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SUBJECT: TYPICAL PERFORMANCE OF LETDOWN HEAT EXCHANGERS
HRT Test No. 1-A-4

TO: S. E. Beall

FROM: R. R. Wiethaup and R. Van Winkle

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The performance of the letdown heat exchangers has been observed for the purpose of establishing a standard of performance against which the results of subsequent operations can be compared.

The performance was observed over an 8-1/2-hr period on February 18 and 19, 1957. During this period, the reactor was in simulated operation with oxygenated water at design temperature and 1500 psig.

The information is summarized in the attached tables. The precision of the data is indicated by the close check between the letdown rate calculated by a heat balance on the letdown heat exchanger and the sum of the inputs to the high-pressure system. An over-all heat transfer coefficient could not be calculated for any section of this unit, because temperatures of the feed stream and letdown stream were not known at the points corresponding with the outlet of the cooling water jacket or the inlet of the purge water jacket; however, the performance of both units was adequate.

Drawings which show the details of these heat exchangers are:

D-18218, Revision a	Fuel Letdown Heat Exchanger
D-18338, Revision b	Blanket Letdown Heat Exchanger

R. Van Winkle

RRW-RVW:be

Table 1. Typical Performance of the Letdown Heat Exchangers*

<u>Flow Rates, gpm</u>	<u>Fuel</u>	<u>Blanket</u>
Feed (oxygenated water)	0.74	0.71
Cooling Water	5.8	5.8
Pressurizer Purge	0.12	0.10
Letdown, calculated from heat balance	0.97	0.93
Total input flows to high- pressure system	0.94	0.93
<u>Temperatures of Inputs, °C</u>		
Feed	54	49
Cooling Water	30	30
Pressurizer Purge	45	45
Letdown	271	275
<u>Heat Transferred, BTU/hr</u>		
To Feed	115,000	114,000
To Cooling Water	56,700	65,100
To Pressurizer Purge	20,100	17,300

* Average of six observations, from 2300, February 18, 1957, through 0830, February 19, 1957.

	Time	°C	gpm	°C	°C	gpm	°C	°C	gpm	°C	°C	gpm calc.	°C	Σ Flows in
FUEL	2300	56	.70	56	33	5.83	44	48	.125	247	272	.98	230	.91
	0100	57	.74	53	26	5.83	38	44	.109	246	272	.96	229	.95
	0300	54	.74	55	33	5.83	44	46	.131	245	271	.99	228	.95
	0500	51	.73	51	29	5.83	39	43	.114	245	271	.96	230	.93
	0830	52	.74	52	30	5.83	40	42	.111	244	271	.96	228	.96
BLANKET	2300	63	.71	53	33	5.83	45	45	.114	244	276	.91	228	.93
	0100	48	.73	51	26	5.83	40	44	.103	244	276	.96	228	.95
	0300	45	.74	53	33	5.83	45	45	.094	243	275	.96	227	.96
	0500	44	.72	51	29	5.83	41	45	.074	243	274	.93	225	.94
	0830	44	.64	50	30	5.83	42	44	.097	244	275	.91	226	.86

Table 2. Observed Temperatures and Flows
Fuel and Blanket Letdown Heat Exchangers