 nations with whom we have made commitments to assist in funding the cost of a completed research reactor and associated facilities, and a more sizable payment of $500,000 to the Philippine Government has already been made. These contributions become due and payable upon receipt of certification of completion of the project.

The United States has also made grants of equipment valued at a total of $2.5 million under 23 of these bilateral agreements. The policy of making equipment grants directly to our bilateral partners ceased in 1962 when this country began to channel its grants through the International Atomic Energy Agency. Since that time U.S. grants of equipment valued at $556,000 have been made through the IAEA to 14 nations.

These statistics sound impressive and in most respects they represent real achievements. I think the program has been worth while and, for the most part, very successful. Nevertheless, I suspect that on too many occasions international politics rather than nuclear science or nuclear engineering played a decisive role in the selection of recipients for our assistance; once assistance has been rendered to one country, the State Department and the AEC have found it very difficult to turn down proposals from neighboring nations who want to share in the prestige associated with possessing a nuclear reactor.

Moreover, in the early stages of the program we all too often found that once the reactor had been constructed and the fuel turned over to the foreign government, there was inadequate followup assistance by the AEC to assure that the facility was properly utilized. History has shown that in some of the developing countries the reactor was operated for a short time and then shut down entirely, or the research activity at the reactor center was reduced to a level far below that which would justify its continued operation.

With Joint Committee prompting, the AEC has adopted certain measures to correct this situation. Occasional surveys of the activities being conducted in these foreign programs and, where necessary, appropriate followon assistance are now standard operating procedures for the AEC. In this connection, a noteworthy development of fairly recent origin was the institution of the so-called sister laboratory relationship between the national laboratories of the AEC and some of their smaller foreign counterparts.

In 1962 the scientists at the Brookhaven National Laboratory, in recognition of the need for the provision of some kind of assistance to the Turks if their reactor were to be effectively utilized, began to furnish scientific guidance concerning the planning and conduct of experiments at the Turkish Nuclear Center near Istanbul—experiments that would be carried out not simply as a training program for the Turkish scientists, but experiments that would result in a significant contribution to nuclear technology. The sister laboratory arrangement between the Brookhaven National Laboratory Group and the Turkish Nuclear Group has been underway for 3 years now, and while an unqualified assessment would be premature, all indications are that it has been the basis for the development of a fine program at the center.

Based on this favorable experience it is my belief that this sort of arrangement should be extended to laboratories in other developing countries. I was gratified, therefore, with the AEC announcement that a sister laboratory relationship has been established between the Koreans and the scientists at the Argonne National Laboratory.

Diplomats and government administrators can draft and sign agreements for cooperation in the uses of atomic energy. In the final analysis, however, it is the individual scientists who work together and exchange ideas who make these cooperative arrangements worth while.

As you are well aware, there are many peaceful uses of atomic energy which can be explored by people of the developing countries working on problems of major significance to their own economic well-being. The use of radioisotopes in medicine and agriculture is well known. Food irradiation is another area in which experiments can be carried out that may have a far-reaching effect in these countries, as well as in our own country. I believe that the sister laboratory relationship, although very small in terms of dollars and man-hours of scientific effort, can have a salutary effect upon our image in these developing countries. If American scientists provide guidance to the scientists of other nations who are

capable of conducting and willing to undertake research for the purpose of solving their own problems, we will have done a good deed, not only for those in the foreign nations but for ourselves as well.

As I stated earlier, each of the bilateral agreements entered into during the last decade has required the cooperating nation to guarantee that none of the fissionable materials transferred pursuant to the agreement will be devoted to military applications. The agreements further provide for periodic onsite inspections by the AEC to assure against such diversion. These inspections have cast the United States somewhat in the role of a policeman—and, as everyone is aware, a policeman's lot is not a happy one. For this reason, and for the further reason that we must begin to establish a worldwide system of inspection and control if we are to minimize the danger to world peace posed by nuclear weapons, the United States has supported the process of transferring these safeguard responsibilities to the International Atomic Energy Agency.

The IAEA, the establishment of which was initiated by the United States in 1953, is in a unique position to carry out this responsibility. It can administer controls strictly and impartially with minimum injury to national pride, and at the same time assure uniformity in the application of such safeguards. As a token of our earnest support for this international organization, the United States during the years between 1957 and 1964 has contributed $26.2 million toward its upkeep.

More important, however, has been our moral commitment to the Agency. In 1962 the United States placed four reactors under Agency safeguards to demonstrate the effectiveness of the inspection system which had been adopted for reactors producing up to 100 thermal megawatts. When, in 1964, the Agency's Board of Governors approved the extension of international safeguards to cover power reactors greater than 100 thermal megawatts, the United States responded with an offer, subsequently accepted, to permit international inspection of the large Yankee Power Reactor at Rowe, Mass. To date inspectors of the International Atomic Energy Agency, on eight separate occasions, have visited the reactor as part of the inspection program.

Yankee is the first large-size reactor to be subject to these inspections. When we announced our intention to put it under inspection, it was our hope that other nations would follow our lead. It was gratifying, therefore, to learn just last week that the United Kingdom has voluntarily agreed to submit its twin reactors at the Bradwell Nuclear Station to IAEA safeguards. These twin reactors are capable of generating a total of 300 electrical megawatts. To date the U.S.S.R. has not been receptive to our suggestion that a Russian reactor come under IAEA safeguards.

Further exemplifying this commitment is the Joint Committee policy of strongly encouraging the AEC to insist that as individual bilateral agreements come up for renewal, they include provisions for the assignment of the safeguard responsibilities to the International Agency. The first such assignment occurred on September 23, 1963, when a trilateral agreement was consummated between the United States, Japan, and the IAEA. To date, arrangements for the Agency to administer safeguards applicable to U.S.-furnished materials, equipment, and technology have been made with 11 countries.

Some nations seem to feel that IAEA inspection is a symbol of second-class citizenship in the nuclear world, and for this reason have balked at the transfer of this responsibility to the Agency. A case in point is India.

In 1963 the AEC proposed to enter into an agreement for cooperation with the Indians whereby the United States would assist them in the construction of a 380,000 electrical kilowatt nuclear power station at Tarapur, 100 miles north of Bombay on the west coast of India. In the early stages of negotiating this agreement, while U.S. inspection was acceptable to them, India's representatives strongly resisted placing their reactor under IAEA inspection. For a while it appeared that the AEC and the State Department were inclined to a solution under which there would be inserted in the agreement an equivocating provision calling for U.S. inspection and "sympathetic consideration" by India to the possible later application of Agency safeguards.

When the Joint Committee learned of this possible compromise the committee informed these government agencies that it would refuse to support the construction of the Tarapur reactor until the Indian Government agreed to IAEA inspection. The committee could not understand how the United States could ask other nations to come around to our policy of transferring safeguard arrangements to the IAEA if we did not adhere to this policy in the case of large reactors with weapons-producing potential, such as the one involved here. Furthermore,

in our view a failure to impose internationally applied safeguards in this case would have been a severe setback to our policy of requiring international inspection and a crucial blow to the IAEA.

As a result of the Joint Committee's unrelenting position, a provision was inserted in the proposed agreement for cooperation under which India accepted the application of international safeguards to the Tarapur installation. The Joint Committee gave its support to the revised agreement and it is now in force.

Subsequent to the India agreement, we had some minor problems with other nations wanting to resist imposition of IAEA safeguards. Israel, for example, for a while was not receptive but finally came around. In April, Israel signed a new agreement for cooperation with the United States, which includes IAEA inspection terms.

Governmental resolve alone will not enable the International Agency to achieve the goals that have been established for it. It requires in addition widespread public support, and as scientists you are in a particularly strong position to give tangible evidence of your support for the ideals embodied in this organization. Increasing numbers of competent scientists will be needed in our cooperative programs with other nations. Technically trained individuals also will be needed as more and more nuclear facilities come under international control and inspection. Unless the Agency is able to secure the highly trained individuals necessary for the conduct of these technical undertakings, it will be unable to maintain the confidence necessary to make such a system work. It is my hope, therefore, that American scientists, and nuclear trained engineers and technicians, will make their talents available to the IAEA when the opportunity presents itself.

The world of today is one of turmoil and crisis. In our own hemisphere we found it necessary to take unilateral action in the Dominican Republic to protect the lives and property of American citizens and to forestall the possibility of another Cuba in the Caribbean.

What for some years has been loosely termed a brush fire war in southeast Asia has, unfortunately, become escalated into a conflict of major proportions for which military and political solutions became increasingly elusive.

The threat of a nuclear confrontation between East and West is always with us. Without the recent break in the monolithic front of the Communist world, the stresses and strains of Vietnam would undoubtedly have made this threat even more serious than it is. Indeed, the possibility that Vietnam may cause a healing of the breach between the Soviet Union and Red China may well turn out to be one of the greatest dangers arising from our unhappy involvement in the Vietnamese struggle.

Even though we may continue to avoid a direct confrontation with the Soviets, there remains the specter of Red China herself emerging as a nuclear power, with scant evidence that her leaders possess the maturity of judgment and restraint which has thus far led existing nuclear powers to recognize that there can be no victory in a nuclear holocaust.

