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MEMORANDUM FOR: G. Lainas, Chief, Plant Systems Branch, DOR

THRU: E. Adensam, Section Leader, Plant Systems Branch, DOR

FROM: E. Lantz, Plant Systems Branch, DOR

SUBJECT: TELEPHONE INTERVIEW WITH KAREN AVERSON OF THE
NEW YORK TIMES ON THE USE OF BORON TO PREVENT
CRITICALITY IN SPENT FUEL POOLS

In a telephone interview on August 7, 1979, Karen Averson wanted to know the history of the use of boron to preclude criticality in spent fuel pools. She was familiar with the various types of boron now being used, i.e., Boral, boron carbide in graphite, boron carbide in composite polymer, and Boroflex, but wanted to know if all of these had been approved by the NRC for use in spent fuel pools and wanted to know about the problems with each. My answer was as follows:

1. Boral has been used in the Yankee Rowe spent fuel pool since 1961. Other plants, especially in New England, started using it in the mid-1970's. Thus, the use of Boral in spent fuel pools has been approved by the NRC for some time.
2. The experience with Boral as a permanent neutron absorber in spent fuel pools has been very good. We have found that the boron carbide in it does not degrade and that, while the aluminum in it tends to become more brittle, it does not degrade in any significant way.
3. The next absorber material to be approved by the NRC for spent fuel pools was boron carbide in graphite plates. The NRC approved this for Haddam Neck in November 1976 and for several other plants after that. There was a swelling problem at the Haddam Neck plant because the manufacturer had not baked out the phenolic binder, as the licensee implied it would do in its submittal to the NRC, but this did not effect the neutron absorption capacity. The swelling was eliminated by venting the cans into which the plates had been sealed. All of the racks with these graphite plates have large amounts of boron in them and consequently are conservatively designed. Also, we do not expect a significant loss of boron from these plates over the 40 year life of the plants.

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4. The other two plate materials, i.e., the composite polymer and the Boraflex, will have phenolics in them throughout their existence in the spent fuel racks. These phenolics are made up of hydrogen, oxygen, and carbon as well as some other materials. The high energy gamma radiation in the spent fuel pool will tend to decompose these phenolics and release the hydrogen atoms. Thus, the licensees have to show by irradiation tests that these plates can withstand the highest radiation dose that could possibly be obtained during the forty year life of the spent fuel pool without significantly degrading and losing more boron than was accounted for in the criticality calculations. At the present time the Point Beach racks with Boraflex in them are the only ones of these to get final NRC approval, but NRC approval of the LaCrosse and Crystal River Unit 3 racks is expected.

E. Lantz
Plant Systems Branch
Division of Operating Reactors

cc: F. Ingram

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