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1 of 1

HW-66854 RD

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July 5, 1960

This document consists of

Page No.

To: R. Nilson

From: W. K. Kratzer

INFORMATION RELATIVE TO FAILED ENRICHED
TUBE-AND-TUBE ELEMENT, PT 292-A, KER-2

A. Fuel Elements

Each of the four tube-and-tube fuel elements consist of a 1.050 inch OD, 0.500 inch ID inner tube mounted concentrically in a 1.920 inch OD, 1.450 inch ID outer tube. Both tubes have 0.020 inch co-extruded Zircaloy-2 jackets. The tubes are 18 inches long with 1/4 inch end caps. Both tubes are supported at the ends by welded Zircaloy-2 semi-flexible supports.

Two unalloyed and two U-2W/O Zr alloyed fuel elements were irradiated. The unalloyed elements were enriched to 1.47% and the alloyed elements to 1.6%.

B. System

The elements were irradiated in KER Loop 2 at a system pressure of 1600 psig. The loop has a Zr-2 process tube 2.028 inches ID. Coolant flow was about 27,500 lbs/hr at an outlet temperature of 272° C.

C. Operating Conditions

Elements were charged January 11, 1960, discharged July 3, 1960, after 138 operating days. Average exposure was 3150 MWD/T.

The failed element was operating at 131 KW/ft at a local coolant temperature of 235° C.

D. Failure Observations

The failure occurred on the outer surface of an inner tube of one of the unalloyed elements. All of the unalloyed pieces exhibited severe bumping, but this

Classification 44- not associated with the failure. The failure was a

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By Authority of

WA Snyder
CG-PR-2, 1-26-94.

By

Jerry Mally, 4-20-94.

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McHanson 4-20-94

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[REDACTED]
R. Wilson

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July 5, 1960

D. Failure Observations (Contd)

longitudinal split in the jacket about 1/2 inch long, located about 2 inches from one end. The jacket was heavily striated and the split apparently resulted from circumferential tensile failure of the jacket. Observations also indicated that the uranium was badly cracked, which is expected at this exposure.

(On the basis of previous high exposure failures of cluster elements, the jacket failure is associated with irregular jacket thickness, not with uranium cracking. This is an opinion - not verified).

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DATE

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9/16/94

END