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TEMPERATURE CONDITIONS IN ENRICHED TUBE AND
TUBE ELEMENTS IN KER-4, PT-IP-292-A

2

AUTHOR

W. K. KRATZER

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June 30, 1960

TEMPERATURE CONDITIONS IN ENRICHED TUBE AND TUBE
ELEMENTS IN KHR-1, PT-IP-292-A

This document consists of

3 pages.

TO: R. O. Gumprecht

FROM: W. K. Kratzer

Four enriched KHR sized tube-and-tube elements are being irradiated in KHR-2 to exposure higher than have been attained during previous KHR irradiations. Using your IBM program, would you determine coolant, jacket, and uranium temperatures, heat fluxes across each surface, and flow and power splits for each of the four elements at the stated equilibrium operating conditions? The fuel element description and the observed and calculated operating conditions are given in the appendix.

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Appendix

A. Fuel Elements

The pre-irradiation room temperature dimensions of the elements are:

Outer tube, O.D. 1.820 in.

I.D. 1.450 in.

Inner Tube O.D. 1.050

I.D. 0.500

Length, overall - 18 in.

Length, uranium - 17-3/8 in.

Jacket thickness - 0.020 in.

Current exposure 3000 MWD/T.

B. Loops

Process tube I.D - 2.028 in.

System Pressure - 1600 psig.

Nominal volumetric flow - 60 gpm

C. Loading

The four elements are loaded end to end without intermediate coolant mixing with the upstream end of the upstream element at the midpoint of the active zone.

D. Operating Conditions

Tube bulk outlet temperature - 272°C

Tube inlet temperature - 226°C

Tube A T 46°C

Mass flow at temperature - 27,700 lbs/hr.

Tube power - 761 KW

Heat from graphite - 48 KW

Charge power - 713 KW

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Element Number	1	2	3	4
Centerline position of element from downstream end of 340 inch active zone, in.	161	143	125	107
Specific power of element, KW/ft of Uranium	131.0	127.5	121.6	112.3
Bulk coolant temperature at inlet of upstream fuel element, °C	227			

DATE

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