

QUESTIONS AND ANSWERS CONCERNING THE EURATOM PROGRAM  
-----1. QUESTION:

Why was it necessary to agree to a deferred payment arrangement instead of lease?

ANSWER:

The United States was willing to lease enriched uranium to Euratom on the same terms and conditions as are available domestically. The Community, however, stated that at this time it was unable to lease special nuclear materials because, as a political and legal matter, under its treaty it must have ownership of special nuclear materials within the Community.

In order to retain the financial incentives provided by lease, but at the same time not undermine ownership which EURATOM feels is essential to effective control, the proposed plan of deferral of payment for the initial inventory was developed. EURATOM intends to lease to the utilities uranium purchased under terms comparable to those in this country.

2. QUESTION:

Under the proposed program, the United States essentially would reserve a very substantial quantity of special nuclear material, namely, 30,000 kilograms of U-235, for EURATOM. Is EURATOM under any obligation to actually purchase the quantity that has been reserved?

ANSWER:

The fact that the United States would "reserve" 30,000 kilograms of U-235 for the program should not be construed to mean that this much material would be taken out of

production channels and set aside for this purpose. The objective of reserving this amount of material is to assure EURATOM, and EURATOM utilities, that enriched uranium will be available as required to fuel the reactors in which they have invested large sums of their own money. The material will be removed from AEC production channels and transferred to EURATOM only as required. The sales contract, under which the material will be transferred for each reactor, will contain a schedule of deliveries and returns which will obligate EURATOM to purchase the quantities set forth in such Agreements.

3. QUESTION:

Why is there a limitation on the end use of any plutonium which may be purchased from EURATOM by the U. S. under the joint program?

ANSWER:

The proposed joint program with EURATOM is to be devoted exclusively to peaceful purposes. The restriction that has been placed in Section 7 of the proposed "EURATOM Cooperation Act" on the end use of the plutonium acquired by the United States is designed to further underscore the civil nature of the program and is in keeping with the President's announcement of November 18, 1956 which stated that, plutonium produced as a result of material furnished by the United States and purchased by the United States would be used solely for peaceful purposes.

4. QUESTION:

How much U-235 is involved in the Joint program? Is this quantity really available?

ANSWER:

For the entire 1,000,000 kw program, the total inventory will contain about 9,000 kg of U-235. The total inventory

includes reactor loadings, material being fabricated, cooled and processed. The burnup will be about 1,000 kg of U-235 per year. For the 20 years of operation, a total of 29,000 kg of contained U-235 will need to be supplied for inventory and burnup. To this quantity is added 1,000 kg of U-235 for research and test reactors associated with the joint program, thus the total figure becomes 30,000 kg of contained U-235.

The U-235 will be made available, as required from current production, under determinations made by the President under Section 41(b) of the Atomic Energy Act covering allocations of U-235 to be made available for peaceful uses abroad. In making this determination, the President takes into consideration production capacity of the U.S. plants and the total requirements for this output.

5. QUESTION:

What assurance do we have that the proposed program of assistance will be sufficient to make the program go?

ANSWER:

The assistance offered seems to meet the objective of giving reasonable assurance that the program will go. While it cannot be guaranteed that the incentives of the proposed program will be sufficient to assure that 1,000,000 kw will be installed, we believe they provide a basis for reasonable assurance that the objectives of the program will be attained. They were developed after careful consideration by the United States and EURATOM personnel of the extent to which European utilities should be willing to absorb costs greater than those estimated for new conventional plants. It was the consensus of the Joint Working Party that on the basis of the assumptions used nuclear power would cost 1 to 3 mils more than power from conventional plants and that European utilities would accept such costs in meeting the objectives of the joint program, provided there was established

a joint research and development program devoted to reductions in costs with the objective of reaching conventional costs at an early date.

6. QUESTION:

Are the assumptions and figures contained in the Wise Men report, "A Target for EURATOM", still sound?

ANSWER:

The assumptions are still generally sound. Conventional power costs are presently somewhat lower than estimated in the report because of a decline in shipping rates for fossil fuel. The estimated nuclear power costs are also somewhat lower and more definitive than those given in the report. Mr. Armand, President of the EURATOM Commission, indicated in a recent statement that there will be some delay in meeting the goal of 15 million EKW by 1967 given in the report. The proposed one million EKW joint program should be of material assistance in minimizing the delay.

7. QUESTION:

Will EURATOM tend to favor public as against private industry?

ANSWER:

EURATOM's responsibility is to further the development of atomic energy within the existing framework of existing industrial organization in the Member States. It has neither the desire nor the authority to alter this framework. Within the EURATOM nations, the production of electrical power ranges from one extreme, exemplified by Germany where practically all of the power is produced by private utilities, to the other extreme in the case of France, where the production of electrical power is State controlled. Between these two extremes lies Italy, where both public and private power groups are strong. EURATOM represents all countries and all factions. This should assure that neither

public nor private power will dominate the nuclear plants. The Memorandum of Understanding recognizes this situation and makes it possible for both public and private groups to participate. Under the selection process, the United States will not participate in the selection of areas or sites. This is primarily an internal political subject which must be resolved by EURATOM. It is interesting to note that during the six years of its existence, the Coal and Steel Community (an organization of the same six nations as EURATOM) has worked with hundreds of Coal and Steel firms without bringing one company under government ownership. As Mr. Armand put it in a recent interview in Forum Memo of the Atomic Industrial Forum: "...To sum up - EURATOM and the joint program will not socialize industry but will bring it help and assistance without modifying its present structure..."