Because of the intransigence of the Soviets on the questions of effective international control and inspection, the nations of the world have not yet found it possible to achieve an effective method for control of nuclear weapons. The limited test ban treaty was a solid step in that direction, but it falls far short of effective control of nuclear weapons themselves. As additional nations achieve a nuclear weapon capability, particularly when Red China is one of those nations, the problem becomes even more complex.

Under the circumstances, the degree of international cooperation achieved in the field of peaceful uses of the atom is significant. The United States had led the way. Through the bilateral agreements we have shared our substance and our technical know-how with other nations. Through our sponsorship of the IAEA, we have demonstrated again our willingness to work with and through an international agency in matters concerning nuclear material, retaining our firm insistence upon effective inspection safeguards over the use of that material.

The program for exchange of nuclear material and knowledge has not been an unqualified success. That would be too much to expect. I doubt, for example, that the bilateral agreement with Indonesia has contributed much either to nuclear knowledge or international understanding.

But, as I have indicated, many of the agreements have contributed to the world's nuclear technology in peaceful uses of atomic energy. In my opinion, this program has in no way endangered our national security. And there are signs that many nations are beginning to accept the concept of international inspection as embodied in IAEA.

If progress thus far made can be continued, perhaps, in time, the potential for good in the atom will make it easier to guard against its use for destruction.

APPENDIX 7

Materials on Safeguards Inspections

A. Technical Basis and Background of Safeguards [1]

In the technical sense, safeguards—as used here—means a system of controls designed to detect any diversion of materials or equipment committed to the peaceful uses of atomic energy to any military purpose. Safeguards, therefore, in the direct sense detect, rather than prevent, diversion. Their effectiveness in preventing diversion is derived indirectly from the deterrent effect which the consequences of detection may exert on the would-be diverter. Hence the aim of safeguards is to detect diversion to any military purpose. Many possible types of violations are of interest to the safeguard system—for example, the use of a reactor to undertake research on reactors for military purposes. However, the most serious and important type of violations is the diversion of fissionable material to research on or use in atomic weapons, and only this aspect is covered in this discussion. The fissionable material subject to safeguards and, thus susceptible to diversion, may be either that supplied directly from one country to another or that produced from the use of a reactor of materials supplied under safeguards.

EARLY DEVELOPMENT

The idea of controls to avoid the military use of atomic energy is nearly as old at atomic energy itself. In the Baruch plan that was presented immediately after World War II, the emphasis was on full ownership and operation of at least all critical atomic energy facilities by the controlling authority. With the failure of the Baruch plan to be accepted and with the development of national military program in the United Kingdom and the Soviet Union, the emphasis shifted to the development of controls which could be applied to militarily oriented national programs to assure that they were longer being used for military purposes; that is, to disarmament controls. In contrast to the Baruch plan, disarmament studies were concentrated on control systems in the strict sense of the word; that is, systems under which the operation of the facilities would continue to be undertaken by national operating authorities, with a control organization superimposed to determine the utilization of all material and equipment. These studies indicated that such systems could be devised and that if the systems were of sufficient intensity they could have an effectiveness in terms of detecting diversion approaching the accuracy of the various measurement methods. This was generally considered to be in the range of 2 or 3 percent. Most studies showed that to be of such high effectiveness, the system would have to be rather elaborate and involve the use of numerous personnel with their associated equipment. For systems of less intensity, the chance of detecting diversions of this magnitude, of course, decreased. No system short of complete operation of the facility by the control authority—and perhaps not even that—could give 100-percent assurance at the technical level that any diversion would be detected.

During the same time period, important progress was made in the application and development of control systems and techniques through the vigorous program of materials accountability or nuclear materials management which was carried out in the U.S. atomic energy program and, presumably in other national programs as well. The domestic program provided an important and valuable basis for the development of safeguards systems designed for control of material abroad. Since both systems have as their objective the detection

[1] Prepared by the Division of International Affairs, U.S. Atomic Energy Commission, February 1965.

of diversion of material to unauthorized uses, many of the same elements and techniques can and do appear in both systems.

There are, however, important differences between a control system designed to be applied nationally and one designed to be applied internationally. In the national context there is a strong presumption that the management and the vast majority of the personnel employed in the operation of atomic energy facilities will be guided by national policy and will not divert material from the uses specified by the Government. Any attempted diversion, therefore, is most likely to be on a small scale and the act of only one or a few people. In the international context, while diversions of this type cannot be ruled out, the system must be designed primarily to cope with the possible situation that a diversion might be attempted by the operating nation iself with the cooperation and support of the facility management and all of the facility personnel. This basic difference places substantially different requirements on the control systems and leads to a different emphasis on the various elements which go to make up a system.

National control or materials management systems may have, in addition to the detection of diversion, the important subsidiary objective of helping to assure the economic use and management of nuclear material. The achievement of this objective requires the acquisition of knowledge not only of whether any material has been diverted, but also how much and what kind of material has been produced, used, or is present in various parts of the system. A safeguards system, on the other hand, need determine only whether material has been diverted, and if it can do so without requiring information on how much material remains in the authorized peaceful channels, it has fulfilled its objective.

With the passage of the Atomic Energy Act of 1954 and the subsequent development of an extensive program of international cooperation, the need for the development of a safeguards system to be applied to materials distributed abroad became immediate. The first agreements calling for the export of reactors and fissionable material abroad were executed in 1955. These early agreements were limited to the export of research reactors and small quantities of material with a maximum of 20-percent enrichment. To a degree, therefore, they contain a self-implementing safeguards system. They reduced the safeguards problem by limiting the kinds of assistance to those which were inherently of little or no military significance. These limitations were possible because there was no immediate requirement for cooperation of a kind where a more comprehensive safeguards system which would clearly be needed.

Despite these limitations even the earliest agreements contained provisions which gave the United States the right to observe from time to time the research reactors and fuel provided for them to determine that they were still being employed for the maintained purposes. In practice, these limited rights have been entirely adequate to apply the kinds of safeguards required for materials and equipment of this nature.

SAFEGUARD RIGHTS

The Atoms-for-Peace program contemplated from the outset that assistance would be given and materials would be distributed for use in the generation of power by nuclear reactors. This meant that large quantities of plutonium would result from the cooperative activities and the development of a safeguards system to accommodate this problem was therefore pursued.

It was recognized that the application of an effective safeguards system would depend on the acquisition of ample rights on behalf of the inspecting authority to enable him to undertake the necessary control measures. Thus, the first step was the formulation of this system of rights. If these rights could be made sufficiently broad, the development of the detailed techniques of control could continue over a longer period, since the actual construction and operation of reactors producing large amounts of plutonium was several years away. Indeed, it can be said that a safeguards system consists of both the rights vested in the controlling authority and the actual measures by which these rights are implemented. The existence of the rights themselves, so long as the possibility of their implementation is maintained through the activities of the inspectorate, is an important element in the total effectiveness of the system.

The system of rights included in U.S. comprehensive bilateral agreements beginning in 1956 and, in almost identical words, in the statute of the IAEA, are an impressive and unprecedented step in international relations. They provide the inspecting authority, that is, the United States in the case of bilateral safe-

guards and the IAEA in the case of Agency arrangements, with the right to send into the recipient country inspectors who shall have access at all times and to all places and data as necessary to account for material and to determine that the commitment to peaceful uses is being observed. This right of access is the central right on which the United States and the IAEA systems are based. It has proven to be sufficiently broad so that any reasonably conceivable safeguard system required by practice can be fitted within it. There are supplementary but important rights—again quite comparable in both U.S. bilaterals and the Agency statute. These include the right to approve the design of facilities from the standpoint of whether effective safeguards can be applied, the right to require the maintenance of satisfactory records, and the right to approve the means for reprocessing material from the standpoint of effective application of safeguards. Neither U.S. bilaterals nor the Agency statute are broad enough to deprive a country of the right to use any plutonium which it has produced under safeguards, so long as this plutonium is used for peaceful purposes under continuing safeguards. Both U.S. bilaterals and the Agency statute, however, do have mechanisms for the transfer of any plutonium produced under safeguards which is excess to its needs for peaceful purposes. Both the bilaterals and the statute also contain the important concept of "pursuit"; that is, the principle that safeguards apply not only to materials and equipment supplied in the first instance, but also to any material produced as a result of the use of safeguarded material or equipment through each successive generation.

SAFEGUARDS PROCEDURES

In application, a safeguards system depends upon two principal elements. First, the maintenance and review of records showing the receipt, production, consumption, transfer, and present location of all nuclear material. Second, the undertaking of actual on-site inspections designed to determine the validity of these records and, therefore, the compliance with the commitment to peaceful uses. A summary description of how safeguards are undertaken in the U.S. bilateral program is given in "U.S. Bilateral Safeguards Inspections."

The effectiveness of a record-keeping system as an element in a safeguards system requires some comment. Where material is transferred from facility to facility and particularly where these various facilities fall under different national jurisdictions, a record-keeping system can be an important and effective means of control in its own right. Where material remains under the national control of a single country, the effectiveness of a records system as a means of control as contrasted merely with a source of information on which to base inspections, is greatly reduced. The atomic energy authority of a nation involved in a deliberate effort to divert material could, and presumably would have to, devise and maintain a set of false records designed to obscure its activities.

