

127

Annex II to the Implementing Arrangement between the Japan Atomic Energy
Research Institute (JAERI) and the United States Department of Energy
(DOE) on Cooperation in Fusion Research and Development

JAERI-DOE Collaborative Program
on Fusion Blanket Neutronics

1 INTRODUCTION AND TERMS OF REFERENCE

Pursuant to Article III.2 of the Implementing Arrangement between the Japan Atomic Energy Research Institute (JAERI) and the United States Department of Energy (DOE) on Cooperation in Fusion Research and Development of November 8, 1983 (hereinafter referred to as the "JAERI-DOE Implementing Arrangement"), JAERI and DOE agree to establish this Annex to define the detailed provisions in a collaborative program of integral experiments and related analyses in fusion blanket neutronics (hereinafter referred to as the "Collaborative Program"), in accordance with the provisions of the JAERI-DOE Implementing Arrangement, as follows:

2. OBJECTIVES

The objectives of this Collaborative Program are to plan, conduct, and evaluate joint blanket neutronics integral experiments in the Fusion Neutronics Source (FNS) facility of JAERI for the purpose of providing experimental data to (a) determine the accuracy, guide the development, and establish the validity of the computational methods and data bases used in calculations for the nuclear design of fusion reactor blankets, and (b) assist in the selection, from the neutronics point of view, of configurations and materials for candidate fusion reactor blanket designs.

3. PROJECT

3.1 The Collaborative Program shall consist of (a) planning and design of experiments at the FNS facility, including pre-experiment analysis, (b) preparation for and conduct of experiments at the FNS facility, (c) post-experiment analysis and evaluation, (d) development of experimental and calculational techniques needed for (a), (b), and (c) above, (e) exchange of personnel and information necessary to carry out the Collaborative Program and (f) exchange of results arising from the Collaborative Program.

3.2 The FNS facility, operated by JAERI at its Tokai establishment, provides an intense deuterium-tritium neutron source and is dedicated to the study of fusion reactor neutronics. The Collaborative Program will be one of several users of the FNS facility; the FNS facility will not be dedicated exclusively to the Collaborative Program. JAERI shall be responsible for and have control over all operations of the FNS facility systems and components.

JAERI shall arrange the planning and scheduling of experiments under this Collaborative Program, with due consideration given to DOE proposals.

3.3 The Collaborative Program shall have at least two phases consisting of a "first phase" and a "second phase".

3.3.1 In the first phase, DOE and JAERI shall perform experiments using model blanket assemblies with Li_2O as the breeder material in a pseudo-cylindrical slab geometry. The assemblies shall be loaded in the experimental port between target rooms No. 1 and No. 2 of the FNS facility. Except where otherwise mutually agreed in writing, JAERI shall provide all equipment and materials necessary for constructing assemblies in the first phase. DOE shall provide beryllium blocks in a form suitable for constructing a slab to be used in experiments on neutron multiplication effects.

3.3.2 In the second phase, DOE and JAERI shall perform experiments using model blanket assemblies surrounding the rotating target in a closed geometry to minimize room return of neutrons and to improve experimental accuracies. The closed geometry shall have as one of its sides a model blanket assembly using Li_2O as the breeder material and the remainder of the closed geometry shall consist of a "container". DOE and JAERI shall reach agreement in writing regarding the materials composition of the container and as to the responsibility that each shall have for design and fabrication of the closed geometry. Except when otherwise mutually agreed in writing, JAERI shall provide all the model blanket assembly portion of the closed geometry and DOE shall provide the container portion of the closed geometry except its support structure. The support structure, which provides for positioning and restraint of the container materials, shall be provided by JAERI.

3.3.3 Each phase shall have one or more experiments. Each experiment shall last about one month and about two experiments per year shall be conducted at the FNS facility.

3.4 Experiments performed during the two phases shall include measurements in two main areas: source characteristics (e.g., source neutron spectrum and angular distribution) and blanket neutronics parameters (e.g., tritium production profiles, spectral indices, neutron spectra and nuclear heating profiles). DOE and JAERI shall share in the performance of experiments and agreement in writing shall be reached as to the responsibilities of each Party. The responsibilities shall include development and preparation of instruments, performance of measurements, data collection, and data processing. For those measurements performed by DOE at the FNS facility, DOE shall provide all instruments which are of a unique nature and JAERI shall provide, when available, conventional instruments of a general nature (e.g., amplifiers, discriminators and scalers).