8. QUESTION:

What is meant by "proven type" reactors? Who will interpret the meaning of this phrase?

ANSWER:

"Proven type" reactor is a reactor type which has been operated on a scale sufficiently large to give significant technical and operational data. Such operation will have shown that there are no major unsolvable technical problems, and that the reactor type is capable of reliable and safe operation and may be integrated into an existing power system. It is a reactor type which has been shown to be technically feasible and one in which the economic uncertainties lend themselves to resolution through the normal industrial process development techniques without dependence on major technical "breakthrough".

Under the terms of the Memorandum of Understanding, as further clarified by an exchange of memoranda between the heads of the EURATOM and U.S. negotiators, it is clear that pressurized and boiling water types fall within the definition. It is

further clear other types (such as the organic moderated concept) that may meet the criterion will be eligible for consideration under the joint program. The development of the precise criteria and the determination of whether a reactor is of a "proven type" will be the responsibility of the joint EURATOM-United States technical board.

9. QUESTION:

What evidence do we have that an assistance program of this kind is really needed?

ANSWER:

The development of a nuclear industry in most EURATOM countries has been relatively slow, up to now, for lack of practical experience both in construction and operation of full-scale power reactor plants.

In order to speed up this development, it is necessary:

1. That the economic feasibility of nuclear power be proven, not by theory and calculation, not by extrapolation from pilot plant operation, but by full-scale operation of power producing units on a scale large enough to assure statistical reliability of the data;
2. That the utilities, into whose grid the power from these nuclear plants must flow, become familiar with the technical and management problems of operating nuclear stations and accept, with confidence, nuclear power plants;
3. That European equipment manufacturers gain knowledge and competence in the production of reactor components;
4. That the various service industries, such as fuel production and fabrication, scrap recycle, irradiated fuel reprocessing, etc., be developed as economic operations.

Traditionally conservative and bound by rate ceilings, the utilities are not prepared to take excessive risks or to invest large amounts of capital in plants in which the costs of energy produced may be well above that of conventional stations.

The fact that there is not already underway a program which would accomplish the objectives of the joint program speaks for itself. Discussions with EURATOM and European utility personnel indicate that the estimated high cost of nuclear power from even proven type reactors and particularly the uncertainties of these costs would preclude a program under which one million EKW of American type reactors would be installed by 1963, unless additional incentives are provided.

10. QUESTION:

Aren't pressures for similar benefits apt to arise from other countries as soon as the program is announced?

ANSWER:

In formulating the program with EURATOM it was recognized that there may be certain other areas where the necessary conditions exist and the development of large-scale power reactors can be undertaken on a similar time schedule. Therefore it is believed that it may be in the interest of the United States, for technical and political reasons, to consider the establishment of a similar cooperative program to accommodate the special requirements of the International Atomic Energy Agency, individual nations, or other groups of nations. The specific needs for such programs have yet to be determined.

11. QUESTION:

How does the proposed program with EURATOM relate to the Agreements for Cooperation which already have been negotiated with the various Member States of EURATOM?

ANSWER:

Article 106 of the treaty which established the European Atomic Energy Community (EURATOM) reads as follows:

"Member States which before the date of the entry into force of this Treaty, have concluded agreements with third countries for cooperation in the field of nuclear energy shall, jointly with the Commission enter into the necessary negotiations with such third countries in order, as far as possible, to cause the rights and obligations arising out of such agreements to be assumed by the Community."

This obligation on the part of the Member States to negotiate with the United States to transfer their rights and responsibilities to EURATOM was recognized at the time we were negotiating agreements with several of the Member States. Consequently, our bilateral agreements with these countries recognize this possibility. For example, Article II of the Agreement for Cooperation with West Germany reads as follows:

"It is recognized that Article 106 of the Treaty Constituting the European Community for Atomic Energy (EURATOM) which the Government of the Federal Republic of Germany signed in Rome on March 25, 1957, contemplates that member states of the Community will seek a re-negotiation of existing agreements in the field of atomic energy with third countries once the Treaty comes into force. If the Treaty comes into force and if a cooperative arrangement is executed between the European Community for Atomic Energy and the Government of the United States of America, the Government of the United States of America would be prepared to arrange for the European Community for Atomic Energy to assume the rights and obligations of the Federal Republic of Germany under this Agreement provided the European Community for Atomic Energy could, in the judgment of the Government of the United States of America, effectively and securely carry out the undertakings of this Agreement."

Therefore, at such time as it appears that EURATOM is prepared to effectively carry out the undertakings of the Agreements for Cooperation and assume the rights and obligations, we would be prepared to enter into negotiations with the individual States to this end. It is not expected, however, that these negotiations will be undertaken until EURATOM has developed its longer range program which is to provide the basis for a subsequent comprehensive agreement with the Community.



12. QUESTION:

What is the relationship of the United Kingdom to EURATOM? Why aren't they a part of the program?

ANSWER:

The United Kingdom is not a member of EURATOM but is a member of the European Nuclear Energy Agency. This is an agency of the Organization for European Economic Cooperation and it includes Austria, Denmark, Greece, Iceland, Ireland, Norway, Portugal, Sweden, Switzerland, Turkey, and the United Kingdom, as well as the six nations which now constitute EURATOM.

There have been discussions during the past months as to the relationship of the EURATOM members to the rest of the OEEC Agency, and it appears likely that EURATOM may participate as a group in certain ENEA projects.

