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April 14, 1958

AEC 751/169

COPY NO. 54

ATOMIC ENERGY COMMISSION

REPORT ON THE DISCUSSIONS HELD BY THE JOINT EURATOM-UNITED STATES WORKING PARTY

Memorandum by the General Manager

1. The attached report by the U.S. Delegation to the Joint U.S.-Euratom Working Party, covering the recent discussions in Luxembourg is circulated for the information of the Commission.

2. The attachment is a summary report which has attached to it a draft Memorandum of Understanding and various supporting papers that were developed by the Working Party. If the proposed program with Euratom is to move ahead this session of Congress, early action will be required and particular attention is called to the schedule of necessary actions contained in Appendix "H" to this paper.

3. The following detailed papers are being circulated concurrently and will require consideration by the Commission before a definitive Memorandum of Understanding, which forms the basis for further implementing actions, can be completed and signed.

DISTRIBUTION	COPY NO.	DISTRIBUTION	COPY NO.
Secretary	1	Information	27-28
Commissioners	2-6,82	Inspection	29
General Manager	7	Intelligence	30
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a. AEC 751/170 - Controls and Safeguards - Euratom
b. AEC 751/171 - Fuel Cycle Phase of the Joint U.S. Euratom Program
c. AEC 751/172 - Financing the Fuel Inventory of a 1,000,000 KW Euratom Program
d. AEC 751/173 - Purchase of Plutonium from Euratom
e. AEC 751/174 - Proposed Legislation to Authorize a Loan for Acquisition of Euratom Facilities

4. In addition, the following supporting papers are necessary to get the program authorized and underway. Most of them are now under preparation and will be completed after consideration of the above papers by the Commission.

a. AEC 978/15 - Amendment to Section 55 to provide authority to enter into a contract to purchase plutonium for a 10-year period (scheduled for consideration during the week of April 14, 1958);

b. A request for Presidential allocation of additional U-235 to cover the requirements of the Euratom program;

c. An authorization, as required by Section 54 of the Act, for distribution of the special nuclear material required;

d. Approval of the final draft of a Memorandum of Understanding and the signing thereof;

e. A Section 124 Agreement, including a draft Presidential message to the Congress;

f. A Section 123 Agreement for Cooperation

g. Authorization and appropriations:

(1) to carry out the U.S. Commitment under the joint research and development program;

(2) necessary to carry out U.S. commitments under the fuel cycle program;

(3) to carry out the commitments of an alternate to lease of fuel;

(4) for the capital loan fund.

K. E. Fields

General Manager

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ATOMIC ENERGY COMMISSION

REPORT ON THE DISCUSSIONS HELD BY THE JOINT EURATOM - UNITED STATES WORKING PARTY

Report by the U. S. Delegation to the Joint U. S. - EURATOM Working Party

1. At the suggestion of the EURATOM Commission, a Joint U. S. - EURATOM Working Party was established in March to examine the means whereby the United States and the European Atomic Energy Community could cooperate in the development of a prototype nuclear power program. In particular, the Working Party was instructed "to pay special attention to the possibility of initiating at an early date a joint program on the order of one million KW for the development of full scale prototype reactors." It will be recalled that, in anticipation of the development of such a joint program, the President on February 6, 1958 approved, in principle, the outlines of a program of United States assistance in support of the Community's objectives (see AEC 751/160).

2. The Working Party held a series of meetings in Luxembourg from March 20 to April 4 to consider the various possibilities of cooperation and to lay the groundwork for the establishment and eventual implementation of a joint nuclear power program. This paper provides a brief summary of the topics discussed during the meetings of the Working Party in Luxembourg, the results achieved to date, the problems encountered, and the action still required.

Development of Draft Memorandum of Understanding

3. The major task confronting the Working Party was to arrive at an agreement, in principle, as to the type of joint program that would be most meaningful to the United States and

EURATOM. It had been agreed beforehand to develop a draft "Memorandum of Understanding" between the United States and the Commission of the European Atomic Energy Community which would specify the proposed objectives and major features of the joint power program and the methods and conditions for implementing the program. This Memorandum would serve as the basic frame of reference for the various actions that subsequently would be required to get the program underway. Among other things it was agreed that the Memorandum of Understanding should cover the following topics:

a. The objectives of the Joint Program

b. The principles governing the selection and approval of reactor projects

c. The arrangements regarding the financing of capital costs

d. The arrangements to be agreed upon in support of the fuel cycle

e. The chemical processing services that would be provided by the United States

f. The principles governing the establishment of a joint research and development program

g. The provision of special nuclear and other materials by the United States in support of the program

h. The conditions governing the disposition of information (both non-patentable and patentable) developed in the program

i. The cooperation that would be required in the field of training

j. Cooperative activities in industry

k. Safeguards and controls

l. Third party liability

m. Tariffs

n. The relationship of the program to existing bilateral agreements

o. Administration of program

4. It also was agreed that the Memorandum would be supplemented, as necessary, by supporting papers which would provide more detailed discussion of certain topics.

5. The participants of both delegations were split into smaller groups to consider and draft the above topics of the Memorandum of Understanding. This was done and the text of a proposed Memorandum of Understanding (Enclosure "A") was prepared for the consideration of the respective authorities on either side and initialed at the conclusion of the meetings by Ambassador Butterworth, Mr. Kohnstamm, and Mr. R. W. Cook. In addition, the following papers were prepared:

a. An Appendix to the Memorandum of Understanding, (Appendix "A" to Enclosure "A") including the following chapters:

Chapter I - Need for Joint Program

Chapter II - Scope of Program

Chapter III - Relationship of the Cost of Nuclear to Conventional Power

Chapter IV - Guarantees and Incentives

Chapter V - Joint Research and Development Program

b. A series of Annexes to this Appendix, including:

Annex 1 - Amount of U-235 Required for the 1,000,000 Kilowatt Program

Annex 2 - Cost of Power - Conventional and Nuclear (Not Attached)

Annex 3 - Fuel Cycle Program (Not Attached)

Annex 4 - Chemical Reprocessing

c. A series of supporting papers on:

(1) Third Party Liability (Appendix "B-1")

(2) Financing of Capital Costs (Appendix "B-2")

(3) Tariffs (Appendix "B-3")

(4) Training Information and Materials (Appendix "B-4")

(5) Relationship of Existing Projects Under Bilaterals to the Joint Program (Appendix "B-5")

d. A proposed statement prepared by the U. S. delegation on the disposition of patent rights. (Appendix "C")

e. The text of a proposed agreement between the United States and the European Atomic Energy Community as required by Section 124 of the Atomic Energy Act of 1954. (Appendix "D")

f. A draft statement on the relationship of existing bilaterals to the "initial" bilateral agreement with EURATOM. (Appendix "E")

6. The Appendix to the Memorandum of Understanding, Annexes 1 and 4, and the supporting papers on third party liability; capital financing; tariffs; training; information and materials; and the relationship of existing projects to the proposed program, (Appendix "B-1" through "B-5") are attached to this report. Annexes 2 and 3 to Appendix "A" were prepared in Luxembourg but are not being circulated at this time since they undoubtedly will need revision. They relate to assistance in support of the fuel cycle, which is the subject of a separate staff paper, and will be modified depending upon the Commission decision on the fuel cycle paper. The statement on patents prepared by the U. S. delegation is attached as Appendix "C". The proposed international agreement pursuant to Section 124 of the Atomic Energy Act is attached as Appendix "D". Appendix "E" is the draft statement on the relationship of the existing agreements for cooperation with individual Member States to the contemplated initial agreement for cooperation with EURATOM.

Areas of Agreement

7. As evidenced in the attached Memorandum of Understanding the Working Party realized complete agreement on many important points including the objectives and scope of the program.

8. Basic Objectives. It was agreed that the major objective of the joint program should be to bring into operation within the Community, by 1963, large-scale nuclear power plants

of proven type, primarily of the PWR/BWR varieties having a total installed capacity of approximately one million eKW. The Working Party examined this proposed objective carefully and concluded that a program of this size would be essential if the data obtained was to have statistical significance, and if the program was to have a wide enough base to involve most of the European firms having a capacity for entering such an undertaking. As a parallel and associated objective it also was agreed that the Community and the United States should initiate immediately, on a matching basis, a joint research and development program designed to improve the performance of these reactors and to effect reductions in the cost of the fuel cycle. The EURATOM Commission has indicated that it now has funds in hand to match the U. S. contribution for the first five years of the program and that it will seek funds to match the U. S. contribution for the second five years.

9. It is estimated that six to eight additional reactors would be constructed under this program and that for twenty years of operation a total of 29,000 kilograms of contained U-235 will be needed for inventory and burnup.*

10. Selection and Approval of Projects. Agreement also was reached on the major principles that should be followed in selecting and approving projects. The criteria for selecting projects would be jointly developed by the EURATOM Commission and the USAEC. Both Parties would participate in the evaluation and selection of projects from their technical and economic aspects, the types of reactors to be supported, the arrangements to be made in support of the fuel cycle, and from the standpoint

*If 1,000 kilograms are added for research and test reactors associated with the program, this figure becomes 30,000 kilograms.

of the contractual arrangements to be made with the institutions participating in the program. The United States would not assume direct responsibility for the difficult problem of determining how the projects should be distributed between the Member States. This will be the responsibility of EURATOM.

