MEMORANDUM OF UNDERSTANDING REGARDING COOPERATION PERTAINING TO THE AVR REACTOR

Whereas the Government of the United States of America and the Government of the Federal Republic of Germany signed an Agreement for Cooperation concerning the Civil uses of atomic energy at Washington on July 3, 1957;

Whereas the Government of the United States of America and the European Atomic Energy Community (Euratom) signed the Additional Agreement for Cooperation concerning peaceful uses of atomic energy at Washington on June 11, 1960;

Whereas by an exchange of letters between A.A. Wells and former Minister Balke, of September 25, 1961, and November 28, 1961, it was agreed to establish an exchange of information between the Government of the United States of America and the Government of the German Federal Republic in the field of pebble-bed, high-temperature, gas-cooled reactors;

Whereas Euratom and Brown-Boveri Krupp Reaktorbau GmbH (BBK) and the Kernforschungsanlage Juelich des Landes Nordrhein-Westfalen e.V. (KFA) have entered into an association agreement with the objective of developing pebble-bed high-temperature gas-cooled reactors and BBK has been authorized and empowered to enter into this Memorandum for and on behalf of the Association;

Whereas the United States Atomic Energy Commission (USAEC), the Arbeitsgemeinschaft Versuchs-Reaktor GmbH (AVR), Euratom, BBK, and KFA have recognized that it would be to their mutual interest to conclude an agreement pertaining to an exchange of information in the field of pebble-bed, high-temperature, gas-cooled reactors;

Whereas the German Minister for Scientific Research approves of the arrangement to be instituted by this Memorandum of Understanding and considers it to be a valuable continuation of the exchange of information as established by the above mentioned exchange of letters;

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Whereas the demonstration of fuel balls procured in the United States for the pebble-bed, high-temperature, gas-cooled reactor being constructed by the BBK for the AVR could provide valuable technical data concerning their performance and could result in the development of a significantly improved fuel element which could contribute greatly to the development of high-temperature, gas-cooled reactors;

The Parties to this Memorandum of Understanding therefore have agreed upon the following arrangement to cover this exchange of information in the field of pebble-bed, high-temperature, gas-cooled reactors;

A. The term "party" or "parties" as used herein means on the one side the USAEC and on the other AVR and BBK (hereinafter referred to in combination as AVR-BBK).

B. (1) AVR agrees to procure at its own expense from a commercial supplier in the United States the fuel balls necessary for the initial full power operation of the AVR reactor. The enriched uranium required for the fabrication of such fuel balls will be purchased from the USAEC by the Supply Agency of the European Atomic Energy Community acting on behalf of the European Atomic Energy Community pursuant to the terms of the aforementioned USAEC-Euratom Additional Agreement for Cooperation. Definitive sale contracts will be developed and entered into by the USAEC and the Supply Agency of the European Atomic Energy Community at the earliest practicable date to provide the enriched uranium required to maintain sufficient reactivity in the AVR reactor to assure a full burnup proof test of the fuel balls procured in the United States over an estimated period of two equivalent full power years. The terms and conditions of such sale will be consistent with those which the USAEC applies in its normal sale contracts for such quantities of enriched uranium when used in foreign reactors.

(2) The USAEC is also prepared to review subsequent requirements for use of such enriched uranium in the AVR reactor in the light of terms and conditions of the Additional Agreement and the nature of such requirements, and to provide its views concerning the supply by the USAEC of the material required.

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(3) The cost of transporting these fuel balls from the United States to the AVR reactor, as well as any subsequent costs of transportation and reprocessing that might be incurred will, except as otherwise agreed with regard to the performance of post-irradiation examination by the USAEC, be borne by AVR-BBK. The fuel balls will be of a general type (U-Th) developed under the USAEC program relating to improved coated particle fuel, and the supplier will be a firm whose fuel of this general type has been demonstrated by testing under the USAEC program at Oak Ridge National Laboratory. Within these general limitations, selection of the specific type of fuel balls and the choice of supplier will be within the discretion of AVR-BBK.

(4) AVR-BBK agree to operate the AVR reactor with such fuel balls for a period of time commensurate with their useful life. At the discretion of AVR-BBK, other fuel balls may be inserted and tested in the AVR reactor during the period of its operation with the fuel balls procured in the U.S. provided that such fuel balls would be of the same general specification as the fuel balls procured in the U.S. in particular with regard to fission product release. It is understood that AVR-BBK also will give consideration to inserting in the AVR reactor, at the request of the USAEC and under terms to be agreed, other test elements that may be developed by the USAEC.