The United Kingdom has appointed its representative to the European Coal and Steel Community, Sir William Mecklereid, as its representative to EURATOM and has expressed its desire to begin discussions with EURATOM with a view to formulating a cooperative agreement. These discussions have just been initiated and it is too early to say what this future agreement will contain.

The "Wise Men" report, "A Target for EURATOM" anticipated that the EURATOM program would include the construction of gas-cooled reactors of the U.K.-type, as well as U.S.-type reactors. Therefore, it is recognized that the proposed program of cooperation with the United States represents only a part of EURATOM's power program. It is likely, on a longer-range basis, that the United States, the United Kingdom, and Canada all will work in cooperation with EURATOM.

13. QUESTION:

What type of relationship is envisioned between EURATOM and the International Atomic Energy Agency?

ANSWER:

The relationship between EURATOM and the IAEA, of course, is a matter for the two groups to decide. EURATOM is interested in cooperating with the Agency and its representatives took the initiative which led to informal discussions with representatives of the IAEA.

In the development of the Memorandum of Understanding, the EURATOM group requested that the following phrase be inserted in the Memorandum: "...The Commission of the European Atomic Energy Community and the Government of the United States re-affirm their dedication to the objectives of the International Atomic Energy Agency and intend that the results of their program will benefit the Agency and the nations participating in it..."

In addition, the Agreement for Cooperation between the United States and EURATOM recognizes that there will be specific cooperation with the IAEA in certain areas. For example, the Agreement states: "...In establishing and implementing its safeguards and control system the Community is prepared to consult with and exchange experience with the International Atomic Energy Agency with the objective of establishing a system reasonably compatible with that of the International Atomic Energy Agency...", and, "...In recognition of the importance of the International Atomic Energy Agency, the United States of America and the European Atomic Energy Community will consult with each other from time to time to determine whether there are any areas of responsibility with regard to safeguards and control and matters relating to health and safety in which the Agency might be asked to assist..."

14. QUESTION:

What is the urgency for Congressional approval of the program during this Session?

ANSWER:

As the President stated on June 23, 1958, the Executive Branch attaches a great deal of importance to the proposed joint program and is most anxious to see it move ahead rapidly. There is a growing sense of urgency in the Community on the need to install a significant amount of nuclear power capacity in the next decade in order to stabilize Europe's dependence on conventional fuel imports. The joint program is considered a vital and urgent first step toward the realization of this broader objective. If one million kilowatts are to be installed under this program by 1963, a start should be made on firm planning and selection during the summer and fall of 1958. Construction should begin in early 1959. Thus, if the program is to move ahead fully on this schedule, it will be necessary not only to obtain approval of the "124" International Agreement and the "123" Agreement for Cooperation, but also the enactment of the proposed "EURATOM Cooperation Act", which contains the basic authorities the Commission requires in order to carry out its obligations under the program.

It is highly significant, if not remarkable, that the Community has been able to adopt the joint program as its first major piece of business, particularly since it only came into being on January 1 of this year. In the past few months EURATOM has been very successful in mustering a mounting interest and enthusiasm in the European utility industry on behalf of the program.

There also has been a significant increase in interest in reactors of American design in countries (such as France and Germany) where this enthusiasm did not exist before. The net effect is that the Europeans are anxious to proceed with the program and the atmosphere is very favorable. Reactions from American industry have been equally encouraging. If, on the

other hand, Congressional action on the entire program is not taken during this session it is feared that the momentum that has been gained will be lost. It is quite likely that, in such an event, the Community itself would suffer a major setback during a very critical period when it is trying to get on its feet. In addition, the utilities involved might lose their interest entirely or shift their attention to reactors of other than American design, and the United States would lose its chance to be the first major power to closely associate itself with EURATOM's program.

The Memorandum of Understanding and the Agreement for Cooperation contemplate that a select number of projects (such as Edisonvolta) in an advanced stage of planning would be eligible for consideration under this program. Some projects have been delayed so far in their efforts to move ahead because of high initial costs and uncertainties associated with the fuel cycle. The proposed program could be of considerable assistance to these projects, and other projects involving U.S. reactors. A postponement of final action until the next session of Congress would lead to further delays and could discourage European utilities involved from doing business with American industry.

In recent months the British press has been criticizing the Government of the United Kingdom for not having had the foresight to initiate a joint program of the kind that has been developed between the U.S. and EURATOM.

The proposed program promises to result in immediate benefits of both parties. The sooner it is initiated, the sooner these advantages will be forthcoming.

15. QUESTION:

It appears that the proposed safeguard arrangements that have been agreed to by the United States authorities and EURATOM represent a departure from the safeguard provisions contained in most of the "power" bilateral agreements for cooperation which have been executed to date. How do the provisions in the EURATOM Agreement compare with those in a typical power bilateral?

Does the United States still have adequate over-all assurance that the material transferred to the Community as well as the special nuclear materials produced therefrom only will be used for peaceful purposes?

ANSWER:

As the Department of State and the Commission have mentioned in their respective testimonies the safeguard arrangements formulated with EURATOM were designed to explicitly recognize the Community's unique attributes, important responsibilities, and its capacity to establish a rigorous multilateral control system over the materials employed and produced in the program. We believe the arrangements agreed to are prudent and will provide us with ample assurance that the materials received from this country as well as special nuclear materials produced therefrom only will be used for peaceful purposes. In anticipation of this question the Commission's staff prepared a comparison of the arrangements incorporated in the proposed Agreement for Cooperation with EURATOM with those contained in a typical power bilateral Agreement for Cooperation (Appendix "A") which compares the similarities and differences between the two approaches.