3.5 DOE and JAERI shall perform pre-experiment analysis of the experiments in the two phases jointly and/or independently for the purpose of planning experiments and measurements. To support this analysis, DOE shall independently develop a computer code and then use it to evaluate the sensitivities of neutronics parameters to various system parameters. JAERI may also do such independent computer code development.

3.6 DOE and JAERI shall perform post-experiment analysis of the experiments in the two phases jointly and/or independently and the results shall be evaluated jointly. To the extent possible, DOE and JAERI shall use common calculational methods and nuclear data bases to establish reference cases. In addition, each Party shall use its own original methods and data for calculations to compare with those of the other Party and with the reference cases.

3.7 JAERI and DOE may exchange personnel to participate in experiments, analysis, and instrumentation developments. As described in Section 8 below, JAERI shall accept at least one experimentalist from DOE for participation in the experiments and at least one analyst from DOE for pre- and post-experiment analysis at JAERI, and DOE shall accept at least one JAERI researcher for participation in the analysis of the experimental data and/or the development of instrumentation.

3.8 Technical Progress Meetings shall be held as required to exchange technical information and to review technical status and accomplishments of the Collaborative Program, in accordance with Article 4 below.

4. MANAGEMENT

4.1 JAERI and DOE agree that the general management of the Collaborative Program shall be carried out by a Steering Committee.

4.2 The Steering Committee shall be composed of four members, two each to be assigned by JAERI and DOE. The Steering Committee shall have the functions as described in paragraph 4.4 below.

4.2.1 DOE and JAERI shall identify a person to serve as co-chairman of the Steering Committee. All communications shall be channeled through these co-chairmen or their designees.

4.2.2 DOE and JAERI shall designate appropriate alternates who shall serve if the assigned members are unable to do so and each shall inform the other in writing of all such designations. DOE and JAERI shall each have one vote in the Steering Committee and all decisions shall be by unanimity. The Steering Committee shall be chaired by the host country of the Steering Committee meeting.

4.3 The Steering Committee shall meet annually or more frequently, if required, on a date and location mutually agreed upon. An exchange of letters may serve as a substitute for a meeting of the Steering Committee.

- 4.4 The functions of the Steering Committee shall include:
- (a) planning the Collaborative Program and development of an annual work plan,
 - (b) arranging for Technical Progress Meetings,
 - (c) reporting to the U.S.-Japan Coordinating Committee on Fusion Energy as described in the exchange of letters between the Science and Technology Agency of Japan and DOE on January 25, 1983, for review of technical progress and for recommendations on future plans,
 - (d) arranging for the implementation of personnel exchanges,
 - (e) reviewing the technical progress in experiments and analyses,
 - (f) reviewing plans for publications, and
 - (g) discussion of other matters as mutually agreed.

In addition to these functions, the Steering Committee shall be responsible for evaluating periodically the Collaborative Program's relevance to both the DOE and JAERI Fusion Programs and shall report these evaluations as needed to the U.S.-Japan Coordinating Committee on Fusion Energy.

5. FINANCE

Except when otherwise mutually agreed in writing, each Party shall bear the costs of its activities in accordance with its responsibilities as set forth in Article 3 of this Annex. The activities to be conducted under this Annex shall be subject to the availability of appropriated funds.

6. INFORMATION AND PATENTS

6.1 The Parties shall exchange information necessary to carry out the Collaborative Program, provided, however, that the codes and data bases of each Party shall only be exchanged with the other Party subject to a prior written agreement between the Parties setting forth the terms and conditions for such exchange.

6.2 The application or use of any information provided under or arising from the Collaborative Program shall be the responsibility of the Party receiving it, and the other Party does not warrant the suitability of such information for any particular use or application.

6.3 The information provided under and arising from the Collaborative Program may be made available to the public by either Party through customary channels and in accordance with the normal procedures of the Parties, subject to the provisions of subparagraphs 6.5-6.8 below.

