## Sandia National Laboratories

Albuquerque, New Mexico 87185 April 17, 1981

46 PR 35280 (wm-2)



Mr. Seth Coplan High Level Waste Technical Development Branch US Nuclear Regulatory Commission 7915 Eastern Avenue Silver Spring, MD 20910

Dear Seth:

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105.3.3

The table below compares heating rates from by ORIGEN runs with those appearing in Table K.1.13 of the GEIS. I have omitted the 20 and 40 year values since our ORIGEN will accept only 10 decay times per run. The differences are not large enough to be concerned. Remember that ORIGEN, any version, solves an idealized problem and small differences in data and the code will cause variations. I am concerned very little with 10-20% variations between ORIGEN calculations and more concerned with the discrepancies between calculations and experiment with real fuel and real burnup histories. The CINDER code, maintained at Los Alamos, is used as the ANS and ANSI decay heat standards. It explicity treats actinide self-shielding which is very sensitive to the exact burnup history and affects the actinide inventories, the dominant longterm contributors to both decay heat and health effects. I would recommend it if you want to understand the variations in inventory that may be encountered with real spent fuel. Repository designers will have to learn to live with these variations.

Sincerely, whend E Par

Richard E. Pepping Fuel Cycle Risk Analysis Division 4413

REP:ljs

Attachment

## PWR Heating (Watt/MTHM)

Age	GEIS K.1.13	PWR 1100(a)	PWR "Real"(b)
-	0.1000	1 0072	2 11 52
5	2.18E3	1.9863	2.1163
10	1.18E3_,	1.20E3	1.27E3
30	7.7E2(C)	7.44E2	7.80E2
50	5.6E2	5.29E2	5.54E2
100	3.0E2	2.74E2	2.87E2
200	1.6E2	1.46E2	1.52E2
300	1.3E2	1.13E2	1.18E2
400	1.1E2	9.55E1	9.93E1
500	9.5E1	8.32E1	8.64E1
1000	5.5E1	4.94E1	5.10E1

(a) Standard ORIGEN run, 1100 days continuous burnup at 30 MW/MTHM

(b) Burnup to 33000 MWD/MTHM but with intermittant "down" periods

(c)  $_{\rm GEIS}$  had 7.7E3, which surely was an error.

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