On-site inspections are the second and crucial element of a safeguards system. The inspections, in turn, may consist of elements of two kinds. First are the steps involved in conducting a physical inventory of material at a given installation to determine whether it complies with the reported figures. The second are the measures of a physical security nature; that is, measures to determine directly whether there has been any unauthorized removal of material. The seals placed by the Agency on the Yankee reactor, and their inspection, are an example of this kind of measure. Particularly in situations where resident inspection is called for and applied, measures in this category may become an extremely important part of the overall safeguards system. While it is difficult to place numerical limits on their effectiveness, this effectiveness may be quite high.

The application of physical security measures of this nature may permit a substantial reduction in the intensity of inventory control techniques with a resultant overall simplification of the system. This is because, as noted previously, the sole objective of safeguards, as opposed to a national accountability system, is to determine whether any material has been removed from the system to unauthorized uses. If the question of diversion can be determined with assurance, it is of no particular importance to the inspector to determine how much material being properly employed remains within the system.

EXPERIENCE TO DATE

Most of the inspection experience acquired to date both by the AEC and by the IAEA has involved comparatively small facilities and amounts of materials. It has also been confined largely to reactors. The material has often, though

not always, been delivered in fuel element form and it is also often returned in the same form. With an increase in the performance of fabrication and reprocessing abroad, new safeguards problems will be presented.

Diversion from a reactor can occur in two different ways. First, by the diversion either before or after diversion, of material known to have been supplied for use in the reactor, or, second, by the irradiation in the reactor of fertile material not declared or reported as having been charged to the reactor. This can be thought of as the diversion of neutrons. For reactors operating on natural or slightly enriched uranium and producing plutonium, the principal safeguards problem, reduced to its simplest terms, is to assure that any material irradiated in the reactor, regardless of its origin, is delivered to a controlled reprocessing facility. If this assurance can be obtained, it makes no difference whether the power output and plutonium production of the reactor are known or not. In practice, because these assurances may not be absolute, it makes sense to develop a system with as many cross-checks as possible. For this reason, information on reactor operation leading to a knowledge of a flow of material through the reactor and estimates of plutonium production are a desirable feature of the safeguards system applied to reactors.

For research reactors without substantial plutonium production capability, the safeguards problem is one of determining that the material supplied for the reactor remains in the reactor or in other controlled channels. This is particularly important where, as is often the case, the research reactor is fueled with highly enriched material, itself suitable for weapons utilization. The size and simplicity of research reactors is such that in many cases the fuel can be physically observed and counted. Moreover, any significant removal of fuel from a research reactor will often prevent its operation. The analysis of the discharged fuel elements of a research reactor when they are reprocessed, completes the material balance and provides a final effective check as to whether any diversion has occurred.

The problems of safeguarding power reactors vary among reactor types. Relevant factors include the presence or absence of on-power charge-discharge machines, the enrichment of the fuel, the time required for removal of the head and fuel, the design of the fuel storage facilities, and other.

Comparatively, little experience has been accumulated so far in the safeguarding of facilities other than reactors. The principal types of facilities in these categories are fuel fabrication plants and reprocessing plants. From the safeguards point of view these facilities share the characteristic of handling fissionable material in dispersed, easily transportable form, as contrasted with the fabricated fuel elements present at a reactor. This fact increases the opportunity for diversion at fuel fabrication and reprocessing plants. On the other hand, it also permits the application of sampling and analytical techniques of materials accountability which are difficult if not impossible to apply to reactors and to their costly fabricated fuel elements.

Probably the central fact of safeguards is that controls must be applied at each step of the fuel cycle. This is essential not only because opportunities for diversion exist in every operation, but because controls applied in this way reinforce each other and supply cross-checks on the effectiveness of the controls applied to the preceding and subsequent operations. As noted earlier, where these operations occur in different countries under independent national control, the cross-checks can be particularly valuable.

EFFECTIVENESS OF SAFEGUARDS

The question of the effectiveness of safeguards is frequently raised. Unfortunately, there is no clear-cut technical answer to this question. Quantitative limits of accuracy can be placed on the various measurements and analyses required to determine the amount of material at each point in a nuclear complex. These measurements and analyses, if performed independently by the inspecting authority, provide one approach to determining the effectiveness of a safeguard system. However, this statistical approach ignores two factors—first, the physical security measures which may be employed to permit actual or inferential observation of diversion and, second, the deterrent effect that the overall safeguards system exerts on the would-be diverter. In the final analysis, the effectiveness of a safeguards system in preventing diversion is a political question. If the probability of detection is high, it is likely that the probablity of prevention is nearly total.

INSTRUMENTATION

One aspect of safeguards which deserves special mention is the possibility of using instruments to reduce or eliminate physical inspections by inspection personnel. In the broad sense, of course, instruments are employed in the present system both those installed in facilities by the operator and those under the control of inspectors. Power level and related measuring instruments at reactors could, in theory, provide a measure of plutonium output that would serve as the input measurement to a reprocessing plant and greatly simplify the need for direct surveillance of the reactor. In practice, however, this approach suffers from two drawbacks—the fact that power level measurements are not convertible with high precision to plutonium production, and the fact that the instruments are under the control of the operator and are, therefore, subject to deliberately induced error. Instruments of this type, while not useless in a safeguards system—particularly if they are subject to checking and calibration by the inspectors—are of only limited value as a subsidiary means of data for cross-checking purposes.

It was recognized early in the development of safeguards systems, however, that instruments could be of substantially greater value if they were "tamperproof"; that is, not subject to manipulation by the operator. The work that has been done to date on tamperproofing indicates that it is not easy to achieve. Moreover, tamperproofing overcomes only one of the shortcomings of instruments noted above so far as measurement instruments in the usual sense of the word are concerned. On the other hand, instruments in the broad sense, particularly including those intended simply to indicate whether a particular operation—such as removal of a reactor closure—has or has not taken place, can perform a valuable service in the simplification of a safeguard system. This, too, is an area where further study is called for.

THE IAEA SAFEGUARDS SYSTEM

Even as the United States was negotiating and implementing its bilateral agreements and applying its safeguards thereunder, concerted efforts were being made to bring about the development and adoption of a safeguards system by the IAEA. This was recognized as the first step in achieving acceptance of IAEA safeguards by a number of countries.

The reason why it was necessary to formally develop an IAEA safeguards system requires some comment. It has already been noted that the IAEA statute contains a series of safeguard rights expressed in very broad terms designed to enable the application of virtually any conceivable safeguards system.

The IAEA membership and particularly those nations who might potentially come under the system, have felt a need for a fairly detailed definition of the scope and intensity of the safeguards system which the Agency would actually apply in the implementation of its safeguards rights.

Discussions with other Agency members convinced the United States that there was no possibility of obtaining Agency approval of a complex safeguards system covering the whole range of possible activities that might ultimately come under Agency safeguards. Consequently, the United States decided to adopt an evolutionary approach to the development of an Agency system, seeking approval for various parts of it as the need arose. The first step, was the development of a system for reactors of less than 100 megawatts and for related small research and development activities.

One of the most controversial points in developing the Agency safeguards system for reactors under 100 megawatts was, as anticipated, the frequency of inspection. While it can be argued that the intensity of each inspection may be as important as the frequency of inspections in determining the impact of the system on the facility and country involved, the fact is that inspection frequency has come to be regarded as the principal measure of the intensity of an inspection system. A U.S. proposal during the development of the original system for small reactors was successful in achieving agreement on the question of inspection frequency. Under this proposal, the inspection frequency varies with the productive capacity of the reactors, rising to a maximum of six inspections per year at 100 megawatts thermal or equivalent. This approach, developed with the help of the Pacific Northwest Laboratories, assumes that the inspection frequency should be such as to permit the detection of diversions of 200 grams of fissionable material in the interim between inspections.

In 1963, development of an extension of the Agency system to reactors of greater than 100 mewagatts thermal was undertaken. While many points were debated, the principal issue again was that of inspection frequency. It was recognized that with larger reactors, particularly of certain types, continuous or resident inspection might be required. Extension of the system was agreed upon and following a review of the system in 1964, specific agreement was obtained on the principle of resident inspection, as well as the principle of inspection without advance notice. Both of these techniques may be necessary for the effective safeguarding of large reactors and other large and complex facilities, such as reprocessing plants.

The current status of the Agency system is that it has been provisionally approved as of February 1965 by the Agency Board of Governors. It will be submitted to the Agency's General Conference taking place in September in Tokyo, and it should be given final approval by the Agency's Board of Governors at the Agency's 1966 Board meeting.[2]

The development of an Agency safeguards system is only a step toward the end objective of bringing about the actual application of this system in all countries receiving U.S. nuclear assistance. The United States is now steadfastly committed to the widespread adoption of this system as soon as possible.

One concern expressed in obtaining acceptance of IAEA controls is with the nationality of the inspectors and, implicitly, the concern that inspectors of unfriendly nations will be used who might harass the inspected country's activities. Under the Agency statute as well as under its safeguards regulations, every inspected country must be consulted in connection with the appointment of inspectors. The United States strongly supports this right so as to insure that no attempt is made to employ inspectors of a nationality which might give rise to a question of their objectivity. On the other hand, it must be recognized that no country subject to inspection by the IAEA should be entitled to limit inspections to nationals of only its closest friends and allies. The nationality of the inspectors which have been employed in the United States illustrates that, between the two extremes, there is a commonsense solution to this problem.