In summary, under the terms incorporated in the proposed Agreement for Cooperation the Community has agreed to set up a safeguards system according to a series of stated principles which have been fashioned in large part after those contained in the Statute of the International Atomic Energy Agency. The Agreement provides that this system must be mutually satisfactory to the Community and the United States. It is further provided that the United States will assist the Community in establishing this system and will provide continuing assistance in its operation. Provision has been made for frequent consultation over the course of the Agreement so that the Parties may be assured of continuing effectiveness of the system and its conformance to the agreed upon principles. Within these terms, it has been agreed that each Party will have the opportunity to verify, by mutually approved scientific methods, that the other

Party's safeguard and control system, as it applies to nuclear materials transferred to the other Party or fissionable materials derived therefrom, is operating effectively. Lastly, continuation of the cooperative program is contingent upon the maintenance by EURATOM of a satisfactory system.

In assessing the over-all import of this arrangement, the Atomic Energy Commission and the Department of State believe it should be recognized that in the first instance it is contemplated that the Community and, not the United States, will be charged with the basic responsibility for assuring that the materials involved only are being used for peaceful purposes. At the same time the arrangements will provide the United States with ample opportunity to verify that the agreed upon system is functioning effectively, without any less assurance to the Commission that material subject to control under the Agreement will be utilized only for peaceful purposes.

16. QUESTION:

Do the safeguard arrangements provide us with essentially the same rights that we have in the existing bilaterals?

ANSWER:

If by rights one means - has the United States the express unilateral rights accorded the Commission under a typical power bilateral, the answer is no. On the other hand, if one means by rights - that the United States has ample opportunity to assure itself that material is being used solely for peaceful purposes, the answer is yes. This difference recognizes the Community's special status and broad responsibility, under the EURATOM Agreement.

Briefly summarized, the provisions of the EURATOM Agreement in this regard are as follows: (1) The Safeguard system to be established by EURATOM must be in accordance with the principles which the United States and EURATOM agreed to. (2) This system must be mutually satisfactory. The parties have agreed that the

United States will provide assistance in establishing this system and will provide continuing assistance in the operation of the system. (3) It is further agreed that there will be frequent consultations and exchange of visits by the parties to give assurance that the Community safeguards system effectively meets the principles agreed to and that the standards of the material acceptability system of the Community and the United States have kept reasonably comparable. (4) Within these terms it has been agreed that each party will have the opportunity to verify, by mutually approved scientific methods, the effectiveness of the safeguards and control system established by the other Party as it applies to nuclear materials transferred to the other Party. (5) Lastly, continuation of the cooperative program is contingent upon the maintenance of EURATOM of a satisfactory safeguard system.

The United States perhaps could take the position that an interpretation of this Agreement permitted the United States to approach EURATOM on the basis of establishing a review system similar to that contemplated under bilateral agreements. However, this would not give a complete or accurate picture of the relationship envisaged. A review of the comparison and the history of the negotiations would clearly indicate that the provisions were drafted with a view that it is basically EURATOM's responsibility to establish and administer the safeguard system. The provisions relating to visits and consultations were designed to give assurance to the United States and EURATOM that this system would be effectively implemented and operated. In satisfying itself, the United States may verify the operation of this system by mutually approved scientific methods.

We are firmly of the view that the United States is in a position to adequately assure itself under the provisions of the EURATOM Agreement that material is being utilized solely for peaceful purposes.

17. QUESTION:

Does the Memorandum of Understanding provide that all of the so-called "know-how", including manufacturing techniques, in addition to plans, designs and specifications, which have been developed by American industry with private funds, must be made freely and widely available to European competitors?

ANSWER:

One of the major purposes of the proposed program is to foster a close and continuing association between American and European industry. In formulating the program it was recognized that normal commercial relationships would have to be preserved, wherever possible to encourage industrial participation. Accordingly, the provisions of the Agreement do not provide for any mandatory exchanges of manufacturing "know-how" or techniques. Exchanges of this kind are expected to be the subject of licensing and other normal commercial arrangements.

With respect to plans, designs, and specifications it was recognized in preparing the Agreement that the program, in large part, was being proposed to provide Europe with a technological foundation, based partially on U.S. experience, for a longer range nuclear power program. Of equal importance, it was designed to afford U.S. industry with the invaluable opportunity to "prove out" its reactors, on a large scale basis, and obtain from the European utilities operating and cost information on these reactors. Accordingly, if the desired benefits were to be realized, on a wide scale basis, it was agreed that there would have to be a reasonably free and reciprocal exchange of information under the program. It was recognized that such an exchange, in fact, would be indispensable to the review of the reactor proposals submitted as well as the administration of the program, including the fuel cycle guarantees. Thus, for example, Article VI, A-1, of the Agreement for Cooperation provides that:

"Under mutually agreed arrangements....all non-patentable information developed in connection with the selective



projects, concerning designs, plans and specifications, construction costs, operations and economics will be delivered currently to the parties as developed and may be used, disseminated, or published by each party for any and all purposes as it sees fit without further obligation or payment."

While this provision contemplates that information developed by American private capital will be disseminated under the program, it is felt that the terms are sufficiently flexible to assure that the exchange will be administered in a manner which is consistent with the objectives of this joint program. It also should be noted that information of this kind normally is made available to the purchasing utility and that, in the over-all, it is our belief that American industry will be gaining an ample return in the form of significant cost and operating data.