11. Relationship to Existing Projects. There also was agreement that, although in the main the proposed program should supplement existing national programs, a limited number of reactors now being planned in Member States of the Community (such as Edisonvolta) would be eligible for and would receive early consideration for support. Both sides agreed that the speedy incorporation of a limited number of such projects, in an advanced state of planning (provided they met the standards and were prepared to assume the obligations) would have a beneficial effect in imparting momentum to the program. At the same time, however, the Working Party felt that the incentives and guarantees of the joint program should apply only to the projects selected and making up the one million kilowatt objective and that these benefits should not be made available for other projects within the Community inasmuch as this would tend to undercut the status and special nature of the EURATOM program and would involve an extension of EURATOM and U.S. obligations.

12. Financing Capital Costs. Agreement also was reached on the principles to be followed with respect to the capital costs of the program, which are estimated to be the equivalent of $350,000,000. Approximately $250,000,000 would be provided by European sources of capital and approximately $100,000,000 would be provided by the United States Government to EURATOM in the form of a low interest, long-term line of credit. A separate paper is being prepared for commission consideration on this subject.

13. Information and Patents. Inasmuch as the proposed program would be designed for the general benefit of all the associated projects and programs within the Community and the United States, it was agreed that information developed in the course of the program should be disseminated promptly and freely without discrimination. Principles along these lines were inserted in the Memorandum. The U. S. side drafted a proposed formula regarding the disposition of patent rights which was designed to afford the industries within the United States and the Community a maximum right to utilize the inventions or concepts developed in the program (see Appendix "C"). In view of the complicated nature of this problem and their need to study this formula further, the European representatives asked that a detailed statement regarding patents be omitted from the Memorandum, at this time, pending their having an opportunity to consider this matter further.

14. Third Party Liability. Lastly, there was complete agreement within the Working Party that the implementation of the proposed program would be dependent upon the realization of adequate measures to protect equipment manufacturers and other suppliers against uninsurable risk and methods for dealing with this problem on a short and long-term basis were considered.

15. Under the terms of the proposed Memorandum of Understanding the EURATOM Commission will seek to develop and to secure the adoption, by the earliest practicable date, of suitable measures which will provide adequate financial protection against third party liability. This could involve suitable indemnification guarantees, national legislation, international convention, or a combination of such measures. It is believed that under pressure of the joint program early action to solve the third

party liability problem is likely and it is expected that the progress made will not only accommodate the needs of the proposed joint program but also might provide the basis for a general solution which will be applicable to other areas.

Major Problems Encountered

16. The discussions, however, did turn up the following major problems that will have to be resolved if the program is to move ahead:

a. The Need for Assistance in Support of the Fuel Cycle

b. Safeguards and Controls, and

c. EURATOM's Problem Relating to Lease of Fuel.

Each of these subjects will be the subject of an individual staff paper to the Commission.

Summary and Outlook

17. In the judgment of the U. S. delegation to the Working Party a substantial amount of progress was made during the discussions although the problems relating to the fuel cycle, safeguards, and lease have yet to be overcome. It became manifestly clear in the course of the discussions that both United States and the Community have a substantial amount to gain in proceeding successfully with this proposed joint program, and, in fact, the rapid initiation of a program of this kind may be vital to the entire success of the European Community. It also was recognized that the rapid, full and widespread participation of industry in the Community and the United States is of essential importance to the success of the program and that adequate incentives and guarantees in support of the fuel cycle will be required to insure such participation.

18. Finally, it was recognized that time is of the essence - that to achieve the objectives of the joint program, a start must be made on firm planning during the summer and fall of 1958, and construction should start in early 1959. This will require Congressional action on the essential features of the program, at least on the Section 124 Agreement, so as to provide a clear indication of Congressional support during this session of Congress. If such action were not taken, the entire program would be delayed the better part of a year and the present momentum in Europe would be lost. Upon review by the Commission of the papers being presented for action and information on the proposed joint program there is a plan for several members of the EURATOM Commission to come to the United States to resolve any outstanding issues so that the Memorandum of Understanding may be put in final form for signature.

19. Appendix "H" contains a list of the major actions that will have to be taken within the United States Government before the proposed program can begin. It includes a target time-schedule for accomplishing these steps which has been drafted with a sense of urgency in mind.

Press Release, Schedule of Actions

20. At the conclusion of the meetings of the Joint Working Party on April 3, a brief press release was issued (Appendix "F"). The members of the Working Party are listed in Appendix "G".

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ENCLOSURE "A"

JOINT UNITED STATES - EURATOM
WORKING PARTY

April 3, 1958

REPORT OF THE JOINT EURATOM-UNITED STATES WORKING PARTY

The Joint EURATOM-United States Working Party met in Luxembourg from March 20 - April 4, 1958 and considered ways and means to carry out a joint program devoted to the peaceful uses of nuclear energy. The attached draft Memorandum of Understanding represents the result of its work.

The EURATOM and the United States representatives of the Working Party will transmit these documents to their respective authorities for their consideration.

The Commission of the
European Atomic Energy
Community

/s/ M. Kohnstamm

M. KOHNSTAMM

The Government of the
United States of America

/s/ W. W. Butterworth

/s/ R. W. Cook

W. Walton BUTERWORTH
R. W. COOK

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EUROPEAN ATOMIC ENERGY
COMMUNITY

The Commission

JOINT UNITED STATES - EURATOM
WORKING PARTY

The attached Draft Memorandum of Understanding and Draft International Agreement are under consideration by the United States Government and the institutions of the European Atomic Energy Community. Their contents should therefore be treated as confidential until the joint release-date, to be notified to the recipients.

Enclosure "A"

UNCLASSIFIED

EUROPEAN ATOMIC ENERGY
COMMUNITY

The Commission

JOINT UNITED STATES - EURATOM
WORKING PARTY

DRAFT

MEMORANDUM OF UNDERSTANDING
between
The Commission of the European
Atomic Energy Community
and
The Government of the United States
of America

The steps taken by the Member States of the European Atomic Energy Community (EURATOM) towards a united Europe and the consistent support of the United States for their efforts are an acknowledgment that in a world being rapidly transformed by technical and political change, the problems our countries face call for increasing solidarity.

The Member States of EURATOM urgently need nuclear power to be in a position to meet future energy requirements and to assure continued economic progress.

Both EURATOM and the United States must carry through the nuclear revolution in industry with maximum speed and efficiency in order to remain in the forefront of progress and to open new horizons for further economic and social advance.

In order to achieve these objectives a large-scale joint development program of power reactors will be launched.

EURATOM will benefit by the experience and capacity which the United States can provide to make a quick start on such a program. This will in turn provide the United States with

the opportunity to accelerate its own industrial development of nuclear power for peaceful purposes by associating itself in the program. Conventional energy is generally more costly in Europe than in the United States, so that nuclear power approaches the competitive range of energy costs in Europe, a stage which will be reached only later in the United States.

For these reasons, the Commission of the European Atomic Energy Community and the Government of the United States of America have today agreed to this Memorandum of Understanding which outlines a joint United-States-EURATOM development program of large-scale nuclear power reactors to be constructed in the European Atomic Energy Community in the next few years.

The aim of the joint program will be to bring into operation in the Community about 1,000,000 electrical kilowatts of installed nuclear capacity in water-type reactors by 1963, thus increasing substantially the total capacity envisaged by existing programs in the Member States. The program is consistent with, and in fact a point of departure towards the program outlined in "A Target for EURATOM".[x)]

It is understood that the establishment and initiation of the joint program is subject to appropriate statutory steps, including authorization by the competent bodies of the Community and of the Government of the United States.

The joint program will be conducted so as to obtain the maximum support of the industries of the Community and the United States; indeed, their active participation is indispensable to the success of the program.

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x) Report submitted by Mr. Louis Armand, Mr. Franz Etzel and Mr. Francesco Giordani at the request of the Governments of Belgium, France, German Federal Republic, Italy, Luxembourg and the Netherlands.

It is the hope and expectation of the Commission and the Government of the United States that the proposed program will lead to further cooperation between the Community and the United States in other fields related to the peaceful uses of atomic energy.

They also see in the joint program a new type of cooperation among allies on a fully equal footing based on organic links forged by common effort, and holding out hopes of new steps for the further development of the Atlantic Community.

The Commission of the European Atomic Energy Community and the Government of the United States reaffirm 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.

1. OBJECTIVES

The objectives of the joint program will be:

A. To bring into operation by 1963, within the European Atomic Energy Community, large-scale power plants using nuclear reactors of proven type, ~~primarily of the pressurized and boiling water types,~~ having a total installed capacity of approximately one million kW of electricity and under conditions which would approach the competitive range of conventional energy costs in Europe.

B. To initiate immediately a joint research and development program centered on these reactors.

2. SELECTION AND APPROVAL

Reactor projects may be proposed, constructed or operated by private or governmental organizations engaged in the power industry or in the nuclear energy field.

The Commission and the Government of the United States will establish jointly technical standards and criteria and the procedures for selection and approval of reactor projects under this program.

In the evaluation and selection of the projects, the technical and economic features, the types of reactors to be supported, the arrangements to be made in connection with the fuel cycle, and the contractual arrangements with institutions participating in the program will be considered and approved jointly by the Commission and the United States Government.

Other features of the projects will be considered and approved by the Commission.