Another issue frequently raised by countries who are asked to submit to IAEA inspection is that of compromise of trade secrets. The Agency safeguards system calls for strict protection and limitation on distribution of all information gained by inspectors in the course of their activities. When reactors are sold, particularly abroad, the information which can be acquired from observing these rectors must in any case be assumed to have been placed in the public domain. Taken together, these facts lead to the conclusion that there is no serious risk of loss of trade secrets and proprietary information through Agency inspections.

In the development of the Agency system, two kinds of questions arose. The difficulty in distinguishing between these two questions led to a great deal of difficulty in reaching agreement on the system. Not simply for historic reasons but because this distinction is still important to the development of U.S. safeguards policy, it should be explained at this point.

The first question to be considered in the establishment of a safeguard system is: What are the circumstances which give rise to the application of the system in the first place? The second question is: What kind of safeguards procedures should be applied to those activities which for one reason or another, have become subject to the system? Under the Agency's statute, the Agency is authorized to apply safeguards under three circumstances: (*a*) where the Agency has assisted in the project, (*b*) where two parties to a bilateral agreement have requested the Agency to apply its safeguards, and (*c*) where a single nation voluntarily requests the Agency to apply its safeguards to the activity. That, of course, is the circumstance under which the Agency is applying safeguards at the Yankee reactor.

In the case where safeguards are based on assistance supplied by the Agency, the nature of the assistance which should give rise to safeguards must be determined. This same question arises in the development of national safeguards policy. There is a degree of assistance that is so remote, insignificant, or generally available that it would be impracticable for a supplying country to require safeguards from a recipient country. Examples are often cited such as

[2] See in this connection explanatory footnote on p. 79.

copper wire, nuts and bolts, concrete, or steel, all of which may end up in a reactor, but whose supply can hardly be used as a basis for requiring safeguards. Thus, the question is presented of what is the nature and degree of assistance which when supplied by one country to another, or by the IAEA, should give rise to, or "trigger," safeguards. Despite the fact that there is little likelihood that the IAEA will act as a major supplier of nuclear assistance, this question has been extensively debated in the IAEA.

The principle is now accepted in the Agency system that the nature of the safeguards to be applied to a particular project depends on the nature of the project, its productive capacity, etc., regardless of the circumstances under which the particular project came under the Agency safeguards system. Moreover, the emphasis in this system is on detecting the diversion of any fissionable material to military use—regardless of whether the "trigger" item was material, equipment, or, perhaps, financial assistance. From the standpoint of what items will trigger safeguards when supplied through the Agency, the general approach adopted is that Agency safeguards will be applied when the Agency has supplied either source or fissionable material, a reactor or substantial parts thereof, or several other specialized materials. In the case of material, exemption limits are specified. In the case of components of a reactor, the Board determines in each case whether the supply has been substantial enough to warrant the applications of safeguards.

The Agency system recognizes, however, that when two parties to a bilateral arrangement request the Agency to apply its safeguards, the Agency may do so regardless of the nature of the supply arrangements between the two parties.

Since the Agency is not playing and is not expected to play a major supply role, these principles, despite the extent to which they were debated, are important primarily to the extent of the importance they may have on the policies of individual supplier countries. A major and continuing problem in the field of safeguards is the achievement of agreement on the items or activities which will form the basis for a requiremnt that safeguards be applied to the project being assisted. Competition among suppliers in safeguards would create a major threat to the system.

PROBLEM AREAS AND FUTURE EVOLUTION

Safeguards to date have been applied only on a limited scale. All the indication from this experience, and from the basic technical considerations involved, are that effective safeguards can be developed and applied without undue interference to the design and operation of facilities and without significant effect on the cost of the finished product—electric power. Nevertheless, more experience is needed. Inspection personnel must be increased many fold in number if the system is to grow with the growing application of nuclear power. The system must be expanded to encompass new types of facilties—particularly large fabrication and reprocessing plants. The possible use of instruments to reduce manpower and inspection requirements must be further studied and exploited.

All of these are areas which are receiving active attention at the present time.

B. U.S. Bilateral Safeguards Inspections [3]

As pointed out in the paper on technical basis and background of safeguards, the safeguards system depends on two principal elements: First is the maintenance and review of records showing the receipt, production, consumption, transfer, and present location of all nuclear material. The second is the undertaking of actual on-site inspections designed to determine the validity of these records and therefore the compliance with the commitment to peaceful uses. In this paper a summary description is given of the second element, inspections, as typically carried out in the U.S. bilateral program. Presentation of this summary does not set a prototype inspection. U.S. inspections have in the past varied from this description and it may be expected that in the future different procedures will be used. It should be noted particularly that most of the facilities which have been inspected so far have been research reactors and the related fuel fabrication facilities.

[3] Prepared by the Division of International Affairs, U.S. Atomic Energy Commission, July 1965.

PLANNING THE INSPECTION SCHEDULE

Safeguards inspections are planned on a semiannual basis. The determination of the frequency of inspection for a given facility follows the criteria adopted by the International Atomic Energy Agency. Under these criteria the frequency of inspection is a function of—

(*a*) the possession by the country of an irradiated fuel reprocessing facility;

(*b*) the nature of the reactor facility;

(*c*) the nature of the nuclear material used or produced in the reactor facility; and

(*d*) the amount of nuclear material used or produced in the reactor facility;

INSPECTION PREPARATION

The first step in preparing for an individual inspection is a detailed review of USAEC records on nuclear material and facilities subject to U.S. safeguards in a particular country. The periodic material balance reports submitted by the country are reviewed to determine nuclear material location for preparation of the inspection itinerary. The reports are also compared to USAEC records and differences, if any, are listed in the workpapers prepared for the inspection for resolution during the course of the inspection. Particular attention is paid to the country's listing of nuclear material processing and consumption losses and to the explanation for these losses. These are losses which are normal to the operation of nuclear fuel fabrication and chemical processing facilities. Of course, unusual losses are reported immediately and special inspections scheduled if necessary. Loss amounts are compared to those experienced in the past in similar processes and those, if any, that appear larger than might be expected are listed in the workpapers for investigation during the inspection. Also, included in the workpapers are descriptions, including quantity and type of material, of all U S. nuclear material shipments to the country to be inspected.

Usually the U.S. Embassy is asked about 3 weeks before the scheduled beginning of the inspection to notify the host country of the planned inspection and suggested itinerary. On arriving at the country to be inspected the visit is coordinated with the control officer designated by the American Embassy or consulate. Following this the government agency responsible for the implementation of the agreement for cooperation is usually visited to discuss inspection plans and itinerary.

INSPECTION IMPLEMENTATION

The type of inspection being described here does not include the element of physical security measures. The inspection therefore consists of—

(*a*) review of reports and records;

(*b*) examination of the facility and material under safeguards;

(*c*) physical inventory to verify amounts of material by physical inspection, measurement, and sampling; and

(d) examination and testing of measurement instruments.

If a country has a central point at which nuclear material records for the whole country are kept, the inspection is initiated with a review of these records. They are compared to the records kept by the USAEC and the differences and comments, if any, are discussed. The review at the central records station also permits the inspectors to obtain current information on material movements and the inspection itinerary is adjusted if necessary.

At each reactor, fuel fabrication plant, laboratory, or other facilities, the inspection begins with a review of the records which are compared with USAEC records and also with the country's central records. At this point differences between these records and processing and operating losses are discussed. Following this, the inspection itinerary for the facility is planned so that the on-site verification of the accuracy of the records can be conducted with minimum interference with the operation of the facility.

For reactors the physical inventory usually begins with the fuel elements and other material in cold storage. Here the elements are counted and the number compared to that given in the records. In the cases where serial numbers are listed on the shipping documents these numbers are compared with those on the elements. Selected elements are then scanned with a gamma ray spectrometer to establish enriched uranium content.

Radioactive reactor fuel elements contained in hot storage are counted and Cerenkov radiation is noted when present. (Cerenkov radiation is characteristic to elements that have been used in an operating reactor.) The number of elements in hot storage is compared with the number listed in the facility records. When possible, hot elements are moved near the surface of the storage pool and the increase in radioactivity at the surface of the pool is observed. This is another qualitative indication to establish that the element had been in the operating core.

The quantity of nuclear material in the core of an operating reactor usually cannot be directly determined. During the inspection various indirect indications of this quantity are observed. Information on reactor power level is usually available from the main power meter and power can be calculated from coolant water inlet and outlet temperatures and the coolant waterflow rate. The reactor control road settings may be noted for comparison with past experience. The strip chart records for selected time periods are reviewed. At each opportunity instrument calibrations are observed and special calibrations include interchange of fuel elements and observation of the effect on control rod settings. At beam ports and other experimental facilities gamma ray fields are monitored using portable instruments carried by the inspectors. Gamma fields may also be detectable at the coolant loops, heat exchangers, and ion exchange columns. These gamma ray measurements are qualitative and are useful mainly in giving independent confirmation of the fact of operation at power. At swimming pool type reactors the core is usually clearly visible from above the surface of the water which serves as the reactor shield and in these reactors the number of elements in the core can be counted and the Cerenkov radiation is visible. (In addition to this information obtained during inspections, a complete analysis of the spent fuel elements is obtained when they are reprocessed in the United States or in a safeguarded facility overseas.)

