SPECIFIC MEMORANDUM OF AGREEMENT

BETWEEN

THE UNITED STATES DEPARTMENT OF ENERGY

AND THE

POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION, JAPAN

IN THE AREA OF

FUEL DEVELOPMENT IN LIQUID METAL COOLED FAST BREEDER REACTORS

This Agreement is made as of the 14th day of November 1979 between the United States Department of Energy (hereinafter referred to as DOE) and the Power Reactor and Nuclear Fuel Development Corporation of Japan (hereinafter referred to as PNC) both hereinafter called the "Parties."

WHEREAS

DOE and PNC have agreed to cooperate in selected areas of applicable fast breeder reactor technology including Fuels and Materials under their Agreement in the field of LMFBRs signed on January 31, 1979 (hereinafter referred to as "the LMFBR Agreement") which superseded the Arrangement between the United States Atomic Energy Commission (USAEC) and PNC signed on March 4, 1969.

Pursuant to the Energy Reorganization Act of 1974, the USAEC was abolished and all functions transferred to and vested in the United States Energy Research and Development Administration (ERDA).

Pursuant to the Department of Energy Organization Act of 1977, ERDA was abolished and all functions transferred to and vested in DOE.

DOE and PNC have a mutual interest in the development of fuels for LMFBRs and in obtaining statistically accurate data on fuel pin behavior which would contribute to the reliable operation of LMFBRs.

DOE is conducting in EBR-II an off-normal transient test of fuel pins called a "power-to-melt" test. It is referred to as P-E01. PNC is conducting a fuel performance test in the Phenix reactor. It is referred to as PNC-3.

DOE and PNC have a mutual interest in closely cooperating in all aspects of these tests.

DOE and PNC have a mutual interest in incorporating PNC fuel pins in the EBR-II P-E01 tests and DOE cladding in the Phenix PNC-3 tests.

DOE and PNC have a mutual interest in exchanging results of these tests as well as their analyses.

IT IS AGREED AS FOLLOWS:

ARTICLE 1 - OBJECTIVES

1.1 The objectives of cooperation under this Agreement are to provide for PNC participation in the DOE EBR-II P-E01 test and DOE participation in the PNC-Phenix PNC-3 tests and to provide for mutually open and comprehensive exchange of results and analyses of these tests.

1.2 Cooperation under this Agreement shall be subject to applicable provisions of the LMFBR Agreement. Articles 6, 7, 8, 11, 12, 13 and 14 of the LMFBR Agreement are hereby incorporated by reference.

ARTICLE 2 - PROGRAM

2.1 A Joint Program designed to meet the objectives of this Agreement is outlined below:

a. Inclusion of three PNC fuel pins in the DOE EBR-II P-E01 power-to-melt test.

b. Inclusion of five fuel pins with US cladding in the PNC Phenix PNC-3 fuel performance test.

c. Full access by each Party to the other Party's fuel pin and test design, test description, irradiation history and test results including post-irradiation data. Such full access will include access to data on PNC fuel pins, in Phenix PNC-3, and DOE fuel pins in EBR-II P-E01. Note that access to PNC-3 test data by DOE will not include information on the performance or operation of Phenix or any other CEA installations.

d. Full exchange between the Parties of any analyses performed by either Party.

e. Assignment of PNC staff or PNC contractor staff to DOE or DOE contractors to participate in post-irradiation examination (PIE) of the DOE P-E01 test.

f. Assignment of DOE staff or DOE contractor staff to PNC or PNC contractors to participate in PIE of the PNC-3 test.

2.2 Any assignments of staff mentioned in 2.1.e. and f. above shall be the subject of separate personnel assignment agreements.

2.3 PIE in DOE facilities of three PNC fuel pins to be irradiated in EBR-II as part of the P-E01 power-to-melt test shall be the subject of a separate contract between PNC and the Westinghouse Hanford Company.

2.4 PIE which may be requested by DOE of DOE cladding to be irradiated in the PNC Phenix PNC-3 fuel performance test shall be the subject of a separate agreement between PNC and DOE.

ARTICLE 3 - RESPONSIBILITIES

3.1 For the P-E01 test DOE shall be responsible for:

a. Receipt and storage of PNC fuel and materials to include cladding, end-cap stock, spring material, plenum spacers and fuel pellets.

b. Inspection on receipt of PNC fuel and materials.

c. Preparation of the engineering test plan, the test description and safety analysis, and, in conjunction with PNC, the fuel pin Fabrication Data Package.

d. Issuance of the Fabrication Data Package.

e. Procurement of gas tag capsules, insulation pellets and wire wrap material.

f. Fabrication of end-caps, springs, spacers, gas tag capsules, and fuel pins.

g. Analysis of fuel and materials.

h. Design, development, fabrication and test of the P-E01 test vehicle.

i. Insertion of PNC fuel pins in EBR-II P-E01 test vehicle.

j. Pre-irradiation testing of EBR-II P-E01 assembled test vehicle.

k. Insertion of P-E01 in EBR-II.

l. Conduct of P-E01 test in EBR-II.

m. Removal and storage of P-E01 test for EBR-II.

n. PIE of DOE fuel pins in P-E01.

o. Transport of DOE and PNC fuel pins between Hanford Engineering Development Laboratory and EBR-II and return.

p. Disposition of scrap fuel and materials resulting from PIE of PNC fuel pins.

q. Provision to PNC of copies of test description, safety analysis documentation, fabrication data package, description of the test vehicle and documentation of all irradiation test and examination results of PNC fuel pins and DOE fuel pins in the test.