Reactors now being planned or constructed in Member States of the Community will be eligible for, and will receive, early consideration under the criteria established pursuant to this section.

It is intended to take and announce decisions on the above matters at the earliest practicable date.

3. CAPITAL COSTS

The total capital cost[x)] of the nuclear power plants with an installed capacity of approximately one million kilowatts of electricity to be constructed under the program is presently estimated not to exceed the equivalent of $350,000,000 to be financed as follows:

A. Approximately $250,000,000 to be provided by the participating utilities and other European sources of capital, such financing to be arranged with the appropriate assistance of EURATOM; and

x) exclusive of the fuel inventory

B. Approximately $100,000,000 to be provided by the United States Government to EURATOM in the form of a long-term line of credit on terms and conditions to be agreed, such funds to be re-lent by EURATOM for the construction of facilities under this program.

4. FUEL CYCLES

The Commission and the Government of the United States will enter into special arrangements with respect to the fuel cycle for reactors to be constructed and operated under the proposed program so as to provide for European operators terms and conditions reasonably comparable in effect with those offered in the domestic reactor program of the United States.

5. CHEMICAL PROCESSING

The United States Atomic Energy Commission is prepared to process in its facilities, at established U.S. domestic prices, spent fuel elements from the reactors to be included in the present program. The United States Atomic Energy Commission agrees to assist in the development of chemical processing techniques in Europe by providing technical advice and assistance both to the "Eurochemic" (which is to design and build a pilot plant at Mol, Belgium), and to the Community in the design and construction of future plants which the Community may decide to design and construct, or to sponsor.

6. RESEARCH AND DEVELOPMENT

A. The Commission and the Government of the United States intend to initiate promptly a joint program of research and development to be conducted both in the United States and in Europe on the types of reactors to be constructed under the present program.

This Research and Development program, established on a matching financial basis, will be primarily aimed at the improvement in performance of these reactors, and at lowering fuel cycle costs.

It will also deal with plutonium recycling and other problems relevant to these reactors, thus contributing to the over-all advance of the nuclear power art.

This Research and Development program will be established for a ten (10) year period, during which it is estimated that the financial contribution of the Community and the United States would amount to about $100,000,000 each.

The administration of this program will be conducted under mutually agreed arrangements.

B. In addition, both the Commission and the United States Atomic Energy Commission will push forward and extend their own research and development programs, either direct or sponsored, on all peaceful aspects of nuclear science and industry, in particular in such fields as advanced civilian reactor design, fuel technology, reactor operation, chemical processing, radioisotopes utilization, waste disposal, and public health.

Information resulting from such work outside of the joint program will be exchanged by the respective Commissions fully and promptly.

7. SPECIAL NUCLEAR AND OTHER MATERIALS

The Government of the United States will make available to the Community, as needed, enriched uranium for the nuclear power reactors to be included within the proposed program, in sufficient quantity to meet inventory and operating requirements for a twenty (20) year operating period.

The Government of the United States also will provide the Community special nuclear materials as may be agreed for research

and development and the operation of research and test reactors associated with the proposed power program, in sufficient quantity to meet inventory and operating requirement for a twenty (20) year operating period. In addition, source material, special reactor material and other materials needed for carrying out the program will be provided under terms and conditions to be agreed upon.

8. AVAILABILITY OF INFORMATION

A. Nonpatentable information developed in joint program

1) The program contemplated by this Memorandum of Understanding, including projects selected for inclusion therein, should serve to benefit other projects and programs (both private and governmental) within the Community and the United States. Accordingly, under mutually agreed arrangements, all information developed in connection with the joint program of research and development, and all information developed in connection with the selected projects, concerning design, 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. There will be no discrimination in the dissemination or use of the information for the reason that the proposed recipient or user is a national of the United States or of any Member-State of Euratom.

2) Both Commissions shall have access to the records of the participating contractors pertaining to their participation in research and development projects under the joint research and development program, or pertaining to the performance of fuel elements that are the subject of United States guarantees.

3) The Parties will further expedite prompt exchange of information through symposia, exchange of personnel, setting up of combined teams, and other methods as may be mutually agreed.

B. Patentable Information

(There was preliminary exploration of this subject by the Joint Working Party. Further study and consideration will be necessary.)

9. TRAINING

The Commission and the United States Atomic Energy Commission will work closely together to develop training programs to satisfy the requirements of the programs described in this memorandum. The United States Atomic Energy Commission will assist the Commission in satisfying these needs by making its facilities and experience available.

10. COOPERATIVE ACTIVITIES IN INDUSTRY

It is expected that the program to be initiated under the terms of this Memorandum of Understanding will increase the cooperation already existing between individuals and organizations, both privately and publicly owned, engaged in nuclear industry, in the United States and in the countries of the Community.

The Commission and the Government of the United States will use their best efforts to foster such cooperation.

11. SAFEGUARDS AND CONTROLS

(There was preliminary exploration of this subject by the Joint Working Party. Further study and consideration will be necessary.)

12. THIRD PARTY LIABILITY

The Community and the Government of the United States recognize that adequate measures to protect equipment manufacturers and other suppliers as well as the participating utilities against now uninsurable risk are necessary to the implementation of the joint program. The Commission will seek to develop and to secure the adoption, by the earliest practicable date, of suitable measures which will provide adequate financial protection against third party liability. Such measures could involve suitable indemnification guarantees, national legislation, international convention, or a combination of such measures.

13. TARIFFS

The Commission will take all action open to it under the Treaty to minimize the impact of customs duties on goods and products imported under this joint program.

14. EXISTING AGREEMENTS

Existing agreements for cooperation in the field of nuclear energy between Member States and the United States of America are not modified by the joint program, but will be subject to appropriate negotiations pursuant to article 106 of the Treaty. Modifications may be made as necessary to permit transfers of reactor projects now contemplated under existing agreements that qualify for and are accepted under the joint program.

15. ADMINISTRATION OF THE PROGRAM

In order to assure the initiation and effective execution of this program, agreement will be reached on the over-all organization needed to establish and carry out the joint program, including the establishment of such joint groups as are required.

The Government of the United States of America	The European Atomic Energy Commission
/s/ W. W. Butterworth	/s/ M. Kohnstamm
W. Walton Butterworth	M. Kohnstamm

/s/ R. W. Cook

R. W. Cook

The foregoing initialing is for the purpose of verification of the text.

APPENDIX "A" TO ENCLOSURE "A"

JOINT UNITED STATES-EURATOM

WORKING PARTY

APPENDIX

TO THE MEMORANDUM OF UNDERSTANDING

CHAPTER ONE

Need for a Program of Construction and Operation of Development Power Reactors in Euratom Countries

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.

CHAPTER TWO

The scope of the program

There are many factors which have an important bearing on the magnitude of the reactor construction and operation program. Most important, it must be of such a size that it will:

1. Assure that the technical and economic data obtained from the program have statistical significance not only with respect to the entire program, but also with respect to factors which are peculiar to individual countries;

2. Involve into early construction of nuclear plants and parts thereof, all European industries which do actually have the potential capacity for such an undertaking;

3. Bring a sufficient number of operating utilities into the program to assure that management in this industry is universally ready to accept nuclear energy and to enter the long-range program with whole-hearted support.

Taking into account the nuclear power projects already in existence in the various European countries, these criteria seem to suggest that a program of six to eight additional reactors, properly distributed among several Euratom nations, would be most effective.

These units should be of a size that is consistent with the practice of the several nations, and would probably vary from station to station, but mostly fall within the range of 100-200 EMW.

Thus, the total capacity of the program would be in the range of 600-1,600 EMW, but it is expected that the total will fall near the middle of this range. Thus, for the purpose of

gross calculations - estimated fuel requirements (See Annex 1), total estimated costs, etc. - the program should be given a nominal rating of a million kilowatts.

The program must be timed to be consistent with achievement of the over-all goal of Euratom to have up to 15 million electrical kilowatts of nuclear power installed late in the nineteen sixties and an ever-expanding program thereafter. Furthermore, its schedule must be such as to enable all nuclear industries in the Community interested in nuclear development to participate from the beginning.

To do this, the construction program must be on a schedule limited only by the abilities of the equipment manufacturers and utilities.

A target schedule under which projects are selected no later than 1959 and construction is completed no later than 1963 seems to meet this situation.

Since the basic objectives of this program are to add to the proof of the economic feasibility of nuclear power stations and to help develop the industrial complex necessary for expansion, it should be based on technology which has already been proven, by operation of pilot and prototype plants, to be technically and scientifically feasible. Reactor types chosen must have already shown that they are capable of operating with reasonable plant factors and that they may be considered as part of an integrated system.

Such requirements are met by the selection for this program of water type reactors, either pressurized or boiling, using slightly enriched uranium, since natural uranium reactors, graphite moderated, are already widely included in the various national plans.

A program of the scope so defined so reinforces the local plans already in existence as certainly to support industries engaging in fuel element fabrication and in auxiliary lines (control mechanisms, electronics, special materials, use of fission products, radiation etc.).

In particular it might well warrant the construction of a chemical treatment plant for the processing of spent fuel, or the adaptation of existing such plants.

It is much too early to try to evaluate now the effect of such developments on the price breakdown presented in Annex 2.

