

Date: October 20, 1982

NEUTRON ABSORBER SAMPLING PLAN - IN POOL

A sampling plan to verify the integrity of the neutron absorber material employed in the high density fuel racks in the long-term environment is described.

The test conditions represent the vented conditions of the spent fuel tubes. The samples will be located adjacent to the fuel racks and suspended from the spent fuel pool wall. Eighteen (18) test samples are to be fabricated in accordance with Figure 1 and installed in each pool when the racks are installed. The selection of Boral for the samples should be representative of what is used in the tubes.

The procedure for fabrication and testing of samples shall be as follows:

1. Samples shall be cut to size and dried in an oven for five hours at 170⁰F, followed by a cycle at 600⁰F for three hours.
2. Samples shall be weighed immediately following removal from the oven and weight in milligrams recorded for each sample.
3. Samples shall be fabricated in accordance with Figure 1 and installed in the pools.
4. Two samples shall be removed per schedule shown in Table 1.

5. Carefully cut samples apart at the weld without damaging the neutron absorber. Wash with a soft brush in a mild abrasive and detergent solution, immerse for five to fifteen minutes in a 25% (by volume) nitric acid aqueous solution to remove surface products, followed by a rinse of clean water and alcohol. Dry (dehydrate) the sample until no further weight loss is observed.
6. Weigh the samples and evaluate the weight change in the neutron absorber composite material in milligrams per square centimeter per year.
7. Visually examine the clad surface for pitting.
8. If pitting is present, the depth of the four major pits are to be recorded and the average pit penetration in mils of an inch per year determined.
9. Take macrographs of the edge surface and any other suspect areas.
10. Should any adverse conditions be detected, the samples may be subject to a B¹⁰ loading analysis.
11. Prepare report of a sample test results and observations.
12. Additionally, two full length vented fuel storage tubes will be suspended in each pool and will be examined should the sample program indicate any loss of neutron absorber material below .02gm/cm², Boron¹⁰.
13. Retain samples.