18. QUESTION:

What will the United States patent policy be with respect to American fuel element fabricators through whom the AEC extends fuel element guarantees?

ANSWER:

The Commission has not determined what patent rights, if any, it believes it should obtain with respect to patents developed by manufacturers covered by fuel element guarantees. If the Commission decides to obtain any patent rights, such rights will be limited to use of such inventions and discoveries by the United States Government with respect to construction and operation of Government owned reactors. We believe this approach will assure that the Government obtains such rights as are necessary for its own needs and at the same time permit manufacturers to be in a position to license others to use such patents.

Section 152 of the Atomic Energy Act provides that any invention or discovery useful in the production or utilization of special nuclear material or atomic energy made or conceived

under any contract, or subcontract, arrangement or other relationship with the Commission shall be deemed to have been made by the Commission. Whether or not this section would be applicable to fuel guarantee contracts has not been determined. However, even if it were so determined the Commission would take such action under the waiver authority set forth in this section as would be consistent with the approach outlined above.

19. QUESTION:

Why doesn't the proposed deferred-payment arrangement relating to the fuel inventory provide for a down payment by the Community at the time of initial delivery?

ANSWER:

We have considered the possibility of requesting the Community to make a down payment on the fuel inventory at the time of initial delivery. However, the objective is to keep the charges for enriched uranium comparable to those in the United States during the first ten years of operation when the EURATOM program will be getting underway. No down payment on fuel inventories is required in the United States, where the material is leased to private users. The deferred-payment arrangement, outlined in the prepared statement, as a substitute for lease and is financially equivalent to lease during the deferral period. To require a down payment for the EURATOM program would upset the basis on which the fuel-cycle costs were estimated and would necessitate other compensating incentives to assure the success of the program.

20. QUESTION:

Was the program discussed with American industry before July 8, 1958?

ANSWER:

The European Atomic Energy Community (EURATOM) came into being on January 1, 1958 and the first formal meeting of the EURATOM Commission was held on February 18, 1958. At this first meeting the Commission recommended the formation of a Joint U.S. - EURATOM Working Party to develop plans for the joint program. This working party met in Luxembourg in March and in Washington in April and May.

It was considered inappropriate to discuss the details of the proposed program with U.S. industry until there was

internal policy approval and until the program was submitted to the Joint Committee on Atomic Energy. However, we did receive many comments and observations from U. S. industry prior to, and during the period of negotiations with EURATOM, on the problems which were being encountered in attempting to sell U.S. reactors abroad, and this information was of considerable value in developing the program. In particular on December 31, 1957, the Commission sent a letter to representatives of the nuclear power industry requesting information on difficulties encountered in negotiating contracts for the sale of reactors abroad.

On July 8, 1958 we held a meeting with representatives of U.S. industry at which the proposed program was discussed in detail, and we believe it was favorably received by this group.

21. QUESTION:

The exchange of letters and the testimony make clear that the safeguard arrangements contain an element of reciprocity. Does this mean that we are undertaking a commitment to allow Euratom representatives to have access to U.S. classified information?

ANSWER:

The Agreement for Cooperation does not provide for classified information to be made available to EURATOM personnel. It does permit EURATOM to verify that plutonium produced in reactors under the program and processed or purchased by the United States will be used for peaceful purposes only. The United States will make arrangements to permit such verification with respect to chemical processing and peaceful uses without any classified information being involved.

22. QUESTION:

What is the status of third-party liability and indemnity coverage, and what would be the effect of any delay in such coverage in meeting the 1963 deadline date?

ANSWER:

In the prepared testimony there is outlined briefly the undertakings of EURATOM with respect to this matter and their complete understanding of the need to solve this problem. As you know, the EURATOM countries are members of the OEEC which currently has under consideration a draft convention which would deal with the third party liability question.

OEEC experts have been working steadily upon the draft convention, having had meetings in January, March and this month. They will meet again in September and hope to be able thereafter to complete such a convention to be presented to the member governments. We believe this is a most heartening indication of EURATOM's intention to deal expeditiously with this problem.

We have seen drafts of the convention and commented thereon. However, they are undergoing revision and further consideration. Basically, the convention would provide for liability in stipulated amounts on the reactor operations and adopt the approach that there would be no third party liability on the part of suppliers, including American suppliers, with respect to nuclear incidents arising in the signatory nations. We are aware, of course that whatever form the convention may take there may still be some problems.

We believe, however, that the main thing to remember is that EURATOM recognizes that a convention might not be the entire solution to this problem and that indemnification of such supplier might be necessary by EURATOM, backed up by the member state.

It is felt that EURATOM's undertaking under the Agreement for Cooperation to secure adoption by the earliest practicable date of suitable measures in this respect, coupled with the realization that the program may not proceed on the agreed time scheduled if the third party liability problem is not solved, is a strong indication that it will be solved.

23. QUESTION:

How will the program be administered? What will be the relationship of the Department of State, the AEC, the ICA, and the Executive Office of the President in the administration of the joint program?

ANSWER:

Both the AEC and the Department of State have been occupied with the substantive elements of the joint program and we, therefore, have not had time to work out the administrative arrangements needed to carry it out; a process which will require consultation with EURATOM officials. The development of administrative arrangements is clearly the next step. We expect to have a preliminary plan of operation by the end of August, and discussions with EURATOM officials in September.