(5) AVR-BBK will permit the USAEC to obtain without charge up to 100 fuel balls containing less than 100 grams of enriched uranium contained in the fuel balls procured in the U.S. and irradiated in the AVR reactor. Additional fuel balls may be made available to the USAEC on such terms and conditions as the Parties may agree. The USAEC will assume all risks and responsibility for the costs of transporting such irradiated fuel balls to the place of examination.

C. (1) The USAEC will make available to AVR-BBK information and data pertaining to the various types of fuel balls developed under the USAEC improved coated particle fuel program, including the fuel ball specifications which the USAEC prepared in contemplation of USAEC procurement of the fuel balls necessary for initial full power operation of the AVR reactor.

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(2) After final selection by AVR-BBK of a United States supplier for the fuel balls, the USAEC agrees to perform a final irradiation test over a period not to exceed four to six months on three (3) AVR fuel balls of the specific type to be supplied, to a burnup of approximately four (4) atom percent of the contained heavy metal. Also, a high burnup test (9-20 atom percent) on loose coated particles of the type used in the AVR reactor will be performed by the USAEC at its facilities. The cost of these irradiation tests shall be borne by the USAEC. The USAEC will consider making its facilities at the Oak Ridge National Laboratory available for additional irradiation tests if such irradiations are compatible with the availability of USAEC facilities. The full cost of any such additional tests, including the costs of the fuel balls, would be borne by AVR-BBK. AVR-BBK will also be responsible for the costs of transporting such fuel balls to any of the Euratom countries or elsewhere for examination following irradiation testing at ORNL.

D. (1) Subject to the patent provisions of this Agreement, the exchange will be implemented as follows :

(a) The USAEC will make available to AVR-BBK for such use as AVR-BBK wishes :

- the design philosophy, conceptual design, selection and specification of the fuel balls procured in the U.S. and other test elements developed by the USAEC;
- the results of experiments and tests including irradiation of above-mentioned fuel.

The exchange of information will include manufacturing techniques and know-how for the above-mentioned fuel of which the AEC is entitled to make disposition.

(b) AVR-BBK will make available to the USAEC for such use as the USAEC wishes :

- conceptual design, safety and operating experience of the AVR reactor;
- the results of experiments and tests, including irradiation tests of the fuel balls procured in the U.S. and other fuel elements inserted together with

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the fuel balls procured in the U.S. and also including the results of in or out of pile tests of other fuel balls prior to insertion of such fuel balls in the AVR reactor with fuel balls procured in the U.S.;

- if, while other fuel balls are being tested in the AVR reactor during the period of its operation with the fuel balls procured in the U.S., as provided under B. (1) above, the measurements conducted in the reactor show unexpected behavior, such as excessive fission product release, AVR-BBK will make available the necessary data, including manufacturing techniques and know-how of the aforementioned fuel, for joint evaluation of this behavior.

D. (2) This cooperative arrangement will be further implemented through the exchange of visits of technical personnel on a mutually agreed schedule and shall include long-term assignments as appropriate. In particular, a mutually agreed number of technical personnel from each of the Parties and/or contractors of the Parties will be exchanged to participate in the testing and irradiation examination of fuel balls procured in the U.S. and test elements that may be developed by the USAEC, and in operations of the AVR reactor and the U.S. reactors in which the tests referred to in paragraph C. (2) are performed. Mutually agreeable terms and conditions governing such assignments will be developed on a case-by-case basis. The patent procedures set forth in the appendix to this Memorandum will apply normally to assignments of more than two weeks duration and will be applicable to assignments of a shorter duration if the Parties so agree. The Parties will each designate a single exchange coordinator who will correspond directly with his counterpart in carrying out their mutual responsibility for administering and facilitating the exchange.

(3) The Parties will consult from time to time on matters of mutual interest pertaining to the AVR reactor and the irradiations being performed therein.

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E. The Parties agree to consider in conjunction with Euratom the development of a broader basis of cooperation in the field of gas-cooled reactors.

F. This agreement will terminate on December 31, 1968, and will be extended as necessary to carry out the cooperation within the scope of this agreement, it being understood that the transfer of any enriched uranium required in the future for the AVR reactor would be made available pursuant to the terms of the U.S.-Euratom Additional Agreement for Cooperation.

G. Neither Party warrants the accuracy, completeness, or suitability for use of any information, specifications, or data made available to the other Party.

