

DOCKET NUMBER PR misc notice  
PROPOSED RULE Reg Guide

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January 27, 1981



Office of the Secretary  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Docketing and Service Branch

Gentlemen:

The Commission recently published a Draft Regulatory Guide identified as Division 3, Task FP034-4, setting forth acceptable heat generation rates for spent nuclear fuel in independent spent fuel storage installations. These heat generation rates were stated to have been based on calculations using the recently revised version of the ORIGEN code (ORIGEN-2), with an updated library.

We have used ORIGEN calculations prepared by a number of different organizations employing the basic code, and have found all to be in general agreement with each other in respect to the thermal output of irradiated fuel, both as a function of fuel exposure and as a function of time out of reactor. In no case, have we seen values approaching those shown in Figure 1, for the 33,000 MWD/MTU exposure curve. In fact, the values presented in the Draft Regulatory Guide are approximately double the values we have seen in any other ORIGEN calculations using the same parameter of exposure level.

A limited investigation of the codes we have been using fails to reveal any reason for the precipitous increase in thermal output of spent fuel reflected in the Draft Guide; it seems unlikely that updating the library would result in such an increase. Thermal data from one unpublished source are presented in the attached table; thermal output is given as a function of time out of reactor for PWR assemblies, and the corresponding values based on one metric ton of uranium charged have been added. This calculation was stated to have employed the updated ORIGEN 2 code, and assumed PWR fuel irradiated at 37.5 MW and a total exposure of 33,000 Mwd/MTU. The resulting values are somewhat less than half those in the Draft Guide at 5 years out-of-reactor and slightly more than half the Draft Guide values at times on either side of this. The variation in the spread between these values and those obtained by reading off of the curve of Figure 1 is within the normal variation in ORIGEN runs using slightly different input parameters. The absolute spread between the two sets of values, however, far exceeds any such normal variation.

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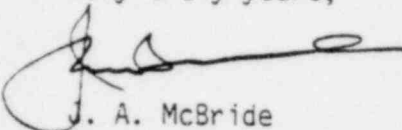
Acknowledged by card... 1/29/81

TYPE II

We wonder if there is an error in the version of the ORIGEN-2 code which NRC has used to develop the curves of Figure 1 or, alternatively, whether an arbitrary safety factor of two may have been applied to the ORIGEN output.

If the latter is the case, we believe it would be appropriate to clearly identify the fact in the Regulatory Guide.

Very truly yours,

A handwritten signature in black ink, appearing to read 'J. A. McBride', with a long horizontal flourish extending to the right.

J. A. McBride

JAM/dom

Attachment

TOTAL WATTS OF THERMAL POWER IN A PWR  
ASSEMBLY AS A FUNCTION OF AGE

Years After Discharge	Activation Products	Heavy Elements	Fission Products	Total/Ass'y	Total/MTU
0	1.378 E+3	3.652 E+4	8.702 E+5	9.081 E+5	1.970E+6
1	6.753 E+1	2.149 E+2	4.527 E+3	4.809 E+3	1.043E+4
2	5.102 E+1	1.091 E+2	2.327 E+3	2.487 E+3	5.395E+3
5	3.323 E+1	8.471 E+1	7.307 E+2	8.486 E+2	1.841E+3
10	1.683 E+1	8.973 E+1	4.188 E+2	5.254 E+2	1.140E+3
30	1.285	9.828 E+1	2.303 E+2	3.299 E+2	7.156E+2
100	7.816 E-2	8.693 E+1	4.258 E-1	1.296 E+2	2.811E+2
300	3.325 E-2	5.777 E+1	3.822 E-1	5.819 E+1	1.262E+2
1,000	2.033 E-2	2.516 E+1	1.001 E-2	2.519 E+1	5.464E+1
3,000	1.949 E-2	1.039 E+1	9.894 E-3	1.042 E+1	2.260E+1
10,000	1.719 E-2	6.234	9.544 E-3	6.261	1.358E+1
30,000	1.275 E-2	2.417	8.624 E-3	2.438	5.289