CHAPTER THREE

Relationship of the Cost of Nuclear Power to Conventional Power

In an effort to determine the limits to be expected on the cost of electricity from nuclear power several cases were examined (see Annex 2)*. The conclusions from these studies are:

1. The economic status of nuclear power, as defined by comparison with the cost of power from new conventional thermal plants, remains essentially as found in "A Target for Euratom". However, trends in power price from conventional oil or coal power stations point to lower cost than was anticipated a year ago.
2. The investment costs for the initial nuclear plants can be expected to be somewhat more than twice that of conventional thermal plants. Recent experience in the U.S. not only substantiates the capital cost picture given in the "Target for Euratom" but provides reasonable assurance that the cost of foreign construction of U.S. reactors will fall within the range of $250 - $350 per kW.

*Not attached.

It is not fully clear, however; to what extent the recent very encouraging news on the performance of experimental and prototype water reactors are reflected in the capital costs as quoted here and in Annex 2.*

3. The nuclear fuel costs represent a major uncertainty on the cost of power. The predominant factors contributing to this uncertainty are fuel performance and the cost of fuel fabrication. A reasonable range on these factors in light of today's experience, give fuel costs of 4-5 mils per kWh, about 2/3 the cost of conventional fuel, if one assumes lease of fuel at 4% (or arrangements with equivalent economic effect) and purchase of plutonium metal at $12 per gram. Reasonably achieveable progress on these factors during the early years of the plants' operation should lead to fuel costs in the range of 2-3 mils per kWh. Such fuel costs would afford a cost of power in the range of 10-14 mils per kwh, with capital costs and charges as stated above and as listed in Annex 2.*

CHAPTER FOUR

Guarantees and Incentives

We are thus faced by two essential facts, leading to apparently opposite conclusions:

a) On the one hand, results significant from both the technical and economic point of view require the rapid setting up of a large production capacity.

b) This involves big investment and operating expenses resulting, initially at least, in power production at costs substantially higher than those of conventional power stations.

* Not attached.

Guarantees and incentives are therefore necessary and the following measures are proposed subject to necessary U.S. administrative approval and legislative action.

Guarantees

1. The reactors now considered will use slightly enriched uranium fuel. The United States Atomic Energy Commission would guarantee full supply of this special material for 20 years operation. At the option of Euratom, this material would either be sold at the published U.S. domestic charges or leased at the 4% domestic use charge. The U.S. would be willing to purchase the plutonium generated from this material at its established fuel price.

2. The United States Atomic Energy Commission would guarantee cost and performance of fuel elements (manufactured by U.S. firms or by Euratom firms under AEC-approved agreement with U.S. firms) and would provide chemical processing and related services at published United States domestic charges as set forth in Annex 3.* These processing charges for fuel would include transportation on the basis f.o.b. a designated port in Europe for delivery of irradiated fuel.

3. The total capital cost of the nuclear power reactors to be constructed under the program is presently estimated not to exceed the equivalent of $350,000,000 to be financed as follows:

A. Approximately $250,000,000 to be provided by the participating utilities and other European sources of capital, such financing to be arranged with the appropriate assistance of Euratom; and,

*Not attached.

B. Approximately $100,000,000 to be provided by the United States to Euratom in the form of a long-term line of credit on terms and conditions to be agreed, such funds to be re-lent by Euratom for the construction of facilities under this program.

Incentives

1. The main, if relatively long-term incentive is, of course, provided by the hope that, owing in particular to the joint research and development program, both capital charges and fuel costs will decrease appreciably in a few years time; it must be emphasized that, contrary to conventional plants, existing nuclear stations can make ample use of technological development occurring after they have been put into commission.

2. Firms operating reactors built under this program may be included by Euratom and the United States Atomic Energy Commission in the research and development program defined in Chapter V and financed jointly by the United States and Euratom.

3. Under agreed-upon conditions such additional equipment and operational cost as result from the research and development program referred to in Chapter V may be charged to the funds made available for this program.

4. The plant operator will have full authority and responsibility for running the station according to a program agreed upon.

5. All information developed in connection with the selected projects, including research and development information and design, construction, operating, and economic data, shall be made freely and fully available

to the Commission of the European Atomic Energy Community, and the Government of the United States of America, and industry in the Community and the United States.

All records of the recipient utility applicable to any project under this program, including operating and cost records, shall be available to both the Commission of the European Atomic Energy Community and the Government of the United States of America. Such separate records as are needed will be maintained for this purpose.

CHAPTER FIVE

Joint Research and Development Program

The Euratom-U.S. program aimed towards the installation of approximately 1,000,000 ekW of developmental power reactors, of the pressurized and boiling water types, has as a primary objective the achievement of economic nuclear power.

One of the best ways of assuring that this goal is reached is through the early inauguration of a joint Euratom-U.S. development program of sufficient size and scope to solve the technical problems.

The proposed joint development program, under which the United States and Euratom would each be prepared to contribute funds in the order of $100,000,000 over a ten-year period, is expected to accomplish such objectives.

Experience has shown that the major gains can be made in improving performance and lowering operating costs of large reactors if there is a companion research and development program prior to, during, and after construction of the reactors. Even in reactors built in a single "generation" there are certain improvements in the design of the reactors themselves,

of major components, and of auxiliary equipment which can be incorporated in successive units. After the reactors are constructed, a strong research and development program can lead to substantial improvements in the power levels of the reactors and in the fuel cycle, which give immediate benefits in lowering unit power costs.

Developmental work on an over-all reactor program must start simultaneously with the initiation of the project, and must continue through the design and construction and operational stages. Clearly, the joint development program must concern itself not only with the reactor components but also with the mechanical, chemical and metallurgical aspects of fuel preparation, the possibility of using other fuels, such as plutonium and U^{233}, the problems of improving the efficiency of techniques for processing spent fuel, the improvement of thermal efficiency, the methods of increasing the power output, and all other phases of reactor servicing and operation.

While this proposed joint program will be directly tied to the "million-kilowatt" reactor program and will have as its primary objective the realization of economic power from this program, its results will be of obvious and important benefit to both the United States and European programs.

Notwithstanding the many water-type reactors in the United States, and the development work associated with them, the mere existence of six to eight operating reactors in which the results of the joint development program may be operationally tested and from which the full operating experience will be available, will be of inestimable value in achieving economic nuclear power in the United States and in Europe. The trend towards equipment and component standardization which will be

the natural result of the prototype program and the longer-range Euratom program should be a major factor in reactor economics in both Europe and the United States. The development of the ancillary industries to service the Euratom and other European programs will have a profound influence on lowering the cost of such services, both in Europe and the United States.

The research and development program is in keeping with the present policies of Western Europe and the United States to contribute to the common good by sharing of scientific and technical information and minimizing the duplication of effort by the limited pool of technical talent available.

ANNEX 1 TO APPENDIX "A"

JOINT U.S. - EURATOM

WORKING PARTY

A N N E X I

Amount of U-235 Required for

the 1,000,000 Kilowatt Program

Consider a pressurized or boiling water reactor having a power level of approximately 150 electrical megawatts and an irradiation level between 7,000 and 10,000 megawatt days per metric ton. The fuel to be supplied for the inventory, including the reactor loading and material being fabricated, cooled, and processed, will contain about 1,300 kilograms of U-235. The burnup of U-235 in such a reactor operated at 80% load factor will be about 150 kilograms a year. For the entire 1,000,000 kilowatt program, the total inventory will contain about 9,000 kilograms of U-235 and the burnup will be about 1,000 kilograms of U-235 a year. For twenty years of operation a total of 29,000 kilograms of contained U-235 will need to be supplied for inventory and burnup. If 1,000 kilograms are added for research and test reactors associated with the program, this figure becomes 30,000 kilograms.

ANNEX 4 TO APPENDIX "A"

ANNEX - 4

CHEMICAL PROCESSING

It is recognized that early Euratom programs for installation of nuclear power stations may not produce a sufficient load of irradiated fuel elements to justify economically the construction of a new chemical processing plant in Europe. Thus, there may be an economic advantage in waiting until the power reactor capacity has reached several million kilowatts before building such a plant.

In view of this economic factor, the United States is prepared to undertake the processing of the irradiated fuel from the reactors constructed under the 1,000,000 Kw cooperative program until such time as a suitable processing plant is constructed in Europe. The charges for processing this fuel would be the same as the established U.S. domestic charges. The bases for these charges are given in the attached announcements which were made by the U.S. Atomic Energy Commission: No. 983, issued February 18, 1957 titled, "AEC Offers Processing Service to Owners of Private Reactors"; No. 999, issued March 7, 1957, titled, "AEC Notice Outlines Basis for Chemical Processing Contracts"; and No. A-47, issued March 12, 1958 titled, "AEC Specifies Conversion Charges Relating to Chemical Processing Service."

In addition, the United States Atomic Energy Commission will be prepared to provide technical advice and assistance, as desired, in the design and construction of the Eurochemic pilot plant and in the design and construction of any future large-scale chemical processing plant that the European Atomic Energy Community decides to construct.

It is anticipated that the Community while making full use of training possibilities in Europe also may desire to send technical personnel to the United States for training in chemical processing operations in preparation for the design and operation of a large-scale Euratom plant.

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Attachment 1

UNITED STATES ATOMIC ENERGY COMMISSION
Washington 25, D.C.