At facilities such as laboratories and fuel fabrication plants where nuclear material is found in fuel element form and other forms such as powder, solutions, metal, etc., material inventory is verified by piece count, where possible, and by weighing. Samples are taken of material in forms amenable to sampling and removed to USAEC laboratories for analysis. Where possible, inspectors also observe analysis of samples at facility laboratories to establish uranium content. Also, selected inventory samples are scanned by a portable gamma spectrometer to establish U^{235} content.

For the analysis using gamma spectrometry, a portable gamma ray spectrometer similar to one used domestically on nuclear material survels is used. The assay method utilized is based on the detection of gamma rays characteristic to the decay of U^{235}. The portable gamma ray spectrometer is used to detect and measure the intensity of this characteristic gamma ray being emitted from a sample. The results are then compared to the data previously obtained from a similar sample containing a known amount of U^{235} to give an indication of the U^{235} content. The safeguards group has developed procedures to extend the use of this instrument to the assay of enriched uranium in plate-type fuel elements, fuel plates, fuel-plate cores, powders, and pellets. In addition the instrument is used to establish the presence of enriched uranium in forms difficult to assay such as in meal scrap and in UF_6 cylinders.

The presence of plutonium in a container can also be established by plotting its gamma spectrum. The results obtained from the use of this instrument during actual insepctions have been consistent with those results obtained during the calibration of the instrument at domestic fuel fabrication facilities.

Finally, following the records review and inventory verification at research facilities—research reactors and laboratories—the programs and experiments, using facilities and nuclear material subject to safeguards, are reviewed in detail to ascertain that the research does not contribute to any military purpose.

APPENDIX 8

Remarks by Congressman Chet Holifield, Chairman, Joint Committee on Atomic Energy, Atomic Industrial Forum-American Nuclear Society Luncheon, Washington, D.C., November 15, 1965

Atomic Energy Policies: Domestic and International

PART I: DOMESTIC POLICIES

It is my distinct pleasure to be invited once again to deliver the address at this annual joint luncheon of the Atomic Industrial Forum and the American Nuclear Society. I believe all of us really look forward to these fall meetings because they provide us with a chance to take stock of how far we have come together—where we are today and where we want to be tomorrow.

I have enjoyed 20 years of intimate participation in our national atomic energy program, and can well recall many such "gatherings of the nuclear clan." Some of the people I see here today were also present in those earlier sessions, and can remember how remote many of our objectives seemed then. Things that we accept as accomplished facts today—such as the 18 civilian power reactors in operation or under construction in the United States, our operating fleet of 54 nuclear submarines, and our vast national capability for mining and milling uranium—were visions we hoped and believed would some day become realities. New goals have now taken their place, and these too call for best endeavors. We are much like a party of mountain-climbers who pause from time to time to survey the route ahead; the way is difficult, but we can take heart by glancing back.

Changing Government-industry relationships

As I look back over the past we have climbed together, it seems to me one of the most significant features of the ascent has been the changing relationship of the Government and industry in the national program for development of peaceful uses of atomic energy. Less than two decades ago the atomic energy domain was a U.S.-Government monopoly—the most extensive one ever created in this country. The military aspects of the program dominated everyone's thoughts, and the role of industry was almost entirely that of support for the Government's military efforts.

However, the authors of our first national atomic energy charter recognized that this would not always be the case—that modifications in this relationship would come about in time. We therefore established a governmental framework which was flexible, and could be adapted to the changes in this new field. The first section of the 1946 Atomic Energy Act expressed our underlying philosophy in the following words:

"The effect of the use of atomic energy for civilian purposes upon the social, economic, and political structures of today cannot now be determined. It is a field in which unknown factors are involved. Therefore, any legislation will necessarily be subject to revision from time to time. It is reasonable to anticipate, however, that tapping this new source of energy will cause profound changes in our present way of life."

By 1953, a few successes in developing experimental reactors for central station power use had engendered a tremendous amount of enthusiasm about the future of a commercial nuclear industry. There were great pressures to turn the entire development of atomic energy over to private hands. A few individuals mistakenly believed this vast force would quickly be developed for the benefit of the American people if the Government withdrew and left the job solely to industry.

One year later, in 1954, the atomic energy law was altered, and private industry was wholeheartedly invited to participate in the vital undertaking of introducing a new energy source into the American economy. Encouraged by this change in the law, many companies enthusiastically invested in the promising new field.

The results of the new approach were somewhat mixed, as we all know. It quickly became obvious that the costs of developing the new technology were much greater than many had anticipated. It also became obvious that the Government would have to offer substantial incentives to private companies to induce them to participate in developing atomic power. The efforts of the Joint Committee and the AEC to provide these incentives through the cooperative power reactor demonstration program are a familiar story to us.

There have been disappointments which have someties marred our successes in this enterprise. There have been times in the past when I have criticized the private sector of the nuclear industry for failure to respond adequately to the challenge of the 1954 act. There have also been times when I have criticized the AEC for lack of leadership. However, I clearly see an overall trend developing in the assumption by private industry of greater responsibility and authority for harnessing the peaceful atom. Likewise, the Atomic Energy Commission has increasingly exercised the leadership we should expect from the Government, by laying out in its 1962 Report to the President a long-term program for the utilization of atomic energy.

In 1962 the first large-scale nuclear power reactors were initiated, with the encouragement of the Joint Committee through modification of the AEC's power demonstration program for reactors of over 400,000 kilowatt capacity.

In 1963, events took place which literally and figuratively had an "electrifying effect" on the Nation—the decisions by two utilities to construct large-size power reactors without direct Government financial assistance. The year 1963 also saw the conclusion of arrangements for construction and operation of a privately owned chemical reprocessing plant, a major step in making the nuclear fuel cycle part of our free enterprise system. These developments, coupled with the predictions of growth contained in the AEC's report to the President, clearly indicated the new position private industry would assume on the atomic energy scene. 1963 was also the year that the coal and fuel transportation industries began to react vigorously to the potential competitive challenge of atomic energy. Americans have already reaped a rich harvest from this reaction, and these benefits in terms of lower prices for fossil fuels will continue to grow over the years.

With the passage of the private ownership law last year a true milestone was passed—one of the most significant since the enactment of the 1954 legislation. Like the 1954 law, the private ownership statute creates a framework for further progress. It provides clear guidelines to the AEC, and at the same time affords latitude for dealing with new problems as they emerge. The private ownership law is another concrete step to move this industry into the mainstream of American commerce by the early 1970's. It represents, a careful and deliberate decision to remove the Government, in the 1970's, from the role of financing the large fuel inventories required for commercial nuclear plants.

Correspondingly, the act provides a statutory basis for the Government to provide a toll enriching service for privately owned uranium. At this point I might say that the Joint Committee carefully considered a plan to permit toll enriching to begin immediately, but after weighing all of the factors decided to delay provision of this service until January 1, 1969. At that point in time the Government-supported $8 per pound price for uranium concentrate will drop to the lower—but nonetheless Government supported—average price of $6 per pound. The special provision for ad hoc barter arrangements with foreign nations during the intervening period, I might add, was not intended as a means of circumventing the basic policy adopted. They were intended to be the exception—not the rule.

Our committee's hearings on the private ownership law also showed a substantial interest building up in transferring facilities for producing enriched uranium to private hands. This action would, of course, constitute the final major link in the chain of commercial development which was first forged in 1946. Obviously, many obstacles must be hurdled before this step is taken.

Important developments during 1965 affecting Government-industry relationships

During our hearings on the Price-Anderson extension last June, we saw further evidence of a trend toward increasing private responsibility for nuclear develop-

ment. It is not yet possible for the nuclear industry to build and operate reactors without some form of Government indemnity, primarily because of the lack of sufficient operating data on these plants. Nevertheless, our committee encouraged the insurance industry to increase the level of its nuclear liability insurance capacity available to reactor operators. The result was about a 25-percent increase in private insurance coverage and, perhaps more important, a commitment on the part of the insurance industry to assess the market periodically for the purpose of steadily increasing this coverage. Assuming the expected growth of the atomic industry occurs and that the exceedingly fine safety record continues, it is possible under the terms of the Price-Anderson Act, as amended this year, to foresee a private insurance capacity of $100 million by 1975, and a corresponding step-by-step withdrawal of the Government from the nuclear indemnity program.

A number of other developments occurred this year that demonstrate the increasing vigor and diversity of private participation in the nuclear program. Four utilities have already announced plans to construct large power reactors without direct Government assistance, and a number of other projects are in the talking stage. The four new plants announced this year have a planned capacity of about 2,400 electrical megawatts, more than twice the nuclear generating capacity in operation as of the present time. If present plans materialize, it appears that the AEC's 1962 estimate of 5,000 electrical megawatts installed by 1970, will clearly be surpassed.

