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COPY 1 OF 1, SERIES MA

RESULTS OF HEAT DECAY TEST

TITLE

AUTHOR

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IRRADIATION PROCESSING DEPARTMENT

GENERAL ELECTRIC

RICHLAND, WASHINGTON

This document consists of
 3 pages. No. 1
 1 copy.

November 19, 1957

S. S. Jones, Specialist
 Process & Reactor Development
 Research and Engineering

COPY 1 OF 1, SERIES MA

RESULTS OF HEAT DECAY TEST

During the outages of 9-28-57 and 10-14-57 a test was performed at KW-Reactor to evaluate conditions present during front nozzle replacement programs. The intent of the test was to prove that backflow from the rear crossheader would provide sufficient cooling to prevent slug damage under the following conditions:

1. The reactor has been shut-down at least eight hours.
2. The headers which supply rows of nozzles to be replaced are valved to the relief riser on the rear, and throttled to a header pressure of 26" on the front.
3. No tubes may be open on the rear.
4. NO tubes closer than five lattice units on the front may be opened at the same time.
5. A maximum of five tubes per header may be open at one time.

The test procedure used was to pick a high factor tube at goal exposure, obtain the above conditions, disconnect the front pigtail and remove the nozzle cap. The temperature of the backflow water was measured with a previously calibrated thermometer and the flow was measured with a calibrated bucket. One minute readings of temperature were obtained until the system attained equilibrium after which final conditions were obtained for rear inlet water temperature, front outlet water temperature, and flow rate. From this, the tube power was calculated. This test was repeated twice with tube 3077-KW during the outage of 9-28-57, and six times with tube 1972-KW during the outage of 10-14-57.

A summary of data are included in the appendix as well as a copy of the resultant procedure.

Sources of possible error in this test are summarized along with the expected magnitude.

1. An error of $\pm 0.5^\circ\text{F}$ may have been possible in measuring the ΔT for a possible error of approximately 5%.

2. An error in obtaining the time to draw a weighed sample of water may have been as great as 3 seconds to a possible error of only 5%.

3. An error in the weighing of the sample may have been as great as 0.1 grams to a possible error of only 1%.

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Verified By Jenni Miley, 4-21-94

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S. S. Jones

-2-

November 19, 1957

It is hoped that these data will be helpful to you in your quest for exact definition of the shut-down heat decay transient and is furnished to you for that purpose.

Process Engineering Operation
Process Technology Operation

RE Hall:mf

cc: JL Benson - RH Gay
RW Reid

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DATA SHEET

Page 3

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Table I

<u>Tube</u>	<u>Days In</u>	<u>Factor</u>	<u>Exposure</u>	<u>Prod. Eff.</u>	<u>Power</u>	<u>Charge Length</u>	<u>Type Metal</u>
3077-KW	97	1.318	489	.735	1225 KW/tube	38 pc.	8" H.M.
1972-KW	78	1.270	438	.716	1175 KW/tube	38 pc.	8" H.M.

Table II

<u>Hours Down</u>	<u>Tube No.</u>	<u>Outage Date</u>	<u>Back Flow</u>	<u>Temperature Rise</u>	<u>Eff. Exp. Time</u>	<u>Power</u>	<u>% of Original Power</u>
4 hours	1972	10-14-57	1.585 gpm	15.7°C	2.37 hr	6.55 KW	0.56%
9.25	1972	10-14-57	1.585	13.0	1.86	5.44	0.46
10	3077	9-28-57	1.92	9.7	2.37	4.90	0.40
12	1972	10-14-57	1.585 gpm	12.0	1.86	5.01	0.426
15	3077	9-28-57	1.92	8.7	2.37	4.40	0.359
17.5	1972	10-14-57	1.585	10.2	1.86	4.26	0.366
22	1972	10-14-57	1.585	9.3	2.37	3.88	0.33
33	1972	10-14-57	1.405	9.5	1.86	3.52	0.3

Table III

<u>Tube</u>	<u>Time to Fill Bucket With Only 1972 open</u>	<u>Time to Fill Bucket With Tubes 1956, 1961, 1967, 1972, 1981, and 1987 open</u>
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1972-KW 7.5 sec 12.120 sec

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