In witness whereof, the undersigned, duly authorized, have signed this memorandum, the present text of which shall be the only authentic version.

Done at Brussels, in six copies, this 2nd day of August 1965.

FOR THE UNITED STATES ATOMIC ENERGY COMMISSION

Charles F. Schaub

FOR ARBEITSGEMEINSCHAFT VERSUCHSREAKTOR GmbH

pp. [signature] pp. Mamet

FOR BROWN BOVERI/KRUPP REAKTORBAU GmbH

[signature] pp. [signature]

PATENT APPENDIX

With respect to any invention or discovery made or conceived during the period of this Memorandum of Understanding, in the course of or under any of the activities within the scope of this Memorandum :

1. If made or conceived by personnel of one party (the assigning party) or its contractors while assigned to the other party (recipient party) or its contractors :

   (a) the recipient party shall acquire all right, title, and interest in and to any such invention, discovery, patent application, or patent in its own country and in third countries, subject to a non-exclusive, irrevocable, royalty-free license to the assigning party, with the right to grant sub-licenses, under any such invention, discovery, patent application, or patent, for use in the production or utilization of special nuclear material or atomic energy, and

   (b) the assigning party shall acquire all right, title, and interest in and to any such invention, discovery, patent application, or patent in its own country, subject to a non-exclusive, irrevocable, royalty-free license to the recipient party, with the right to grant sub-licenses, under any such invention, discovery, patent application, or patent, for use in the production or utilization of special nuclear material or atomic energy.

2. If made or conceived when employing information which has been communicated under this Memorandum by one party or its contractors to the other party or its contractors, each party shall grant to the other party a royalty-free, non-exclusive, irrevocable license, with the right to grant sub-licenses, in and to any such invention, discovery, patent application, or patent, in all countries, for use in the production or utilization of special nuclear material or atomic energy.

3. Neither party shall discriminate against citizens of the country of the other party with respect to granting any license or sub-license under any invention of paragraphs 1 and 2 above.

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4. Each party waives any and all claims against the other party for compensation, royalty, or award as regards any such invention or discovery, patent application, or patent, and releases the other party with respect to any and all such claims, including any claims under the provisions of the United States Atomic Energy Act of 1954, as amended, and the Arbeitnehmererfindungsgesetz (German Employees' Invention Law), and AVR-BBK agree to hold the USAEC and its contractors harmless from any liability arising under the German Employees' Invention Law with respect to any invention or discovery in which the USAEC acquires rights pursuant to this Memorandum of Understanding.

5. The term "own country" means, on the USAEC side, the territory of the United States of America, and on the AVR-BBK side, the territory of the six Members States of Euratom.

EUROPAISCHE
ATOMGEMEINSCHAFT

Die Kommission

COMUNITA EUROPEA
DELL'ENERGIA ATOMICA

La Commissione

General Directorate
Research and Training

EURATOM

COMMUNAUTE EUROPEENNE
DE L'ENERGIE ATOMIQUE

La Commission

EUROPESE GEMEENSCHAP
VOOR ATOOMENERGIE

De Commissie

Brussels, 2. 8. 1965

10466

Mr. Charles F. SCHANK
Senior US AEC Representative
United States Mission to
the European Communities

23, Avenue des Arts

B r u s s e l s

Dear Mr. Schank,

I have the honour to refer to the Memorandum of Understanding regarding cooperation pertaining to the AVR reactor, executed today between the US AEC on the one hand and the Arbeitsgemeinschaft Versuchsreaktor GmbH (AVR) and Brown, Boveri/Krupp Reaktorbau GmbH (BBK) on the other.

As is stated in said Memorandum, Euratom and BBK and also the Kernforschungsanlage des Landes Nordrhein-Westfalen e.V. (KFA) have entered into an Association Agreement with the objective of developing pebble-bed high-temperature gas-cooled reactors and BBK has been authorized and empowered to enter into said Memorandum under the referenced Association Agreement.

Attached to the present letter, you will find a copy and a translation of the letter by which the Euratom Commission authorizes and empowers BBK to exchange with the US AEC information, as provided in the Memorandum.

Furthermore, I wish to confirm that the Euratom Commission will take any steps that might be necessary to assure a prompt and faithful implementation of the obligation assumed by the European partners under said Memorandum.

I am convinced that the cooperation provided for in the Memorandum which was signed today will be highly beneficial for all parties concerned.

Yours truly,

J. GUERON