The growth of the private sector of the nuclear economy—evidenced by such matters as investment in research and development and in new facilities—should continue and accelerate in the near future. This is fully consistent with one of the fundamental objectives stated in the AEC's report to the President, namely:

"The early establishment of a self-sufficient and growing nuclear power industry that will assume an increasing share of the development costs."

I have further comments later on the element of competition in the nuclear industry.

Effects of changing relationships

Having identified these trends, we should ask ourselves: "What are some of the implications of this change in relationships between Government and industry?" I would like to explore with you today some of the answers to that question.

One obvious result will be a still further lessening of the once total reliance upon the Government for financial support in all aspects of the atomic energy program. The Government's expenditures in certain areas of the program are diminishing and in some instances have ceased. The Government's efforts at the same time on the longer range energy development objectives are being increased. To cite just a few examples of this change in emphasis, there are the termination of AEC's support of the spectral shift and sodium graphite thermal reactor concepts, and the reduction in the level of support for the "conventional" light water reactors between fiscal years 1965 and 1966.

There is another side to the coin I have just described. I refer to the increasing responsibility that is falling upon representatives of private industry, as distinguished from Members of Congress and officials of the executive branch. I believe the degree to which leaders of U.S. industry fulfill their new responsibilities during the rest of this decade will largely determine the long-range success of this program.

For example, it is now up to private industry to bear the burden of developing improvements to types of reactors that are commercially available. The committee believes that continual vigilance must be exercised to phase the Government out of this type of activity. This belief underlies the committee's recommendation that the AEC accelerate its withdrawal from the basic superheat program in fiscal year 1966.

The field of plutonium recycle technology is another one in which private industry should assume a larger part of the development effort. In this connection I want to compliment the Edison Electric Institute for its valuable work in informing EEI members and the nuclear power industry of the status of plutonium as a power reactor fuel and its economic importance to the industry, and for taking on part of the work. The problem of economical recycling of plutonium in power reactors warrants the closest attention of the commercial power reactor industry as a whole. I would hope that concrete, large-scale

programs of privately sponsored research and development will be directed to this problem by appropriate segments of the industry.

Private industry's new responsibility encompasses more than determining expenditures of funds for atomic energy development. It also requires that industry participate in making some of the difficult policy decisions that confront us—decisions such as the most appropriate means of safeguarding the competitive health of the nuclear industry—and as to methods for satisfying our constantly expanding energy demands without poisoning our environment.

Air pollution

In connection with the problems of pollution, the recent report by a panel of the President's Science Advisory Committee is particularly pertinent. The report states that carbon dioxide is being added to the earth's atmosphere through combustion processes at the rate of 6 billion tons a year. Within 35 years there will be so much more carbon dioxide in our atmosphere that the earth's heat balance will be modified to such an extent that "marked changes in climate, not controllable through local or even national efforts, could occur."

The report further states that combustion products, together with gasoline and natural gas vapors, undergo chemical change in air and sunlight, and become the noxious constituents of smog.

Although the report cites the desirability of finding an alternative nonpolluting energy source for automotive power, I was astounded to discover that there was no recognition by the panel that nuclear energy constitutes a suitable nonpolluting alternative to the burning of fossil fuel in electric powerplants. The report offers no explanation for this omission. I have already written to the President's science adviser and to the Atomic Energy Commission to inquire about this matter.

Gentlemen, I welcome the changing relationship between Government and industry—as I know you do—and believe it is wholly in accord with the original intent of the national atomic energy charter. I also believe that more needs to be done to educate the leaders of American business as to their new responsibilities in this field. In my opinion, there are too few top industrial leaders who adequately appreciate the facts about peaceful applications of nuclear energy. Furthermore, if our leading utilities and other industrial concerns are to fulfill their responsibilities to their stockholders and the public, they must also build up an adequate level of expertise within their own organizations.

New focus for governmental efforts

Of course, one of the distinguishing features of the atomic energy program has always been its dynamic quality. A well-known former member of the Joint Committee—President Johnson—described this quality recently in the following words:

"It is characteristic of nuclear energy that its great potential is continually expanding. The full range of its ultimate contributions cannot be foreseen. We must continually press toward the discovery of areas and applications of which we have not yet dreamed, even as we strive to realize the full potential of the areas already defined."

The possible applications of this energy source are so numerous that as we conquer new heights, whole vistas of progress are opened to us. Although I have been describing the increasing importance of private industry's role in atomic energy, this is not tantamount to saying that the Government should close up shop. On the contrary, the Government should concentrate its energies on those areas for which further public support is necessary.

Our committee, in cooperation with the AEC, expects to play an important part in determining the new direction of the Government's efforts in this field. Two years ago we recommended an important amendment to the Atomic Energy Act, which would require that all of AEC's appropriations, for both operating and construction funds, be authorized by the Joint Committee. The amendment of the law to accomplish this result was a crucial step in enabling the Joint Committee to carry out its statutory role as Congress specialized arm for dealing with atomic energy. As the Government increases its support for more advanced concepts—such as the breeder reactor—the Joint Committee intends to carry out its statutory responsibilities to Congress and the American people vigorously and effectively.

To those persons who occasionally criticize our committee for taking too active a part in the establishment of national atomic energy policy, I will only say, with Al Smith, "Let's look at the record." That record offers a clear basis for

satisfaction in the accomplishments of the committee, and in the ability of a representative democracy to cope with the demands of our highly technical age.

Finding of practical value

My talk thus far has been devoted to setting forth my views on the state of Government-industry relationships and the trend in these relationships for the near future. I want to take a few minutes now to discuss two specific matters which are closely related to the general subject of this talk, and which will occupy the attention of our committee next year.

The first concerns the question of the "practical value" of certain reactors, with which the AEC has been wrestling since late 1963. Section 102 of the Atomic Energy Act calls for the Commission to determine the "practical value" of facilities under certain circumstances. The strong interest in this matter flows from the increased economic attractiveness of pressurized water and boiling water reactors being offered commercially.

It is obvious that a number of approaches could be followed in determining whether some reactor types have "practical value" within the meaning of the Atomic Energy Act. I do not propose to argue about the technical meaning of the act's requirement, which can be interpreted in different ways to make the shoe fit a different size foot. I know from my own experience why this statutory requirement was originally included in the 1946 act. For one thing, at that time we were all seriously concerned that the changes which might be brought about by the use of atomic energy could render entire industries obsolete virtually overnight. Like so many other provisions of our atomic energy legislation, the requirement for a finding of practical value was designed as a brake—a safeguard against a premature plunge into utilization of atomic energy in our society.

Experience quickly proved that the effect of atomic energy upon our economy, however monumental it might be, would be felt over a relatively long period. When the 1954 act was passed, a watered-down version of the original requirement concerning reports to the President and Congress and findings of practical value was left in, as a means of distinguishing between "developmental" and "commercial" uses of atomic energy. There were a variety of reasons why we retained this distinction. A finding of practical value was intended to serve as a bar to Government subsidies of "established" reactor types. Other reasons for the distinction included uncertainty over the availability of enough enriched uranium to support a large number of commercial power reactors—and our desire to safeguard the competitive structure of the nuclear industry.

In June of 1964 the National Coal Policy Conference, the National Coal Association and the United Mine Workers formally petitioned the AEC to make a finding of practical value in the case of certain types of light water reactors. These groups have urged that the decisions of utility executives to build large commercial power reactors without direct Government assistance establishes that such plants have "practical value." Others have argued forcefully that the finding cannot be made until there has been demonstration of the economic competitiveness of nuclear power—an actual showing that some of the optimistic predictions that have motivated utility companies during the last 2 years are indeed well founded. I myself share this latter conviction. There have also been suggestions from a committee of your own Atomic Industrial Forum, that the distinction between developmental and commercial licenses and the requirement for a finding of practical value are obsolete, and should be removed from the law.

I have never agreed with the recommendation of the AIF Committee that the Atomic Energy Act should be amended to eliminate the requirement for a finding of practical value, if the purpose of this recommendation is to eliminate the necessity for the Atomic Energy Commission to reach a decision in the formal proceeding currently before it. The Commissioners have had this matter under advisement for a considerable period and ought to be able to reach their decision in the near future—which I understand they intend to do.

The fundamental question remains, however, do we really need this administrative device thereafter?

The formalistic procedure the AEC has been following in attempting to resolve this problem seems to me to be much less relevant to the real issues that face the nuclear industry than the Joint Committee's annual authorization hearings. Both legally and in fact there is a close association between the Joint Committee and the AEC. In addition to our many public and executive hearings on the atomic energy program, the committee and its staff engage in practically daily consultation with the AEC as to present and future policy direction for the pro-

gram. Working together we intend to follow the act's mandate that atomic energy shall be developed for the maximum protection and benefit of Americans and the whole world.

We have in the past followed this procedure with AEC's programs—initiating, developing, canceling them in some instances, and completing many others successfully. The Atomic Energy Commission is constantly studying its programs and policies in relation to the requirements of the act. They convey to us their findings and recommendations and we expect to continue this procedure which has proven so fruitful. In the same spirit of cooperation, we have amended the Atomic Energy Act many times, to keep it an efficient tool of national policy. As the congressional committee with legislative jurisdiction over this program, we will continue to exercise our prerogatives as forcefully in the future as in the past.