We assume that certain major operating responsibility will have to be focused in Europe. The AEC intends to assign a senior representative to the EURATOM headquarters, supported by appropriate technical personnel, who will work within the general framework of the United States Mission to the three Communities, which is headed by Ambassador Butterworth.

In view of the fact that no Mutual Security funds are involved, the ICA is not involved in the administration of this program.

With favorable action by the Congress on the program, the next phase is one of organization, to be followed by actual administration of the program. These are phases of Executive operations outside the immediate interest of the Executive Office of the President, which is concerned with policy matters. Should major policy problems arise in connection with the joint program that require the attention of the Executive Office, then presumably the normal procedures would be followed, namely, a joint recommendation by the Secretary of State and the AEC to the President for his consideration.

24. QUESTION:

What activities will be included in the research and development program?

ANSWER:

The need for a well developed extensive research and development program as a compliment to the construction and operation of the reactors envisioned under the joint U.S.-EURATOM program was recognized by the Joint Working Party. The participating utilities want some assurance that the reactors, in which they will invest some 350 millions of dollars, have a reasonable chance of some day standing on their own feet as competitive power producers. The guarantees and other financial incentives offered for the first ten years under the program serve only to limit the loss of the operators during the initial period. Without a vigorous research and development program, these units would probably not produce appreciably cheaper power after ten years than they would initially and, with the termination of the operational assistance program, the utilities would find themselves with expensive power generating facilities.

The actual extent of the research and development program will, of course, be determined by the amount of useful research and development that can be done during the initial design and construction phase of the specific reactor projects that are chosen for the program and on those phases of the reactor system which lend themselves to improvement and modification after the reactors are part of an operating system.

The attached list of types of work that can and must be done gives an idea of the scope of the expected program.

With two, and possibly three, basic types of reactors being constructed, and with the variations that will be inherent in the six to eight actual projects under the program, and with the understanding that a major emphasis will be placed on full

scale testing, under actual operating conditions, of fuel elements, components, instruments, etc., the anticipated expenditure of 100 million dollars during the next five years is thought to be reasonable. Experience in this country has indicated that 5 to 10 million dollars of preoperational research and development is not unreasonable for reactors of the size contemplated. As a matter of interest, about 85 million was spent on PWR, not including the reactor facility itself. To achieve the economical promise of the reactors constructed under the U.S.-EURATOM program an extensive post-operational program also is required and would be supported by this R&D fund.

Since our experience with power reactors is somewhat limited, it is not possible to predict, on the basis of experience, how much research and development money can be spent on programs which will be expected to give a reasonable chance of a worthwhile pay-off. We have had about 14 years of experience with the effectiveness of research and development on improvement of operation of our production units. On the basis of the dollars spent at Hanford and Savannah River and of the improvement on productivity, it is felt that expenditures of the order proposed are entirely in line with our experience and more importantly that the results which we would expect to obtain from those expenditures will go far toward achievement of economic nuclear power in the reactors under the joint project as well as in all other reactors of similar type.

#### Type of Developmental Activities Envisioned Under the Joint Program

##### I. Fuel Cycle Studies:

- a. Methods of converting  $UF_6$  to material used as fuel.
- b. Development of new cladding for fuel.
- c. Optimization of fuel enrichment and geometry.
- d. Techniques for fabricating fuel elements.



- e. Procedures for extending operating life of fuel.
- f. Minimizing problems of corrosion of fuel elements by coolant.
- g. Irradiation tests of fuel elements in test reactors and in full-scale operating reactors.
- h. Optimization of heat transfer and nuclear performance of fuel.
- i. Improvement of fuel handling equipment and techniques.
- j. Methods of processing and re-using inactivated fuel including evaluation of degree of decontamination needed.

II. Moderator and Coolant Studies:

- a. Possibility of changes in moderator and coolant in reactors: for example, heavy water for light water.
- b. Methods for clean-up and purification of moderator and coolant.

III. Control and Instrumentation Studies:

- a. Development of more effective control materials.
- b. Development of better mechanisms for introducing control material.
- c. Improvement of techniques of manufacture and fabrication of control unit.
- d. Minimizing corrosion of control rods by coolant.
- e. Irradiation tests on new control material in test and full-scale reactors.
- f. Development of new or improved over-all instrumentation to make possible more stable operation under transient and equilibrium operating conditions.

IV. Operational Efficiency and Safety Studies:

- a. Development of improved operating procedures to decrease costs, minimize maintenance, increase on-stream time and improve over-all operational safety.

V. General Studies:

- a. Improvement of auxiliary systems and components so that improvements in reactor operation may be easily translated into decrease in unit costs.

25. QUESTION:

What use does the AEC plan to make of the plutonium purchased under the program?

ANSWER:

We cannot at this time make accurate predictions of the ultimate needs for plutonium for non-military uses because its limited availability for such uses has, to date, made it impossible to carry out the extensive research and development which will be required to assure that this material takes its rightful place among the nuclear fuels of the future.

The Commission is only now turning its efforts in a serious way toward the potential of plutonium as a nuclear fuel. It,

together, with industry must establish the special facilities needed for the chemical and physical handling of this highly poisonous material. Programs dealing with its chemical and metallurgical properties as well as with the techniques of handling it must be developed. Numerous alloys must be studied in order to determine which is the most suitable for uses in reactors. Large-scale experiments must be undertaken to determine the behavior of plutonium in its various physical and chemical forms under conditions of irradiation. Its stability and efficiency as a nuclear fuel must be determined by using it as fuel in various types of reactors under various conditions.