6.4 Article VII of the JAERI-DOE Implementing Arrangement shall apply to the Collaborative Program.

6.5 Proprietary information shall not be accepted for or utilized in the Collaborative Program without the written approval of the Parties. For the purposes of the Collaborative Program, proprietary information shall mean information of a confidential nature acquired prior to or outside the scope of the Collaborative Program such as trade secrets and know-how (e.g., computer programs, design procedures and techniques, chemical composition of materials or manufacturing methods, processes and treatments) which is appropriately marked, provided such information: (a) has been held in confidence by its owner; (b) is of a type which is customarily held in confidence by its owner; (c) has not been transmitted by the Transmitting Party to other entities, including the Receiving Party, except on the basis that it be held in confidence; and (d) is not otherwise available to the Receiving Party from another source without restriction on its further dissemination. It shall be the responsibility of the Party supplying proprietary information to identify the information as such and to ensure that it is appropriately marked.

6.6 Inventions or discoveries made or conceived in the course of or under the Collaborative Program (hereinafter referred to as "arising inventions") shall be identified by the Inventing Party and shall be reported promptly to the other Party. Information regarding arising inventions on which patent protection is to be obtained shall not be published or publicly disclosed by the Parties until a patent application has been filed in either country of the Parties provided, however, that this restriction on publication or disclosure shall not extend beyond six months from the date of reporting of the arising invention. It shall be the responsibility of the Inventing Party to appropriately mark reports which disclose arising inventions that have not been appropriately protected by the filing of a patent application.

6.7 Arising inventions shall be owned (a) by JAERI in Japan and third countries subject to a royalty-free, nonexclusive, irrevocable license to DOE, its Government, and the nationals of its country designated by it and (b) by DOE in the United States subject to a royalty-free, nonexclusive, irrevocable license to JAERI, its Government, and the nationals of its country designated by it.

6.8 This Article shall apply mutatis mutandis to the protection of utility models and of design.

6.9 Each Party shall, without prejudice to any rights of inventors or authors under its national laws, take all necessary steps to provide the cooperation from its inventors or authors required to carry out the provisions of this Article. Each Party shall assume the responsibility to pay awards or compensation required to be paid to its own nationals according to its own laws.

7. LOAN OF EQUIPMENT AND MATERIALS

7.1 Any exchanges, loan or supply of equipment, instruments, materials or spare parts under the Collaborative Program shall be conducted in accordance with Article X of the JAERI-DOE Implementing Arrangement.

7.2 Equipment, instruments, materials or spare parts provided by DOE under this Annex shall, in principle, be returned to DOE, unless necessary decontamination cannot be performed. In such a case, contaminated items shall be disposed of by JAERI, if and when DOE abandons the right of possession, and the cost of such disposal shall, in principle, be borne by DOE. For all items returned to DOE, the cost of decontamination, if any, and of transport shall, in principle, be borne by DOE. Final disposition of all equipment, instruments, materials, and spare parts used in the Collaborative Program shall be carried out in accordance with recommendations of the Steering Committee and decisions of DOE and JAERI.

8. PERSONNEL ASSIGNMENT

DOE and JAERI may each assign to the other Party at least one scientific and technical personnel at any time, in accordance with Article IX of the JAERI-DOE Implementing Arrangement, in order to carry out the Collaborative Program. Each such assignment of personnel shall be the subject of a separate assignment agreement.

9. REFERENCE

Article VIII of the JAERI-DOE Implementing Arrangement shall apply to this Collaborative Program.

10. DURATION AND TERMINATION

The Collaborative Program shall enter into force upon signature of this Annex by JAERI and DOE and shall remain in force for a period of three (3) years. This Annex may be renewed or amended by written agreement between JAERI and DOE. The Collaborative Program may be terminated at the discretion of either JAERI or DOE upon six months advance notice in writing by the side seeking termination. Such termination shall be without prejudice to the rights which may have accrued under the

Collaborative Program to either Party up to the Date of such termination. Specific activities initiated hereunder but not completed at the termination of this Annex may be continued until their completion under the terms of this Annex.

Done at Tokyo, this 23rd day of October, 1984, in duplicate in the English and Japanese languages, both being equally authentic.

for THE UNITED STATES
DEPARTMENT OF ENERGY

for THE JAPAN ATOMIC ENERGY
RESEARCH INSTITUTE



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