

January 23, 2002

MEMORANDUM TO: Ashok Thadani, Director  
Office of Nuclear Regulatory Research

FROM: Farouk Eltawila, Director **/RA/**  
Division of Systems Analysis and Regulatory Effectiveness  
Office of Nuclear Regulatory Research

SUBJECT: MEMORANDUM OF UNDERSTANDING WITH FRAMATOME ANP  
CONCERNING COOPERATIVE RESEARCH ON M5 CLADDING

We recommend that you sign the attached Memorandum of Understanding (MOU) with Framatome ANP concerning cooperative research on M5 cladding. The work will be done at Argonne National Laboratory and is similar to work currently being done there on Zircaloy-2 and Zircaloy-4 in cooperation with EPRI. Following Brian Kildee's suggestion, the EPRI MOU was used as a pattern for this MOU. Subsequently, Don Hassell reviewed this MOU and requested some specific changes that have been made. OGC has no objection.

The attached draft was prepared by Framatome ANP and the accompanying transmittal letter indicates their acceptance of the draft. Their signature should therefore be forthcoming and work could begin in the very near future.

Attachment: As stated

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**A MEMORANDUM OF UNDERSTANDING**  
**between the**  
**U.S. NUCLEAR REGULATORY COMMISSION**  
**and**  
**FRAMATOME ANP, Inc.**  
**on a**  
**COOPERATIVE NUCLEAR FUEL RESEARCH PROGRAM**

**PURPOSE**

The U.S. Nuclear Regulatory Commission (NRC) and Framatome ANP, Inc., a U.S. Corporation, (FRA-ANP) each conduct research on nuclear fuel. Although the goals of this research may differ, the research testing methods developed and applied and the technical information obtained can be useful to both parties. The purpose of the cooperative research program is for the NRC to gain additional knowledge on the behavior of advanced cladding alloy M5 under loss of coolant accident (LOCA) conditions. Therefore, the NRC and FRA-ANP agree to cooperate in establishing and managing a fuel research program.

This memorandum of understanding (MOU) between the NRC and FRA-ANP describes the conditions under which a cooperative research program will be conducted and is subject to applicable federal laws and regulations.

**PRINCIPLES OF COOPERATION**

Article 1 -- Responsibilities of the Parties

1.1 The NRC and FRA-ANP will establish and manage a cooperative research program. A management board, consisting of representatives from each party, will be responsible for integrating the needs of both parties, setting priorities, and providing direction to the organization conducting the research related to the behavior of alloy M5 cladding material under accident conditions. The NRC representatives shall be the Director, Office of Nuclear Regulatory Research and the Director of the Division of Safety Analysis and Regulatory Effectiveness. The FRA-ANP representatives shall be the Director of R&D, the Director of Regulatory Affairs and Senior Technical Consultant Dr. H. A. Hassan. The members of the management board will develop and manage plans for the research program described in this MOU. They shall meet as necessary, but at least annually, to:

- 1) Evaluate potential added tests that could be addressed within the fuel research program specified in this MOU.
- 2) Determine priorities for the research program.
- 3) Review the progress of the research program.
- 4) Provide direction on the conduct of the research program including possible termination.

- 1.2 Management board decisions will be reached by mutual agreement.
- 1.3 Technical oversight of the research program will be conducted by a technical advisory group (TAG) consisting of two representatives from each party (NRC and FRA-ANP). The TAG shall be responsible for making the decisions necessary to implement the directives of the management board. TAG decisions will be reached by mutual agreement.
- 1.4 The management board may terminate the cooperative research program at any time due to unsatisfactory contractor performance, lack of funds, changes in priority, or any other reason.

#### Article 2 -- Guidelines for Cooperative Research

- 2.1 The cooperative research program shall be structured to avoid any conflict of interest among the parties. In addition, the objective of this cooperative program shall be limited to obtaining defined data and information.
- 2.2 Results from the cooperative research program shall be shared by both parties. The management board shall determine whether the results of any test not specifically performed to simulate an accident--such as a materials characterization test--reveals proprietary information, including data that could be used to duplicate the process used to develop this particular alloy, and must be withheld from public disclosure.
- 2.3 The content of any publication proposed by either party shall be reviewed by the management board.
- 2.4 All patent rights related to the M5 material supplied by FRA-ANP, including but not limited to its composition and manufacturing, shall remain assigned to FRA-ANP. FRA-ANP may generate and provide certain data to the TAG to assist in developing the testing program; any data designated by FRA-ANP as being proprietary shall be handled and safeguarded accordingly.
- 2.5 Both parties shall have access to the test facilities, separately or jointly, and shall have the right to review the data being generated, to interview personnel conducting the research, to audit the processes and procedures used in the program, and to observe tests in progress.

#### Article 3 -- Outline of Cooperative Research Program

##### 3.1 Scope

The scope of the tests performed in the research program will be defined by the TAG with concurrence by the management board. As provided in Section 2.4, data provided by FRA-ANP may be used to adjust the scope of the testing program, as appropriate.

### 3.2 Objectives

The objective of the cooperative research program is to obtain data not previously available on unirradiated M5 cladding material concerning certain physical and mechanical properties associated with accident-related environments.

### 3.3 Technical Requirements

Detailed technical requirements will be developed by the contractor or operating agent responsible for each phase of the research and documented in a detailed plan. These plans shall be consistent with the direction provided by the management board.

The detailed plans, including test procedures, for the cooperative research program will be reviewed and approved by the TAG.

### 3.4 Resource Commitments

FRA-ANP shall supply unirradiated M5 tubing specimens in a quantity and at a time that supports the approved cooperative research program. The NRC shall be responsible for the payment of the contractor or operating agent responsible for conducting the research program, as described in the approved plan.

At the conclusion of the testing, all unused MS tubing shall be returned to FRA-ANP. Specimens used in the testing program shall either be returned to FRA-ANP or shall be archived and suitably protected to prevent unauthorized use.

## Article 4 -- Cooperation with Other Organizations

If mutually agreeable, other organizations may be invited to participate in the cooperative program. The TAG will work with representatives of those other organizations that have agreed to participate to define the scope and conduct of the research program. It is understood that the Electric Power Research Institute will be invited to participate by providing technical advice and to provide certain support services and analyses as mutually agreed.

## Article 5 -- Terms of the Agreement

- 5.1 This agreement shall be effective when signed and dated by both parties, and shall remain in effect for a period of two years.
- 5.2 This MOU may be modified or extended by the management board, if approved by the signatories.
- 5.3 Either party may terminate this agreement at any time by giving a two-month written notice.
- 5.4 All data generated subsequent to the withdrawal of a party shall be subject to the provisions of this MOU at the time of termination.

- 5.5 It is understood that the NRC may enter into substantially similar agreements with other organizations to perform the same tests on other advanced alloy claddings.

#### AGREEMENT

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Ashok C. Thadani, Director  
Office of Nuclear Regulatory Research  
U.S. Nuclear Regulatory Commission

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Roger S. Reynolds, Director  
Research and Development  
Framatome ANP, Inc.