As the program progresses, as data from one series of experiments become available for analysis, and as more and more reactor physicists, chemists and metallurgists turn their efforts in this direction, the scope and magnitude of the program will rapidly expand and with it will expand the need for material. Our present preliminary and tentative thinking, developed in the current period when plutonium is looked upon as a scarce material needed for vital military programs, calls for approximately 3300 kg during the next 15 years. We are convinced that as soon as plutonium is available in significant quantities for non-military purposes there will be a sizable demand for all the material made available for the purpose. The long-range nuclear power program must be based on the ultimate use of all available nuclear materials. Plutonium and U-233 must take their place with U-235 as an energy source. Before this can happen there must be extensive research and development programs committing large amounts of these materials.

It should be mentioned that the quantity of plutonium to be purchased by the United States from EURATOM to meet these

needs may be substantially reduced by the existence of the same types of needs in the member states.

In addition to the obvious needs for developing and using plutonium as a nuclear fuel in power reactors, there is also the potential non-military use of nuclear explosives which is now in the very early stage of development. Should experiments which will be carried out under the Commission's Project Plowshare be successful, and there is every reason to believe that they will be, the demand for nuclear explosive devices could well become a very important factor in our nuclear planning and plutonium which is earmarked for non-military purposes could well find extreme utility in this manner.

26. QUESTION:

How was the figure of \$135,000,000 for the capital loan arrived at?

ANSWER:

The Memorandum of Understanding provides that the U.S. loan would be up to \$135,000,000. This figure was developed on the basis, and is meant to reflect, a reasonable estimate of the dollar value of U.S. equipment and services purchased for the reactors constructed under this program.

Based on our understanding of proposals submitted by U.S. industry on reactor projects in Europe, 50% - 60% of the equipment and services (excluding civil works) would be imported from the United States. On the basis of the total plant cost it appears reasonable to expect that 35 - 45% of the cost would be for U.S. equipment and services.

TYPICAL BREAKDOWN OF CONSTRUCTION COSTS

<u>Item</u>	<u>% of Total Cost</u>
Reactor Vessel	1.2
Containment	1.8
Fuel Handling Equipment	1.3
Building and Site	20.8
Instr. and Controls	2.8
Reactor Core and Fittings	1.8
Accessory Electrical Equipment	3.7
Control Rods and Drives	0.5
Turbo-Gen	23.5
Condenser	2.9
Feedwater Heaters	.9
Reactor Forced Circ. Pumps	1.2
Reactor Feed Pumps	0.5
Inter-Conn. Piping	5.6
Engr.	12.8
Overhead	5.9
Contingency @ 15%	13.0
	<u>100</u>

Cost Distribution

Labor	35%
Materials	62%
Engineering	13%
	<u>100%</u>

PLUTONIUM REQUIREMENTS

Use (3)	Fiscal Years																	<u>Total</u>
	<u>Thru 6/30/57</u>	<u>FY 58</u>	<u>59</u>	<u>60</u>	<u>61</u>	<u>62</u>	<u>63</u>	<u>64</u>	<u>65</u>	<u>66</u>	<u>67</u>	<u>68</u>	<u>69</u>	<u>70</u>	<u>71</u>	<u>72</u>	<u>73</u>	
Domestic Power (1) and R&D	40	140	130	390	150	50	100	100	100	100	100	100	100	100	100	100	100	2000
Commission R&D (2)	40	-20	65	40	10	10	10	10	10	10	10	10	10	10	10	10	10	255
Recycle Power Reactors	0	0	0	0	0	20	30	50	50	50	50	50	60	60	60	60	60	600
Fast Breeder Reactors	0	0	0	0	0	0	0	20	30	50	50	50	50	75	75	75	75	550
Private R&D	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	<u>140</u>
																		<u>3545</u>

(1) Includes base program reactors such as EBR-II, PRTR, Lampre, & ZPR's

(2) Basic R&D not associated with civilian power.

(3) Table does not reflect requirements for Pu in the following applications:

- a. The use in existing power reactors as enrichment in place of U-235.
- b. New MTR's and ETR's operating with Pu loading.
- c. Loan of material for foreign power reactors operating on Recycle basis or as substitution for U-235.
- d. Loan of material to foreign R&D programs.
- e. Operation Plowshare
- f. Medical uses

27. QUESTION:

Are one or two companies apt to get all the business at the expense of most of the industry?

ANSWER:

In view of the size of the program and the target date of 1963, it is highly unlikely that one or two companies in the United States have the ability or capacity to provide all of the equipment, material, or services required. On the contrary, we believe there will be a reasonable distribution of the orders among the companies within the nuclear industry that have a capacity to compete in the program.

APPENDIX "A"

COMPARISON OF THE SAFEGUARD PROVISIONS OF  
THE EURATOM AGREEMENT AND THE SAFEGUARD  
PROVISIONS CONTAINED IN A TYPICAL U.S.  
COMPREHENSIVE AGREEMENT FOR COOPERATION.

EURATOM SAFEGUARD PROVISIONS:

- 32 -
- A. The Community undertakes the responsibility for establishing and implementing a safeguard and control system in accordance with agreed upon principles which are set forth in the Agreement for Cooperation. This system will be designed to give maximum assurance that any material, equipment or devices made available pursuant to the Agreement and any source or special nuclear material derived therefrom shall be utilized solely for peaceful purposes.
- B. The Community undertakes the obligation to consult with the International Agency with the objective of establishing a system reasonably comparable with the International Agency system.