No. 983 Monday, February 18, 1957

AEC OFFERS PROCESSING SERVICE
TO OWNERS OF PRIVATE REACTORS

Pending the setting up of commercial services to do the work, the Atomic Energy Commission has established a policy to provide for chemical processing services for the operators of private nuclear reactors.

The Commission offers to contract with the reactor owners providing for the chemical processing and recovery of source and special nuclear material contained in irradiated fuel elements removed from the reactors.

Individually negotiated contracts will establish firm charges for the service, subject to escalation on the basis of an appropriate price index, and cancellation by the Commission, after giving 12 months' notice, upon a determination that the services will be commercially available at reasonable prices.

The purpose of the new policy is to give further encouragement to the development of a private atomic energy industry by giving licensed reactor operators an assured means for recovering the valuable constituents which remain in spent fuel elements after their removal from reactors.

The Commission service covers waste disposal in addition to processing of irradiated fuel elements and blanket materials.

Irradiated fuel elements are "spent" elements removed from a reactor. Substantial quantities of fissionable materials are still present in the elements and these can be recovered for reuse. The term "Blanket materials" refers to fertile materials which may be placed around the reactor core to be transmuted into fissionable material. After irradiation, the blanket is taken from the reactor and subjected to processing to remove the fissionable materials produced through the action of neutrons.

So far, operations of this sort are being performed only by government-owned plants at various Atomic Energy Commission sites.

The Commission announced last year that it had approved a program to encourage private industry to build and operate plants for the chemical processing of irradiated fuel elements from research and power reactors. Under this program various meetings and seminars have been held for the information of industry, and the Commission has made available to interested firms its technology in the field of chemical processing. This program will be continued.

It is recognized, however, that several years will elapse before commercial processing plants can be put in operation, and that meanwhile reactor owners must have assurance that the service will be available when needed. The Commission, therefore, is offering its services during the iterim. It is prepared to contract to provide these services with owners of licensed reactors for a term extending to June 30, 1967.

The Commission intends to furnish processing services at similar charges to reactors located abroad fueled with material supplied by the U.S.

The term and cancellation provisions are set up in the expectation that in the next few years commercially operated processing plants capable of serving the private atomic energy industry will come into being.

Further detail is expected to be issued shortly in the Federal Register.

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CHEMICAL PROCESSING
Attachment 2

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D.C.

No. 999 Thursday, March 7, 1957

AEC NOTICE OUTLINES BASIS FOR CHEMICAL PROCESSING CONTRACTS

The Atomic Energy Commission has established the conditions under which it is prepared to contract with operators of private nuclear reactors to provide for chemical processing by the Commission of spent fuel elements taken from their reactors.

On February 18, 1957, the Commission announced that, until commercial facilities had been set up to do the work, it had approved a policy of establishing prices, under individually negotiated contracts, for the recovery of source and special nuclear materials contained in irradiated fuel elements or blanket materials removed from privately operated reactors. ("Blanket materials" are fertile materials placed around a reactor core to be transmuted into fissionable materials.)

While no demand for the immediate furnishing of processing services from private reactor operators is expected, the terms and conditions under which the services will be available have been established for the use of those planning power reactor projects. Details are provided in a notice to be published in the Federal Register on March [illegible], 1957.

Processing costs per kilowatt hour for individual reactor operators will vary, depending on such factors as the efficiency with which reactor heat is converted to electricity, the type of fuel element, and the attainable service life or "burn-up" of the element. (A low burn-up means that the reactor must be shut down and the fuel element removed for reprocessing more often than under conditions of high burn-up.)

Principal features of the Commission notice are:

1. Contracts with private reactor operators extending through June 30, 1967, will be negotiated on the basis of operating a conceptual plant, capable of processing all the fuel element types now known to be planned for use in power reactors, at a standard daily processing charge of $15,300. Adjustments may be necessary for other types of fuel elements for which costs are substantially higher or lower, or which require modifications of the assumed plant.
(The daily rate is based on costs associated with an assumed plant costing $20,570,000 to construct and with annual operating costs, including amortization, totaling $4,592,000. It is assumed that the plant would be capable of handling daily 1 ton of natural or slightly enriched uranium, and would operate 300 days annually).

2. Each contract will provide for firm charges for the service, except that they will be subject to escalation on the basis of an appropriate recognized price index to adjust for changes in costs of labor and materials.

3. Contracts will be subject to cancellation by the Commission, on 12 months' notice, if the Commission finds that fuel element processing services are available commercially at reasonable prices.

4. The services will provide for the mechanical, metallurgical and chemical treatment of spent fuel elements and blanket materials and storage of resulting wastes.

5. The processing system would yield purified nitrate salts of uranium and plutonium. There will be additional charges (not yet established) for conversion of these products to forms - uranium hexafluoride and plutonium metal - for which Commission prices have been established. There will be an additional standard charge to cover process losses, and unless waived by the Commission, a use charge for the materials during the normal processing time.

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Attachment 3

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D.C.

No. A-47 Wednesday, March 12, 1958

AEC SPECIFIES CONVERSION CHARGES
RELATING TO CHEMICAL PROCESSING SERVICE

In connection with the chemical processing service available from the Atomic Energy Commission to operators of private nuclear reactors, the Commission has specified charges for converting the material resulting from the processing system into forms for which Commission prices have been established.

Last year the Commission announced that, until commercial facilities have been set up to do the work at reasonable prices, it will furnish a processing service for the recovery of source and special nuclear materials contained in irradiated fuel elements or blanket materials removed from privately operated reactors. The Commission will carry out the processing at firm charges under individually negotiated contracts.

The earlier announcement pointed out that the processing system would yield purified nitrate salts of uranium and plutonium, and that there would be additional charges, to be specified later, for conversion of these products to forms, - uranium hexafluoride and plutonium metal - for which Commission prices have been established. These additional charges have now been specified, as follows:

1. Conversion of purified low-enrichment uranyl nitrate (5% or less by weight of U-235 in total uranium) into uranium hexafluoride (UF_6): $5.60 per kilogram of contained uranium.

2. Conversion of purified high-enrichment uranyl nitrate (more than 5% by weight of U-235 in total uranium) into uranium hexafluoride (UF_6): $32 per kilogram of contained uranium.

3. Conversion of purified plutonium nitrate into plutonium metal: $1.50 per gram of contained plutonium.

NOTE: Established prices for uranium hexafluoride vary according to the degree of enrichment in the isotope U-235 - from $5.62 per gram of U-235 content for material of very slight enrichment to $17.11 per gram for material enriched to 95% in U-235.

For the period through June 30, 1962, established plutonium metal prices range from $30 to $45 per gram depending on the plutonium 240 content of the material. For the year July 1, 1962 through June 30, 1963, the established single price is $30 per gram.

APPENDIX "B-1" TO ENCLOSURE "A"

JOINT U.S. - EURATOM WORKING PARTY

THIRD PARTY LIABILITY

The crux of the "third party liability problem" is: upon whom, and in what proportions, should fall the risk of legal liability to persons who may be harmed as a result of nuclear incidents. How much, if any, of this risk is to be borne by (1) the supplier or operator in the particular nuclear incident; or (2) those individuals who have sustained the harm; or (3) governments, through the disbursement of public funds to the harmed individuals.

There are, of course, any number of possible combinations for apportioning the risk. Under recently enacted United States legislation, as outlined more fully in the attached statement on the problem of the American supplier, the risk of liability for a nuclear incident is borne by the person liable, whether he be supplier or operator, up to the amount of liability insurance prescribed; the risk is borne by the United States Government as to liability up to $500,000,000 above that amount, the risk beyond the insurance prescribed and the $500,000,000 is borne by the persons harmed.

A number of other approaches could be considered. One approach, for example, would make the reactor operator solely liable, excluding all others (including suppliers) from any liability whatever, and limiting the operators liability to a defined amount. Another would leave the supplier liable under applicable law, but would limit his liability to the amount of available insurance coverage. Under either of these approaches, the persons harmed would not be assured of recovery above the limit of liability fixed for the person liable.

Any approach which would limit or preclude liability of operators or suppliers requires action on a governmental level. This could take the form of national legislation or an international Convention. In either case, while the person liable could be protected by this legislation against uninsurable liability in suits brought by persons harmed in the country or countries in which the legislation or Convention was in force, it may be that he would not be protected against liability to persons whose injury or damage occurs in some other country. There may be other situations too, in which he would not be protected.

At this juncture, of course, it is not known what form the legislation in the various countries, - or perhaps an international Convention - may take; the extent to which it will protect suppliers and enterprises against liability beyond the coverage of insurance they can get; or how long it will take to get the legislation enacted or the Convention ratified. For the interim period, until such legislation or Convention becomes effective, adequate protection would require an indemnification guarantee from the Community or the nation or nations concerned with the reactor or reactors. Beyond the interim period, adequate protection would appear to require such an indemnification guarantee against liability which might be adjudged despite the national legislation or Convention.

Both parties recognize that adequate arrangements to protect equipment manufacturers and other suppliers, as well as the participating utilities, against uninsurable risk are necessary to implementation of the joint program. As can be seen, there are both immediate and longer-term problems of importance which require solution. A combination of means may be necessary to assure protection against risks which to a

significant extent may be uninsurable. Accordingly, the Commission of the European Atomic Energy Community will seek to develop and to secure the adoption, by the earliest practicable date, of measures which will provide such protection. The parties will consult currently on the problems involved and on steps appropriate to their solution.