What many regard as the most fundamental purpose of the requirement for a finding of practical value—the avoidance of unwarranted Government subsidies—probably is already being better served by another, more flexible means of administrative and congressional supervision. The annual review given the AEC's entire budget by the Joint Committee, the Appropriations Committees and the entire Congress, in addition to the review within the executive branch, affords an opportunity to verify the appropriateness of governmental assistance to a project or program.

Congress has already determined that further assistance in the cooperative power reactor demonstration program for light water-moderated and cooled reactors of the type proposed by utilities in the past 2 years cannot be further justified. For example, the Joint Committee did not go along with the AEC's proposal to issue a second invitation in August 1963 under the modified third round of the program. During the committee's hearings on the AEC's fiscal year 1964 authorization act, it was brought out that the Commission intended to utilize this second invitation to seek construction of a larger proven-type plant—perhaps at the 600 megawatt level. The committee demurred. The wisdom of the committee's position was borne out by later developments, including proposals by utilities to construct large-scale, water-type plants without governmental assistance.

Another example of this process of critical examination occurred in connection with enactment of the private ownership legislation. The AEC in its proposed private ownership bill had requested authority to establish guaranteed purchase prices for periods of up to 7 years, for plutonium produced in licensed reactors. After carefully reviewing this matter, the committee decided to specify in the law that AEC could pay a guaranteed purchase price only for that plutonium delivered to the AEC before January 1, 1971.

I could easily list other examples of the deliberate scrutiny which our committee gives to requests for governmental assistance to foster nuclear development. I think these few illustrate the point quite clearly that there is already an effective procedure for ascertaining which projects warrant Government support.

I also wish to emphasize that it is not my purpose at this time to commit either myself or the committee to any specific action concerning the statutory requirement of a finding of practical value. No doubt there would be some problem areas which we would want to examine very carefully as part of any proposal for a change in the law. We would want to look at all the objectives which the requirement for a finding of practical value is supposed to accomplish. We would also have to determine if these objectives are already being served adequately by other means, or if more effective methods for accomplishing these objectives are available to us. I do feel, however, that the committee will want to explore as soon as it is feasible, perhaps in the form of public hearings, the desirability of eliminating this requirement from the statute.

Competition in the nuclear industry

Another matter in which the committee is keenly interested is the competitive state of the nuclear industry, particularly the reactor manufacturing business. The Atomic Energy Act directs that the national atomic energy program be conducted so as to strengthen free competition. During a forum panel discussion last year I called attention to this subject and pointed out then that there was a serious question in my mind as to whether the electrical generating industry could support more than three or four reactor manufacturers. I also said I believed it is inevitable that in the years to come we will have some additional dropouts and some further mergers.

Events of this past year have made this problem even more critical. All of the civilian power reactors announced this year—in fact, all such projects announced since the fall of 1963 to be constructed in the United States without direct Government assistance—have gone to one or the other of two companies. The AEC also recognized the seriousness of the problem, and has conducted a series of meetings with utilities and equipment manufacturers to explore the implications of this emerging pattern in the industry. The Joint Committee received testimony on this subject from industry and the AEC at the "202-type" hearings in August and September.

The Government has a positive responsibility to preserve a healthy competitive industry. However, the Joint Committee cannot approve any arrangement for Government support designed solely to maintain an excessive number of companies in the nuclear power field when there is no reasonable basis to expect that the industry can ultimately support that number.

As I mentioned earlier in my talk, the changing relationship between Government and industry places increasing responsibility upon the leaders of private business for making decisions as to the future course of this industry. This overall trend has perhaps its greatest impact in the area of competition among reactor manufacturers. Decisions that utility executives make in connection with current plans for purchasing reactors will obviously have a very significant influence on the future competitive structure of this industry. I urge the utility industry to give careful consideration to this fact in their overall planning and to take a long view of the problem.

All of us are familiar with the projections of the Federal Power Commission which show that nuclear power is expected to supply about 19 percent of the 1980 market for electricity. In reaching decisions on purchasing nuclear plants today, utility executives should bear in mind the effect of these decisions a few years hence. The problem of competition calls for initiative and imagination on the part of all segments of the nuclear ndustry.

The problems of "practical value" and competition in the nuclear industry are two of many with which our committee will be dealing next year. I have attempted to sketch them in broad outline, and also to relate them to the overall trend in Government-industry relationships in the nuclear field as I see them. This cooperative effort has already produced some of the greatest scientific and engineering triumphs of all times for the benefit of the American people and all freemen.

PART II—INTERNATIONAL POLICIES

Now I would like to depart from some of our domestic atomic matters and comment on two international problems which are receiving so much attention these days:

(1) The problem of nuclear weapon proliferation; and

(2) The problem of command and control of nuclear weapons assigned to NATO.

Proliferation of nuclear weapons

One of the most important, if not the most important problem facing the world today is how to prevent additional nations from joining the nuclear weapons club.

Direct assistance from nuclear weapon producing nations to nonnuclear nations, while possible, seems unlikely at this time. There appears to be a definite sobering effect which tends to develop in each nation that achieves nuclear weapon status when it comes to sharing nuclear weapon technology with others. At that point each nuclear weapon nation seems to be shocked into a sobering responsibility and each of the nuclear club members tends to become an exponent of nonproliferation.

Resolutions against proliferation, desirable as they may be, will, of course, be ignored by the ambitious nation that decides to join the nuclear club. France ignored our protestations and achieved independent nuclear weapon capability. Red China, pursuing her own aggressive interest, has obtained nuclear weapon capability—India, Israel, and others, from time to time have been reputed to be moving in the same direction.

Our nonproliferation policy requires us to obtain pledges from those we assist in civilian reactor projects that each project involved will be subject to international safeguards inspection. However, reactors are being built throughout the world which are not subject to the safeguards of international inspection. Similarly, uranium and plutonium processing plants exist in the world which are

not subject to international safeguards. Inspection of these latter facilities may be more important than inspection of operating reactors.

Let us not be chasing mavericks in the brush instead of closing the gates of the corral.

If we intend to prevent proliferation we cannot be content with having inspections of only those nuclear reactors which were built or fueled with our assistance. Nations must be prepared and agree to place all civilian reactors and processing plants under international inspection.

I believe it is important in furthering our policy that any nonproliferation treaty that may be entered into in the future include a provision that nations will not supply nuclear material or equipment to other nations for civilian purposes unless the material and equipment be subject to International Atomic Energy Agency or similar international safeguards and that signatory nations will not import such material or equipment without international inspection.

This provision would be an important step forward in controlling the proliferation problem. However it is not the complete answer. The United States should explore, together with other nuclear nations, the possibility of arrangements whereby all nations who agree not to develop their own independent nuclear weapon capability will be guaranteed assistance in the event of a nuclear attack by others.

In addition, the United States could make a particular effort to furnish economic aid to those nations who are willing to deny themselves independent nuclear weapon capability and who are willing to place all their nuclear facilities and projects under International Atomic Energy Agency inspection. In this regard, the United States today has billions of dollars in counterpart funds and AID money which have not been utilized and part of these funds could be made available to develop nuclear-powered electrical systems in those nations which cooperate and are technically ready.

During the 1930's the U.S. development of the Tennessee Valley Authority resulted in the rapid economic and industrial development of a previously impoverished area. We should inaugurate a major effort to put new life into our atoms-for-peace program directed toward developing extensive electrical grids coupled, when practical, with large-scale water desalting units for those cooperating nations.

Such an effort on our part could furnish the necessary incentive for nations to forsake nuclear weapons. Given the opportunities of developing major electrical energy capabilities and desalting projects for needed water resources, nations such as India, Israel, and others, should be willing to forego developing nuclear weapons. At least they would be given the clear choice between taking a major step forward in their civilian economy or diverting their limited resources to nuclear weapons with the corresponding adverse effect on their economy for the dubious honor of becoming a junior member of the nuclear club.

NATO problems

Now let us look at the Atlantic Alliance. Despite the difficulties and problems that have faced NATO, let there be no doubt that it has served its purpose during the years since it was first formed in 1949 to prevent further Communist expansion in Europe. Today it is beset with problems. President de Gaulle is threatening to pull France out. And the Germans are demanding a greater participation in nuclear weapon policy matters.

First, let me say that I believe we should continue NATO and that we can have a strong NATO whether France is withdrawn or remains in NATO. I am not impressed with those who wring their hands and believe that the strategic location of France and its military contributions are vital to a powerful free world alliance. If after the spending by the United States of billions in military efforts in two World Wars and if after expending by the United States of $9 billion of Marshall aid funds after World War II to restore the economic and political integrity of France, and if after living for 20 years under the protection of the U.S. nuclear umbrella, France prefers to engage in the outmoded policy of national and self-sufficiency, then I say: "Let President de Gaulle go his way." And I say further: "Let us take those steps which are necessary to preserve and improve the collective military strength of the free world alliance, without French participation."

I would also like to point out that although President de Gaulle repeatedly refers to French nuclear weapons, he curiously refrains from discussing the U.S. nuclear weapon stockpile assigned to French forces in NATO, which significantly surpasses in firepower his so-called force de frappe.