BILATERAL SAFEGUARD PROVISIONS:

- A. The safeguard provisions contain no express provisions relating to the type of safeguard system to be established by the nation. The U.S. however can require the maintenance and production of operating records and call for reports to assist in assuring accountability of material. The implementation of this provision could well influence the type of accountability system established by the subject Government.
- B. There is no specific undertaking on the part of a nation to consult with the IAEA in order to design a system reasonably comparable with the IAEA's system.



C. The United States and the Community have agreed on the principles which are to be employed by EURATOM in establishing a safeguard and control system and the Community is responsible for establishing and maintaining a mutually satisfactory and effective safeguard and control system in accordance with the agreed upon principles.

D. The Government of the United States will assist EURATOM in establishing the safeguard system and will provide continuing assistance in the operation of the system.

C. Bilateral agreements contain no provisions as to the standard to be adopted by the subject government in establishing a safeguard and control system and there is no express requirement that such system be mutually satisfactory.

D. There is no provision in Agreements for Cooperation which specifically provide for U.S. assistance in establishing the subject governments safeguard system. However, the U.S. does provide assistance under the information provisions of Agreements for Cooperation.

E. Under the joint program, the Parties will jointly approve the technical and economic features of the reactors to be selected. It is expected that designs will be reviewed in this evaluation. Euratom will review and approve the design for purposes of assuring the inspectibility of reactors.

34  
F. EURATOM must establish a safeguards system in accordance with agreed principles. One such principle provides that EURATOM will require the maintenance and production of operating records to assure accountability for materials and receive reports with respect to projects. The system developed by EURATOM based upon this principle must be mutually satisfactory. Visits and consultations are provided for to assure the system effectively meets the responsibilities and principles set forth in the Agreement and that the materials accountability systems of both parties are kept reasonable comparable.

E. The U.S. may, with the objective of assuring design and operation for civil purposes and permitting effective application of its rights, review the design of any reactor and other equipment or the design of any reactor which utilizes materials furnished by the United States.

F. The bilateral agreement with respect to the material covered (comparable to the material to be covered in the EURATOM system) permits the Commission to require the maintenance and production of operating records and to request and receive reports for the purpose of assisting and insuring accountability of such materials.

G. All material covered by the agreement in the custody of EURATOM will be subject to the EURATOM safeguard system and the provisions of the Agreement for Cooperation with EURATOM, including the guarantee provisions.

H. Under the principles agreed upon, EURATOM undertakes the obligation to assure that materials not currently utilized for civil purposes are deposited in storage facilities maintained by the Community.

I. Frequent consultations and visits between the parties will take place to give assurance to both parties that the Community's safeguard and control system effectively meet responsibilities and principles stated in the Agreement and that the standards of the materials accountability system of the United States and the Community are kept reasonably comparable. The United States will assist the Community in

G. Materials covered by the agreement in the custody of the subject Government or any person under its jurisdiction is subject to all the safeguards and the guarantees.

H. Special nuclear material not currently utilized for civil purposes is required to be deposited in storage facilities designated by the U.S.

I. The U.S., after consultation with the subject Government may designate personnel accompanied, if either party so requests, by personnel of the subject Government who shall have access to all places and data necessary to account for the source and special nuclear material which are subject to the safeguard provisions of the Agreement.

I. (Continued)

the establishment of its system and will provide continuing assistance in the operation of the system. The Commission may verify by mutually approved scientific methods the effectiveness of the safeguards and controls system established by EURATOM and EURATOM may do likewise with respect to materials made available to the Commission.

J. A continuation of the cooperative program is contingent upon Community's establishing and maintaining a mutually satisfactory and effective safeguard and control system which is in accord with the principles set forth in the Agreement.

I. (Continued)

The personnel assigned by the U.S. may make such independent measurements as it deems necessary.

J. In the event of non-compliance with the safeguard provisions of the Agreement or the guarantees set forth in the Agreement and the failure of the subject Government to carry out the safeguard provisions within a reasonable time, the U.S. may suspend or terminate the Agreement and require the return of any material, equipment and devices subject to safeguards.

- K. Under the exchange of information provisions, the parties will consult on matters of health and safety.
- L. No express provision dealing with Bilateral L., see however Section C of the Agreement concerning exchange of visits and consultations and the necessity to establishing a mutually satisfactory system and Section E of the Agreement providing that the cooperative program is contingent upon the Community's establishing and maintaining a mutually satisfactory system.
- M. The Commission and the Community will consult with each other from time to time to determine whether there are any areas of responsibility with regard to safeguards and controls and matters relating to health and safety in which the Agency might be asked to assist.

- K. The United States is to consult with the subject Government relating to matters of health and safety.
- L. The subject Government undertakes to facilitate the application of the safeguards set forth in the Agreement.
- M. The Parties will consult to determine in what respects if any they desire to modify the provisions of the Agreement for Cooperation to arrange for the administration by the IAEA of those conditions, controls, and safeguards, including those related to health and safety standards required by the IAEA' in connection with similar assistance rendered to a

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M. (Continued)

cooperating nation under the aegis of the IAEA. In the event the parties do not reach a mutually satisfactory agreement following such consultation, either party may terminate the agreement and in the event it is terminated the subject Government shall return to the Commission all source and special nuclear materials received pursuant to the Agreement.