THE PROBLEM OF THE AMERICAN SUPPLIER

Under the so-called Price-Anderson law, enacted in 1957, the United States distributed the risk of third party liability as follows:

1. Risk is left where it falls under American law, up to the amount of "financial protection", that the Atomic Energy Commission requires to be provided. The financial protection required is to be based on the amount of liability insurance available from private souces, although the Atomic Energy Commission may establish lesser amounts for power reactors of no more than 100,000 KW rated capacity. Operators of reactors are required to carry the amount of financial protection established by A.E.C. This will normally be in the form of insurance, and will also protect the suppliers and manufacturers to the extent they, rather than the operator, may be liable.

2. With respect to the risk <u>over</u> the required amount of financial protection:
   (a) The risk is eliminated entirely from the operator, and from the suppliers and manufacturers, by provision for a Government indemnification agreement with the operator, coverage of which extended to all persons who might be liable under American law.

(b) The risk of harm over $500,000,000 plus the amount of insurance for each reactor incident is placed upon the individuals who might be harmed, by virtue of a provision limiting the liability of the person or persons liable to a total of $500,000,000 plus the amount of insurance.

(c) The risk of harm up to $500,000,000 is placed upon the United States Government, by virtue of the Government indemnification agreement referred to in (a).

Under the United States law, the foregoing applies only to domestic nuclear incidents. Foreign as well as American suppliers are protected by the indemnification agreements.

The American approach has had two purposes: first, to provide protection to the industry, beyond insurable risks, against conceivably enormous liability, and second, to provide the public (primarily, the American public) with assurance, to a considerable measure, of recovery of damages for injury or loss due to a nuclear incident.

The United States Congress did not extend the Price-Anderson protection to American suppliers for foreign reactors, although this matter was brought to its attention. For that reason, the American supplier must look to the law of the country to which he is furnishing equipment or services, or to other measures, for his protection.

He has no protection at this time beyond the amount of insurance he is able to obtain. He is very concerned about this lack of protection. The nature of the risk is such that in the event of a major catastrophe he could conceivably be wiped out if liability should fall on him. Though this contingency may be remote for a number of reasons, it is conceivable. In negotiations thus far with American suppliers on larger

reactors, the third party liability question has been a serious problem. Thus far the only clear solution seems to be an indemnity agreement furnished to the supplier by the foreign government involved.

The problem is not peculiar, of course, to American suppliers. It is just as real to all who participate in constructing and operating in another country a reactor that could conceivably cause damage above the insurable risk.

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APPENDIX "B-2" TO ENCLOSURE "A"

JOINT U.S. - EURATOM WORKING PARTY

FINANCING OF THE CAPITAL COSTS

The construction of nuclear power plants with an installed capacity of approximately one million kilowatts of electricity, is estimated to require a maximum total capital expenditure excluding fuel of about $350 per kilowatt or $350 million (equivalent) in total, excluding interest during the construction period. (This compares with the cost of conventional power facilities of about $150 per kilowatt). Of the total amount of $350 million, it is estimated that $100 - 150 million will be needed for equipment purchased in the U.S.

The general plan for financing the program is as follows:

1. Approximately $250 million to be provided by the participating utilities and other European sources of capital; and

2. Approximately $100 million to be provided through a loan from the U.S. Government to Euratom for re-lending to enterprises.

The amount of $250,000,000 referred to above would come from sources within and possibly outside Euratom: from public utilities that will operate the plants, including funds from their own earnings, from banks and other sectors of the capital market; from the Governments of the member States of their agencies. Other sources of financing are also envisaged.

It is recognized that the prospects for obtaining capital from the various European sources cannot be defined in more than general terms at present; more detailed information will be provided an quickly as possible.

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It is recognized that the prospects for obtaining capital from the various European sources cannot be defined in more than general terms at present; more detailed information will be provided an quickly as possible.

The proceeds of the loan from the U.S. Government to Euratom would be re-lent by Euratom for the construction of facilities under the program. The proceeds of the U.S. loan should be expended so as to assure the most efficient use of these funds in the joint program, taking into account the availability of other funds, their cost, and other factors relevant to this purpose.

It is not possible at this stage to specify the terms and conditions of the U.S. Government loan. A few general observations may be made, however. The loan should be for a long term, taking into account, among other relevant considerations, the expected life of the plants. The interest rate should be determined in the light of the purposes (In this connection it was noted that the U.S. loan to the High Authority of the European Coal and Steel Community was re-lent at the interest rate for the U.S. loan plus a small charge for administrative expense.) of the program, allowing for re-lending by Euratom at rates appropriate to these purposes. It would be reasonable to have a grace period for the repayment of principal which will take into account the period of construction of the facilities. Consideration will have to be given to the appropriate period of time during which the drawing of funds would take place.

The question of security for the U.S. loan has several aspects. On the one hand, it was pointed out that the unconditional commitment of re-payment of principal and interest by the Community was buttressed by the unconditional obligation undertaken by the six member countries in the Treaty, to provide the funds necessary to balance the budgets of the Community, including its investment budget. Since a loan to the Community from the United States constitutes a budgetary commitment

approved by the Council of Ministers, the full faith and credit of the Community is supplemented by Treaty obligations of the member countries to furnish the necessary resources in proportions specified in the Treaty.

On the other hand, it was pointed out that the Community had no perennial resource other than that to be provided by member countries to support the budgets and no power to levy to secure such resources, and that the obligation of member countries ran to the Community but not to lenders to the Community.

There was also discussion whether or not an act of pledge similar to that entered into by the European Coal and Steel Community was necessary or appropriate in the light of the considerations mentioned in the two preceding paragraphs. The inconvenience of such a mechanism as well as other factors relating to it were also discussed.

It was generally considered that a commitment was appropriate that the obligation to re-pay the U.S. Government loan should not be placed in any junior or inferior position to the obligation to re-pay any other borrowings by the Community.

Another point discussed was the convertibility of the sums of principal and interest re-payments to the Community on loans made by the Community to enterprises from the proceeds of the United States loan. It was pointed out that the Treaty makes provision for such convertibility, which, when supplemented by appropriate financial regulations, will assure such convertibility. It will be necessary, of course, to examine such financial regulations.

It is clear that further consideration of these matters is necessary.

APPENDIX "B-3" TO ENCLOSURE "A"

JOINT U.S. - EURATOM WORKING PARTY

NOTE ON TARIFFS

The goods and products related to the joint program will be imported by the Community only after the Nuclear Common Market will have entered into force on January 1, 1959.

The area of application of the Nuclear Common Market is defined by three lists: A^1, A^2, and B. These lists may, at the request of the Commission or a Member State, be modified by the Council acting on the proposal of the Commission.

List A^1 comprises in principle all materials under the competence of the Agency. For this reason they have been grouped in a special list. List A^2 comprises all goods and products which are specifically nuclear, i.e. which have practically no other application but in the nuclear field. List B contains the products which can be utilized either in the nuclear or in other industries.

Internal tariffs on items on List A^1 and A^2 will be abolished at the end of one year from the entry into force of the Treaty. Similar action will be taken on List B items to the extent that they are covered by a common customs (external) tariff and are certified to be intended for nuclear purposes.

There will be a common customs tariff which will be established by a distinct procedure for each of the three lists as provided for by Articles 94 and 95 of the Euratom Treaty.

As to the items on List A^1 there is no problem. For these items the common tariff will be laid down automatically at the level of the lowest tariff applied as of January 1, 1957 in any Member State. Since at least one Member State has no

tariff on each item of List A^1, there will be no tariff on items on list A^1 on January 1, 1959.

The list most relevant to the joint program, however, is List A^2. There will be no automatically-fixed tariff for this list. Article 94 provides that, within three months after the date of entry into force of the Treaty, the Commission will open negotiations with the Member States with regard to the products of List A^2. If, at the end of the first year after the entry into force of the Treaty, no agreement is reached, the Commission itself will make a proposal to the Council which shall, by a qualified majority vote, lay down the duties of the common customs tariff to be applied.

Also relevant to the joint program is List B. The rules concerning this list are laid down in Article 95. There will be no negotiations for List B comparable to those provided for List A^2. The principles and calculation methods of the Treaty establishing the European Economic Community will be followed, i.e. the common tariff will be at the level of the arithmetical average of the Member States' tariffs. However, according to Article 95, the European Atomic Energy Community does not have to await the establishment of the Common Market before taking action with respect to the products of List B; the Council of Ministers may by a unanimous vote, decide upon an earlier application of a common customs tariff.

The success of the joint nuclear power program will be influenced by the extent to which cost of power can be minimized.

The cost of materials and equipment required for the projected facilities will be an important element in the cost of power. It will be in the interest of all concerned with the promotion of the program to eliminate all barriers to economical

construction and operation and hence to have the lowest possible levels of duties on the items required therefor.

APPENDIX "B-4" TO ENCLOSURE "A"

JOINT UNITED STATES - EURATOM

WORKING PARTY

TRAINING, INFORMATION AND MATERIALS

A. TRAINING

The report, "A Target for Euratom" recognized that some industrial reorientation would be basic to the success of the program and that an intensive training program would be essential to realize the proposed objectives. The report indicated that the United States would be prepared to assist the Community in training the required number of people. It also was recognized that the number of trained men required to design and build proven reactors, such as those contemplated under the proposed program, would be smaller than the number needed to develop entirely new facilities.

