WANL-TMI-1407

Reactor Design

INFORMATION CATEGORY
Unclassified
E Walter 12/16/65
Authorized Classifier (Date)

From Engineering Mechanics

Date February 19, 1965

Subject Interim Report - EML-69 Support Block Mechanical and Thermal Tests

WESTINGHOUSE ASTRONUCLEAR LABORATORY

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As part of EML-69 compression strength of support blocks is being obtained at high temperatures. On February 16 and 17, 1965 two blocks were loaded to failure. One at 4000°R and one at 4500°R. These were block numbers HT 1731 and HT 1715 respectively. Both had been rejected for unacceptable edge chipping but were otherwise acceptable specimens.

Block HT 1731, tested at 4000°R, failed at 8100 lb and block HT 1715, tested at 4500°R, failed at 7600 lb. The type of failure in each case was similar. The downstream seat punched out in a conical shape into the inner bore. In each case the failure was sudden and accompanied by a sharp noise. The main structure of the block remained intact, at least to external observation. The blocks will be sectioned to determine internal damage.

Dimensionally the blocks remained the same within measuring tolerances before and after failure with two small deviations. The diameter of the inner bore holes increased approximately 5 to 15 mils and the depth of the upstream recess decreased from 1 to 10 mils.

It should be pointed out that the high temperature load application is not quite similar to the room temperature load application since cooling methods have not been worked out for metal parts at the high temperatures. The stress under the graphite plunger is probably less than under the molybdenum support cone. Additionally no pyro sleeve has been used in the inner bore to minimize the possibility of explosive failure of the main block structure with risk of subsequent damage to the furnace element.

DISCLAIMER

In each case the load application versus total load train deflection was very close to linear from start to failure and cross head travel was at the rate of 0.020 in. per minute.

Further tests are planned to determine peak temperature strength and to compare the strengths of blocks returned from the NRX-A2 reactor with those of new blocks.

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