

November 8, 2002

James F. Mallay  
Director, Regulatory Affairs  
Framatome ANP  
P.O. Box 10935  
Lynchburg, VA 24506-0935

Dear Mr. Mallay:

In accordance with our discussion on November 7, 2002, we would like to request additional amounts of cladding tubing for NRC research at Argonne National Laboratory. Some of this material is for testing within the cooperative program as outlined in our Memorandum of Understanding of February 5, 2002, and some of the material is for work outside of that scope. The types and amounts of tubing are specified in the enclosure along with an indication of the program element in which they are to be used. Thank you for your cooperation in supplying this material. Please call me if further information is needed.

Sincerely,

***Original signed by R. Meyer***

Ralph O. Meyer, Senior Technical Advisor  
Safety Margins and Systems Analysis Branch  
Division of Systems Analysis and Regulatory Effectiveness  
Office of Nuclear Regulatory Research

Enclosure: As stated

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## Framatome-ANP Cladding Material

We request that Framatome-ANP cladding tubing be sent to Argonne National Laboratory (ANL) for three programs: the Post-LOCA-Quench Ductility Program (covered by the MOU), the H.B. Robinson LOCA Program (pre-dates MOU), and the Air Oxidation Program (outside the scope of the MOU). Specific lengths, outer diameters and wall thicknesses for the requested M5 and Zircaloy-4 tubing are listed for each program.

### 1. Post-LOCA-Quench Ductility Program (covered by MOU)

Twelve feet (3.66 m) of 17x17 assembly design M5 and 12 feet of low-tin Zircaloy-4 are requested for the Post-LOCA-Quench Ductility ring compression, three-point bending and LOCA Integral testing of these materials following high temperature steam oxidation and quench. The specific cladding outer diameter (OD) and wall thickness (t) for these cladding alloys are to be chosen by Framatome-ANP. However, in order to compare the ANL results to the extensive database Framatome-ANP has already accumulated, it is requested that the same cladding tubing of the same dimensions be supplied as was used in the Framatome test program. It is assumed that both the M5 and Zircaloy-4 are characterized by nominal dimensions of OD = 0.374 inches (9.500 mm) and t = 0.0225 inches (0.57 mm). If these dimensions are not correct or if the Zircaloy-4 17x17 cladding has different dimensions than the M5 17x17 cladding, it is requested that Framatome supply this information along with the tubing.

### 2. H.B. Robinson LOCA Integral Testing (work predates 2002 MOU)

H.B. Robinson cladding is standard 15x15 Zircaloy-4 with OD = 0.424 inches (10.77 mm) and t = 0.03 inches (0.76 mm). In order to generate baseline oxidation kinetics data, mechanical properties data and LOCA Integral Test data for comparison to the behavior of the high-burnup Robinson cladding, it is requested that 12 feet (3.66 mm) of this cladding be sent to ANL. By way of reference, the archival Robinson cladding had a tin content of about 1.42 wt.% and a final anneal of 4 hours at 930°F.

### 3. Air Oxidation Studies (work outside 2002 MOU)

The purpose of the Air Oxidation Study is to assess the air oxidation kinetics of spent-fuel cladding following rapid pool dryout. Initial studies have been conducted using 17x17 low-tin Zircaloy-4 tubing with OD = 0.376 inches (9.55 mm) and t = 0.024 inches (0.61 mm). The material has a tin content of about 1.3 wt.% and a final anneal of 4 hours at 915°F. It is requested that 24 feet (7.32 m) of similar Zircaloy-4 be supplied to ANL for this program.

Based on guidance received from NRC, ANL would also like to investigate the air oxidation kinetics of M5 under the same test conditions used for the Zircaloy-4 samples. Thirty-six feet (11 mm) of 17x17 assembly design M5 are requested for these studies. This is the same design as the M5 requested in Item #1 above.