1. Basic Objective

The over-all objective of the European Atomic Energy Community's program is to develop a relatively self-sufficient nuclear power industry in Western Europe and accordingly the Community will wish to become proficient in all major facets of the nuclear power industry, including reactor design and engineering, reactor operation, supervision and maintenance, chemical processing technology, fuel fabrication, waste disposal, and other fields that are essential to a well-integrated nuclear power industry. In addition, as the developmental and operational program of the Community progresses, the Community will have an ever increasing demand for persons with training in the fundamental physical and life sciences.

The basic purpose of the proposed joint program is the installation of a series of power reactors that will serve to provide the experience that the Community needs to move ahead on a large-scale basis. The training benefits to be derived will be an important result of the program.

II. Specific Needs

A. Design Engineering Experience

At the outset, it is to be expected that participating utilities and equipment manufacturers in the Community will be interested in obtaining detailed technical knowledge and engineering experience primarily on pressurized and boiling water reactors. In terms of relative urgency, accordingly, it is assumed that one of the most immediate requirements will be to provide this type of experience to a selected cadre of personnel from within the Community (including prospective reactor supervisors).

B. Training of Station Personnel

Once the program gets underway, it will be necessary to evolve means of training power station personnel in reactor supervision, operation and maintenance. The magnitude of this training requirement is difficult to predict accurately. However, if one assumes that each of the reactor projects under the proposed joint program will require of the order of 100 persons for plant operation, then a total of approximately 800 qualified people would be required for supervision, operation and maintenance.

C. Other Requirements

In addition to the people associated with the design, construction and operation of the reactors themselves, it

also is to be expected that the program will have other manpower requirements, in related fields.

Demands for training and on-the-job experience in the fields of fuel element fabrication, processing, waste disposal, etc. will arise in the near future.

The European Atomic Energy Commission itself is faced with the immediate problem of assembling and training its staff in the various technical fields in which it will have responsibilities.

III. How Needs May be Satisfied

To a large extent, it is expected that the Commission of the European Atomic Energy Community will go a long way in satisfying its own requirements for training in the physical and life sciences, and in basic reactor science and technology through its own resources. Chapter I of the Treaty establishing the European Atomic Energy Community vests the Commission with the responsibility for establishing schools for the training of specialists, including the establishment of an institution at the university level. The United States Atomic Energy Commission will assist the Commission by making its facilities and experience available. It will work with the European Commission in the establishment of cooperative training programs.

It is expected, for example, that the United States Atomic Energy Commission will be able to assist the Commission of the European Atomic Energy Community in meeting part of its anticipated specialized training requirements in arranging for training in reactor design, engineering, operation, maintenance, supervision, etc., in selected U.S. facilities within the United States. It also is believed that arrangements can be made for the companies providing the nuclear components of the

plants to be constructed to afford training in their plants to employees of the European utilities and manufacturers involved. In addition, the reactors constructed under the 1,000,000 kW program in Euratom Member States will constitute valuable facilities for the training of Community personnel. In addition, when feasible, the United States Atomic Energy Commission will make every effort to provide specialized training and experience in such fields as chemical processing, waste utilization, and fuel fabrication technology by means of temporary assignment of personnel to the Atomic Energy Commission laboratories engaged in this work (e.g. Oak Ridge, Argonne etc.).

B. INFORMATION

The United States Atomic Energy Commission and the Commission of the European Atomic Energy Community will engage in a full and prompt exchange of information in all fields related to the peaceful applications of atomic energy. This will be accomplished through an exchange of reports, symposia, the exchange of personnel and the establishment of mixed teams for joint projects. The United States will provide the Commission of the European Atomic Energy Community with an unclassified technical library and, if desired, will assist the European Commission in the establishment of a system for the distribution of technical information within the Community.

C. MATERIALS

Within the framework of the proposed program, the United States Atomic Energy Commission and the Commission of the European Atomic Energy Community will arrange to make available materials of interest in addition to those specified in Chapter 6, including source materials, special reactor materials,

and materials under terms to be agreed. It is contemplated that persons under the jurisdiction of the United States and of the Member States of the European Atomic Energy Community will be permitted, subject to appropriate regulations, to make arrangements to transfer and export materials and to perform services for persons under the jurisdiction of the other party.

D. OTHER ASSOCIATED FIELDS

At the request of the Commission of the European Atomic Energy Community the United States Atomic Energy Commission will be prepared to provide the Commission of the European Atomic Energy Community with the experience it has had in the administration of a large-scale atomic energy program by providing information on the formulation of health and safety standards, health physics, monitoring for radiation protection, waste disposal, reactor hazards evaluation, regulations and licensing, contract administration and materials management.

APPENDIX "B-5" TO ENCLOSURE "A"

JOINT U.S. - EURATOM

WORKING PARTY

EXISTING PROJECTS

As stated in the Memorandum of Understanding, it is intended to give early consideration to projects which industrial groups have in an advanced state of planning. The nomination and selection of such projects as qualify would have a beneficial effect in imparting momentum to the program. Presumably, the initiative for proposing these projects for consideration will come from the industrial groups. It is important in discussions with the European utilities concerned, as well as their American associates, they be advised that should these projects become a part of the joint program, their projects would not only enjoy the benefits of the program but must assume the obligations as well.

It is also important for both Euratom and U.S. officials to make it clear from the outset that the incentives and guarantees of the joint program apply only to the projects selected and making up the one million kilowatt objective and these benefits will not be available for other projects within the Community.

UNCLASSIFIED

APPENDIX "C"

35 Boulevard Royal,
Luxembourg,
April 3, 1958

Dear Mr. Kohnstamm:

Because of your conclusion that Euratom needed more time to study the patent situation, we agreed on April second not to include at this time a patent section in the draft Memorandum of Understanding developed by the US-Euratom Working Party.

The United States position is reflected in the attached proposed section 8.b., "Patentable Information".

Faithfully yours,

W. Walton Butterworth
Ambassador

Enclosure: Section 8.b.

Mr. Max Kohnstamm,
President of the Euratom Delegation
to the Working Party,
28 rue Aldringer,
Luxembourg.

8. b. Patentable Information

As to any invention made in the course of, in connection with, or under any of the work in the joint research and development program, or any of the work in project fuel cycles with respect to which the United States provides guarantees, it is agreed in principle that:

1. The United States will, without further obligation, have title and all rights to United States patent, subject to a non-exclusive license in Euratom, with the right to grant non-exclusive sublicenses, for all purposes; and

2. Euratom will, without further obligation, have title and all rights to patent in the Member States, subject to a non-exclusive license in the United States, with the right to grant non-exclusive sublicenses, for all purposes.

3. The title and rights to patents in other countries will vest in Euratom or in the United States, depending on Whether the inventor is a national of a Member State or of the United States, subject to a non-exclusive license in the other, with the right to grant non-exclusive sublicenses, for all purposes.

Neither party will discriminate in the granting of any license or sublicense for the reason that the proposed licensee or sublicensee is a national of the United States or of any Member State.

In view of the importance of the use of inventions arising out of the joint program, detailed provisions with respect thereto will be marked out in connection with the drafting of the agreements for cooperation. The respective contractual arrangements of the Parties will contain provisions that will enable them to effectuate their agreement with respect to patentable information.

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APPENDIX "D"

EUROPEAN ATOMIC ENERGY
COMMUNITY

The Commission

JOINT UNITED STATES-EURATOM
WORKING PARTY

DRAFT

AGREEMENT BETWEEN THE UNITED STATES OF AMERICA
and
THE EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM)

WHEREAS, the European Atomic Energy Cummunity (Euratom) has been established by the Kingdom of Belgium, the Federal Republic of Germany, the French Republic, the Italian Republic, the Grand Duchy of Luxembourg, and the Kingdom of the Netherlands, in the Treaty of Rome signed on March 25, 1957, with the aim of contributing to the raising of the standard of living in Member States and to the development of commercial exchanges with other countries by the creation of conditions necessaryfor the speedy establishment and growth of nuclear industries;

WHEREAS, the United States of America has institued a program of international cooperation to make available to cooperating nations the benefits of peaceful applications of atomic energy as widely as expanding technology and considerations of the common defense and security will permit;

WHEREAS, the European Atomic Energy Community (Euratom) and the United States of America have expressed their mutual desire for close cooperation in the peaceful applications of atomic energy, and the European Atomic Energy Community (Euratom) intends to foster an extensive program which promises to redound to their common benefit;:

WHEREAS, an arrangement providing for cooperation in the peaceful applications of atomic energy would initiate a fruitful exchange of experience and technical development, open a new era for mutually beneficial action on both the governmental and industrial level and reinforce solidarity within Europe and across the Atlantic;

The Parties agree as follows:

ARTICLE 1

The Parties will cooperate in programs for the advancement of the peaceful applications of atomic energy. Such cooperation will be undertaken from time to time pursuant to such terms and conditions as may be agreed and shall be subject to all provisions of law respectively applicable to the Parties. Specifically it is understood that under existing law the cooperation extended by the Government of the United States of America will be undertaken pursuant to an Agreement for Cooperation entered into in accordance with Section 123 of the Atomic Energy Act of 1954, as amended.