As President Johnson, his predecessors and Secretary McNamara have so often publicly stated, our NATO allies should have no doubts as to U.S. commitments to their defense. As evidence of our commitment, during the period 1961 to 1963, for example, there was a 60-percent increase in the tactical nuclear forces deployed in Western Europe. The detailed information on the numbers and firepower of the NATO nuclear weapons stockpile have been furnished in classified briefings to representatives of our NATO allies.

Chancellor Erhard of the Federal Republic of Germany is expected to visit the United States next month to meet with President Johnson and other top officials of the United States. Numerous advance stories are being released through various sources by the West Germans to the effect that one of the matters he will want to discuss is the German desire for greater participation in nuclear weapon policy matters within NATO.

Few, if any, of these stories make mention of the degree to which West Germany presently does participate in the NATO nuclear defense matters. Right now, for example, we have assigned to West German operating NATO units, under a mutual arrangement—which includes U.S. control and release authority—U.S. nuclear weapons whose firepower far exceeds all the explosives of World War II. West Germany, together with other NATO nations, participates in the NATO nuclear weapon stockpile arrangement and in determining necessary targets for nuclear defense forces. This participation includes target planning at the U.S. Strategic Air Command headquarters.

Let no one mistakenly believe that the West Germans have not already been granted a strong participating role in the nuclear defense of Europe. What is apparently wanted is a greater role.

If they want a greater role in the nuclear defense of Europe, then it is important to ask: What kind of a "greater role" does Germany want? Do they want this "greater role" as a separate sovereign power or as a member of NATO?

We are repeatedly told by the West Germans that they do not wish to become a sovereign nuclear power but merely wish to be granted an appropriate voice in policy planning for the use of nuclear weapons assigned to the defense of Western Europe. If this be true then let us review our current arrangements and, if necessary, be prepared to seek an improvement in implementing our planning procedures and our decisionmaking apparatus in NATO. I want to stress this point. This problem is not a separate German problem; it is a NATO problem. Our policy and our commitment is for the security of free Western European nations working through the North Atlantic Treaty Organization as a group, and not to any single nation.

The methods of improving the Atlantic Alliance, in my opinion cannot be best served by the proposed concepts of MLF or ANF. These proposals will not give the member nations any greater degree of participation in overall planning or policy decisions than they already have. In my opinion we cannot and will not solve what are basically high-level policy planning problems by new-type operational concepts which in themselves are inefficient, politically divisive, and questionable from a cost-military point of view.

What is needed to improve the alliance is closer policy coordination and a more cohesive working relationship at the highest levels. In this way, each nation will be better assured that its security is amply protected by the total security of the alliance. The recent proposal of Secretary McNamara for the establishment of a select committee is, in my opinion, a step in the right direction and could, if properly developed, be the mechanism for solution of some of the problems which apparently concern the other nations of NATO, including Germany.

I, for one, do not advocate additional ownership or possession of nuclear weapons on a national sovereign basis. The chances for peace in the world will not be enhanced by increasing the number of independent nuclear powers. I recognize, however, that some nations in NATO have doubts regarding their nuclear protection under the present NATO command and control policy. I do not share these doubts but I do recognize their existence.

By broadening the formula for policy decision so as to give responsibility for nuclear weapons use to a properly constituted select committee in NATO, we should be able to resolve the doubts which may now exist without opening the door to *n*th nation proliferation. I am aware of the difficulty in developing such a formula, but I am also aware of the increasing dangers if we do not solve this problem. The United States may have to choose between the possibility of sharing greater responsibility on nuclear matters within the North Atlantic

Treaty Organization and the danger of a crumbling alliance with the predictable growth of *n*th nation proliferation.

As I said before, I do not believe the chances for peace in the world are enhanced by additional nations obtaining independent nuclear weapon capability. Neither do I believe peace in the world is enhanced by a crumbling NATO alliance. The deterioration in NATO can be checked, in my opinion, only through establishing a feeling of confidence in each nation that they have parity participation in making the decisions which will determine their security and destiny as a nation.

The Joint Committee on Atomic Energy for many years has been closely following nuclear policy matters within NATO. By law the committee is required to review proposed agreements for cooperation on nuclear matters and their subsequent implementation. In 1960, I headed an ad hoc subcommittee that made an extensive inspection trip throughout NATO. With the unanimous approval of the Joint Committee my subcommittee made a number of major recommendations to President Kennedy, which were subsequently adopted. While the details of the report and recommendations must remain top secret, two of the recommendations which were implemented and made public by the executive branch included the removal of Jupiter missiles from Turkey and Italy and the development and installation of permissive action links on nuclear weapons—electronic and mechancial devices to prevent unauthorized use of these weapons.

Since 1960, members and staff of the Joint Committee have continued to keep abreast of NATO nuclear matters through briefings and regular visits to NATO installations. Our most recent visit was last month.

The responsible committees of Congress know the details of our current stockpile arrangements within NATO. We can state that there is a high degree of cooperation with the West Germans, the French, and our other allied operational forces in NATO. Those who would, because of internal political pressures and maneuvers, minimize the present powerful defensive nuclear arrangements, do their own nations and the free world alliance a disservice.

Certainly I do not believe that improvement in NATO is impossible. The deterioration of unity in NATO demands improvement in command and control structure and in the area of formulation of policy decisions. I believe the Congress is prepared to consider and evaluate necessary modification of present arrangements, providing such modifications are based upon wise and clearly understood objectives.

The United States has backed the concept of the NATO shield with its manpower and strongest military equipment since its inception in 1949. Our confidence in the shield must be matched by the nations in the alliance or the shield will become another Maginot line. I believe the NATO shield can continue to deserve allied confidence by new arrangements by new formula of policy decisionmaking and at the same time we can achieve this goal without nuclear weapon proliferation on a sovereign *n*th country basis.

APPENDIX 9

STATE DEPARTMENT LETTER CONCERNING IAEA SAFEGUARDS UNDER AGREEMENT WITH UNITED KINGDOM

DEPARTMENT OF STATE,
Washington, December 7, 1965.

MR. JOHN T. CONWAY,
Executive Director, Joint Committee on Atomic Energy, Congress of the United States.

DEAR MR. CONWAY: You will recall the meetings that were held in late June with the Joint Committee and officials of the Department of State and the Atomic Energy Commission concerning IAEA safeguards under the proposed United States-United Kingdom bilateral agreement.

At that time, we proposed to the British that they accept reciprocal IAEA safeguards on all materials and equipment transferred under that agreement. They pointed out that this was a very difficult question, but that they would be happy to consider it at the highest level in the British Government.

The United Kingdom has now suggested that because of the complexity of this whole question it might be desirable for them to send a team of political and technical experts to Washington in early January for further discussions of this issue.

Recognizing the importance of this subject matter and the interest of the Joint Committee in the entire question, we agree that such a visit by British experts would be desirable and are, therefore, inviting them to visit Washington in early January for discussions with the officers of the Department and the AEC.

Sincerely yours,

DONOVAN Q. ZOOK,
International Scientific and Technological Affairs.

APPENDIX 10

NOTES EXCHANGED BY BRAZIL AND UNITED STATES CONCERNING CONTINUING EFFECT OF SAFEGUARD AND GUARANTEE PROVISIONS OF EXPIRED AGREEMENT

No. 232/663.80(22)(42)

The Brazilian Ambassador presents his compliments to His Excellency the Secretary of State and has the honor to refer to the Agreement for Cooperation between the Government of the United States of Brazil and the Government of the United States of America concerning Civil Uses of Atomic Energy that was signed on July 8, 1965, in Washington, D.C.

The Government of the United States of Brazil takes this opportunity to inform the Secretary of State that certain steps required by Brazilian law to bring the aforementioned Agreement for Cooperation into force will in all likelihood not have been satisfied by August 2, 1965, the date on which the existing Agreement for Cooperation of August 3, 1955, as amended, between our Governments will expire.

The Brazilian Government, however, recognizes the continuing effect of the safeguards and guarantees provisions of the Agreement for Cooperation of August 3, 1955, as amended, and states that it will hold any materials, equipment, and devices it has received thereunder subject to the terms and conditions of that agreement and those of applicable subsidiary arrangements thereto pending the coming into force of the Agreement for Cooperation signed in Washington on July 8, 1965.

The Ambassador avails himself of this opportunity to renew to the Secretary of State the assurances of his highest consideration.

WASHINGTON, *July 27, 1965.*

The Secretary of State presents his compliments to his Excellency the Brazilian Ambassador and has the honor to acknowledge the Ambassador's note No. 232/663.80(22)(42) of July 27, 1965 referring to the Agreement for Cooperation between the Government of the United States of America and the Government of the United States of Brazil Concerning Civil Uses of Atomic Energy signed at Washington on July 8, 1965.

The Government of the United States of America notes with appreciation the statement of the Brazilian Government that it recognizes the continuing effect of the safeguards and guarantees provisions of the Agreement for Cooperation of August 3, 1955 as amended, and that it will hold any materials, equipment, and devices it has received thereunder subject to the terms and conditions of that agreement and those of applicable subsidiary arrangements thereto, pending the coming into force of the Agreement for Cooperation signed at Washington on July 8, 1965.

DEPARTMENT OF STATE.

AUGUST 5, 1965.

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