

M-3 PDR

Pacific Sierra Nuclear



5619 Scotts Valley Dr., Scotts Valley, CA 95056 (408) 438-6445

December 20, 1990
PSN-90-227

Mr. John P. Roberts
U. S. Nuclear Regulatory Commission
One White Flint North
11055 Rockville Pike
Rockville, MD 20852

Dear John:

Attached is the spreadsheet which calculates the heat-up rate of the MSB. As you can see with a heat-up rate of 3.0°F/hr it would take $(212-70/3.0)$ 47.3 hours to start boiling. The MSB will be dried and seal welded long before this time. Furthermore, as the NRC noted in the NUHOMS safety evaluation report, the criticality concern in boiling is only of academic interest since fresh fuel produces no heat and, thus, cannot boil water and burned fuel has such a low reactivity that boiling is of no significance in borated water systems. Therefore, boiling, or the potential for optimum moderator density, is not a safety concern for our basket. Criticality is assured by the double contingency of

- 1) having only burned fuel loaded in the basket
- 2) having boron at, or above, the levels shown in Figure 11.2-6.

Furthermore, as we have previously shown, our basket is already in an undermoderated state and reducing the water density decreases k (by at least 0.004). Boiling which would remove H_2O , but concentrate the boron, would thus only make k decrease.

We hope this information adequately responds to your criticality comment of December 5, 1990.

Very truly yours,

John V. Massey, Ph.D.
General Manager

JVM:mao

Attachment

cc: K. C. Leu (2 copies), NRC
J. Stokely, SAIC
WEP Files

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PDR PROJ PDR
M-53

NF08

MSB Heat Up Rate (Adiabatic)

Heat = 24 kW

Component	Material	Mass [m] (lbm)	Specific Heat [Cp] (Btu/lbm°F)	m*Cp (Btu/F)
MSB	Water	12313	1.000	12313
	Steel	27062	0.119	3220
	RX-277	328	0.220	72.2
	Zircalloy	7766	0.070	544
	UO2	28770	0.055	1582
MTC	Steel	44794	0.119	5331
	Lead	63457	0.031	1970
	RX-277	10430	0.220	2295
$\Sigma(m \cdot Cp)_i$ (Btu/F)				27327

Heat up

Rate = $Q / \Sigma(m \cdot Cp)_i$ 3.00 F/hr

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95066

FAX TRANSMITTAL SHEET

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6-H-3

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John Roberts

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John V. Massey

COMMENTS:

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