ARTICLE II

As used in this Agreement, "Parties" means the European Atomic Energy Community (Euratom), acting through its Commission, and the Government of the United States of America, including the United States Atomic Energy Commission on behalf of the Government of the United States of America. "Party" means one of the Parties.

ARTICLE III

This Agreement shall enter into force on the day on which each Party shall have received from the other Party written notification that it has complied with all statutory and constitutional requirements for the entry into force of such Agreement.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed pursuant to duly constituted authority.

Done at_____, in duplicate, in the_____language(s) this_____day of_____, 1958.

For the United States of America:

For the European Atomic Energy Community (Euratom):

APPENDIX "E"

RELATIONSHIP OF PROPOSED JOINT PROGRAM TO EXISTING BILATERALS

In the course of the discussions between representatives of the United States Government and the Commission of the European Atomic Energy Community in Paris in February it was agreed that it would be desirable if the United States and the Community eventually would enter into a comprehensive agreement for cooperation which would cover peaceful applications of atomic energy in all fields. Article 106 of the Community's Treaty, as well as provisions in the existing agreements for cooperation between the United States and Member States, contemplate a renegotiation of these existing bilateral agreements with a view to having the Community assume the rights and obligations now set forth in these agreements. It is expected that these negotitations with Member States will take place in the context of the negotiation of the comprehensive agreement between the Community and the United States.

For the immediate future, however, it was agreed that it would be desirable to proceed at this time with a limited agreement between the Community and the United States which would be specifically oriented to the proposed joint program. The comprehensive agreement would follow as soon as the Community had arrived at appropriate understandings with the Member States and had developed further its own plans and programs. The negotiation of a limited agreement initially at this time would assure that the EURATOM program would not lose momentum pending the broader readjustments.

For the purpose of planning the proposed joint program it has been assumed that the amount of fuel required (approximately

30,000 kilograms of contained U-235) will be in addition to the quantities already contemplated in the existing agreements for cooperation between the United States and the individual Member States of EURATOM. The fuel for the reactors supported under the proposed joint program would be made available under the proposed initial Agreement for Cooperation between the Community and the United States. It is recognized, however, that under the joint program certain projects, in an advanced state of planning, may be selected for support and that in some instances these projects may be the same as the ones that were contemplated when the fuel ceilings were inserted in the individual agreements with the various Member States. In such instances the reactors will be fueled pursuant to the initial agreement with the Community but appropriate understandings will be arrived at informally with the Member States.

The initial agreement will not modify the provisions of the existing agreements for cooperation with the various Member States. These provisions will remain intact until they are renegotiated.

UNCLASSIFIED

APPENDIX "F"

JOINT PRESS STATEMENT
(Released 1:00 PM, April 3, 1958, Luxembourg time)

A joint Working Party composed of representatives of the Commission of the European Atomic Energy Community (EURATOM) and the Government of the United States has today concluded a series of meetings in Luxembourg.

This group has been studying the means whereby a joint EURATOM-United States nuclear power program might be developed. The objective would be to initiate promptly a program aimed at bringing into operation by 1963 a number of large-scale nuclear power plants to be built within the Community, primarily of the pressurized and boiling water types, and having a total installed capacity of approximately one million kilowatts of electricity.

The group also has been examining the principal aspects of a supporting joint research and development program which would be centered on these reactors.

The program would be designed to encourage maximum participation by the industries of the Community and of the United States.

Substantial progress has been made toward these objectives and it is planned that there will be further discussion of the proposed joint program in Washington later in April.

APPENDIX "G"

LIST OF PARTICIPANTS

A. UNITED STATES DELEGATION

Ambassador W. Walton Butterworth, United States Representative to the European Communities

Mr. R. W. Cook, Deputy General Manager, AEC, Washington

Mr. Harold D. Bengelsdorf, Foreign Affairs Officer, European Branch, Division of International Affairs, AEC, Washington

Dr. Amasa S. Bishop, Scientific Representative, AEC, Paris

Mr. Louis Boochever, United States Mission to the European Communities

Mr. Stanley M. Cleveland, Office of European Regional Affairs, Department of State, Washington

Mr. Edwin E. Ferguson, Deputy General Counsel, AEC, Washington

Mr. Paul C. Fine, Director, Office of Operations Analysis and Planning, AEC, Washington

Mr. William F. Miller, United States Mission to the European Communities

Mr. Frank K. Pittman, Director, Office of Industrial Development, AEC, Washington

Mr. Louis Roddis, Deputy Director Reactor Development, AEC, Washington

Mr. Robert Schaetzel, Office of the Special Assistant to the Secretary, Department of State, Washington

Mr. Nelson F. Sievering, Jr., Assistant to Director, Division of Reactor Development, AEC, Washington

Dr. A. J. Vander Weyden, Deputy Director, Division of International Affairs, AEC, Washington

Miss Sonya Bergen, Secretary, American Embassy, Paris

Miss Olga D. Nelson, Secretary, Washington

B. EURATOM DELEGATION

Max Kohnstamm, Special Counsellor to the High Authority, President of the EURATOM Delegation to the Working Party

Jules Gueron, Special Counsellor on Research

Aldo Forcella, Director of the Power Reactors Division of the National Nuclear Research Committee (CNRN), Roma

Henrich Mandel, of the Rheinisch Westphalische Elektrizitatswerke (RWE), Essen

Walther Schnurr, Director of Research and Technical Division of the German Ministry of Atomic Affairs, Bonn

Rudolf Regul, Assistant-director of the High Authority's Economics Division

Gerd Brand, EURATOM Foreign Affairs Division

Ferdinand Dierckens, Technical Counsellor to Mr. de Groote, member of the EURATOM Commission

Claude Ramadier, EURATOM Economic and Technical Division

Heinz Rudolph, EURATOM Economic and Technical Division

Maurice Gibon, Principal Private Secretary to Mr. de Groote

Jacques Ravelli, Technical Counsellor to Mr. Louis Armand

G. Eildert Stykel, EURATOM Economic and Technical Division

Peter B. Bolt, Secretary of the Working Party

Paul Delouvrier, Director of the High Authority's Finance Division

Hans Skribanowitz, Director in the High Authority's Finance Division

Michel Gaudet, General Counsel to the High Authority

Jean De Liedekerke, Investment Officer of the International Finance Corp.

Theodore Vogelaar, Legal Counsel to C. and A. Brenninkmeyer Concern Ltd. Amsterdam

APPENDIX "H"

SCHEDULE OF ACTIONS NECESSARY BEFORE THE COOPERATIVE PROGRAM CAN BEGIN

ON THE UNITED STATES SIDE

A. Authority needed.

1. Execution of the international arrangement and its approval by the Joint Resolution of Congress, in accordance with section 124 of the Atomic Energy Act of 1954, as amended (hereinafter called the Act).
2. Approval by the President and execution of the agreement for cooperation in accordance with section 123 of the Act; submittal of the executed agreement for cooperation to the Joint Committee on Atomic Energy for the 30 day statutory waiting period.
3. Revised Presidential Determination on Availability of Fuel.
4. Authorization from Congress for the distribution to EURATOM of the amounts of special nuclear material required during the period of time contemplated by the cooperative program. Section 54 of the Act states that AEC may distribute to a group of nations "only such amounts of special nuclear materials and for such periods of time as are authorized by Congress."
5. Authorization from Congress for AEC to make long-term commitments for (a) fuel processing or other services (Section 161), (b) acquisitions of plutonium produced in the fuel furnished EURATOM (Section 55), and (c) guarantees on fuel fabrication costs and fuel life.
6. Authorization from Congress for the appropriation of funds needed to carry out AEC commitments relating to joint research and development and fuel cycle programs.

7. Authorization from Congress for appropriation of funds needed to meet the U. S. Loan commitment to EURATOM.
8. Appropriation by Congress of funds needed to meet the foregoing financial commitments as may be needed.

B. Target Time Schedule

April 7 - 18	Obtain State Department and Commission approvals of draft memorandum of understanding, international arrangement and underlying documents and decisions on unresolved problems.
April 21 - 27	Reach agreement with EURATOM on unresolved matters.
April 28 - May 2	Complete Executive Branch clearance of draft memorandum of understanding and international arrangement (Section 124). Preparation and clearance of draft Presidential message to Congress to accompany the international arrangement.
May 5 - 8	Signature of memorandum of understanding and international arrangement.
May 12 - 14	Signing of Presidential message and transmittal to Congress with the agreed international arrangement for Congressional approval.
May 14	(After preparation of necessary material and obtaining Executive Branch Clearance during the period April 7 - 25). Submission by A.E.C. to Congress of request for all necessary authorizations for the cooperative program, including authorizations for transfers of special nuclear

material, long-term commitments and guarantees, and appropriation of funds (see items 3 - 7 above, "Authority Needed").

Further target dates depend on congressional action. As soon as Congress has approved the international arrangement, the agreement for cooperation would be promptly forwarded to the President for his approval and can be signed immediately thereafter and forwarded to the Joint Committee on Atomic Energy for the 30-day waiting period required by section 123 of the Act. Congress is not likely to continue in session beyond July, and if the 30-day period has not run by the date of adjournment the agreement will not become effective until after Congress reconvenes.

After Congress has passed and the President has approved the law which authorizes the appropriations of U. S. funds for the cooperative program, the A.E.C. would transmit promptly to the appropriations committee of the House of Representatives a request for the funds needed for fiscal year 1959.