3.2 For the P-E01 test PNC shall be responsible for:

a. Design of fuel pin internals.

b. Preparation, in conjunction with DOE, of the PNC fuel pin Fabrication Data Package.

c. Procurement of PNC fuel pin cladding, end-cap stock, spring material, plenum spacers, and fuel pellets.

d. Shipment of PNC P-E01 fuel pellets and other material to US.

e. Post-irradiation Non-Destructive and Destructive Examination of the PNC fuel pins.

f. Provision to DOE of copies of the fuel pin fabrication data package and fuel pin drawings.

3.3 For PNC-3 test DOE shall be responsible for:

a. Shipment of US cladding materials to Japan.

b. Provision to PNC of all characterization data for shipped material.

3.4 For PNC-3 test PNC shall be responsible for:

a. Receipt and storage of DOE cladding material and its examination.

b. Fabrication of five fuel pins using DOE cladding material.

c. Shipment of PNC-3 fuel pins to France.

d. PIE of the fuel pins in Japan.

e. Recording and analysis of pin data.

f. Provision to DOE of test description, irradiation history, PIE data and results of all PNC-3 fuel pins.

ARTICLE 4 - MANAGEMENT

4.1 The DOE/PNC Joint Coordinating Committee, which was established pursuant to the exchange of letters between ERDA and PNC dated January 19, 1976 and March 5, 1976 to Article 4 of the LMFBR Agreement, shall be responsible for the review, evaluation, assessment and approval of the Joint Fuel Performance Program to be conducted under this Agreement.

4.2 For periods between meetings of the DOE/PNC Joint Coordinating Committee, each Party shall designate one person to act on its behalf in all matters concerning cooperation under this Agreement.

ARTICLE 5 - FINANCIAL TERMS

5.1 DOE shall bear all costs of the P-E01 tests incurred in the US except as noted in 5.2. PNC shall bear all costs of the PNC-3 tests incurred in Japan or in France except as noted in 5.2.

5.2 Costs of PIE of PNC-P-E01 fuel pins requested by PNC and incurred in the US shall be paid by PNC. Costs of PIE of PNC-3 pins using US cladding requested by DOE and incurred outside of the

US shall be paid by DOE. Provision of PIE services by either DOE or PNC, as provided for in Paragraph 5.2 above shall be the subject of separate agreements between the Parties (see Articles 2.3 and 2.4).

5.3 The ability of the Parties to carry out their obligations is subject to the availability of appropriated funds.

ARTICLE 6 - ATTACHMENT OF STAFF

6.1 Short term visits of DOE staff to PNC and PNC staff to DOE to discuss the technical aspects of this Specific Memorandum of Agreement (SMA) during the life of the SMA shall be made at no cost to the Receiving Party.

6.2 Long term assignments of one month or more shall be the subject of separate personnel assignment agreements pursuant to Article 11 of the LMFBR Agreement. Both Parties agree that such personnel assignment agreements will be executed to cover the assignment of PNC staff to DOE and DOE staff to PNC to participate in PIE of the P-E01 test in the US and the PNC-3 test in Japan.

ARTICLE 7 - PATENTS

7.1 Under the authority of Article 9.1.c of the LMFBR Agreement, any invention or discovery made or conceived in the course of or under exchange of personnel shall be governed by Article 9.1.a of the LMFBR Agreement, and other inventions or discoveries shall be governed by Article 9.1.b of the LMFBR Agreement. Subparagraphs 2, 3 and 4 of that Article shall be applicable as appropriate.

ARTICLE 8 - DURATION

8.1 This Agreement shall enter into force upon signature and shall continue for a three year period and may be extended by mutual written consent. The implementation and progress of the Program may be subject to review by the Parties.

8.2 This Agreement may be terminated at any time at the discretion of either Party, upon 12 months advance notification in writing by the Party seeking to terminate the Agreement. Such termination shall be without prejudice to the rights which may have accrued under this Agreement to either Party up to the date of such termination.

8.3 All joint efforts and experiments not completed at the termination of this Agreement may be continued until their completion under terms of this Agreement.

Done at TOKYO in duplicate, this 14th day of NOVEMBER 1979.

FOR THE UNITED STATES DEPARTMENT OF ENERGY

NAME: Billy D. Idell

TITLE: DOE Representative

FOR THE POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION, JAPAN

NAME: M. Iida

TITLE: Vice President