

50-289

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

FILE NUMBER

TO: Robert W. Reid

FROM:
Metropolitan Edison Co.
Reading, PA
J. G. HerbeinDATE OF DOCUMENT
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DESCRIPTION

RE THEIR 3-4-77 LTR

ENCLOSURE

Results of the current GPUSC analysis of the NRC proposed burnup dependent fission gas release model show that the internal pin pressure of the peak burnup rod (cycle 3) will not exceed system pressure at expected end-of-life exposure.
3p+1p

ACKNOWLEDGED

1491 058

PLANT NAME: Three Mile Island Nuclear Pwr Plt
Unit No. 1
RBT 7/21/77

SAFETY

FOR ACTION/INFORMATION

ENVIRONMENTAL

ASSIGNED AD:	Reid (7)	ASSIGNED AD:	V. MOORE (LTR)
BRANCH CHIEF:		BRANCH CHIEF:	
PROJECT MANAGER:		PROJECT MANAGER:	
LICENSING ASSISTANT:		LICENSING ASSISTANT:	

B. HARLESS

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	RUTBERG		KREGER

EXTERNAL DISTRIBUTION

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NAT LAB	
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16 CYS ACRS SENT CATEGORY B	

11/14C
77220310

7910300

510 P



METROPOLITAN EDISON COMPANY

POST OFFICE BOX 542 READING, PENNSYLVANIA 19603

TELEPHONE 215 - 929-3601

July 15, 1977
GQL 0925

Regulatory Docket File

Director of Nuclear Reactor Regulation
Attn: Mr. R. W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20055

pdh

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Docket No. 50-289
Operating License No. DPR - 50

Our letter to you of March 4, 1977, presented interim results of our independent analysis of the NRC proposed burnup dependent fission gas release model. The analysis was undertaken by GPU Service Corporation (GPUSC), on behalf of Metropolitan Edison Co., in order to evaluate the B&W response to the new model as well as to provide us with a clearer understanding of the potential effects of the new model on fuel performance and future licensing efforts.

The preliminary results, reported in our March 4, 1977 letter, indicated that the peak rod internal pressure would exceed system pressure at approximately 32,000 MWD/MTM, prior to expected end-of-life for the fuel in Cycle 3 of Three Mile Island Nuclear Station, Unit 1. The analysis was performed using an in-house version of the GAPCON-THERMAL-2 fuel performance code which was modified to incorporate both the B&W (TAFY) and the NRC fission gas release models. Pin pressures calculated using the NRC enhancement model showed an increasing difference for burnups above 20,000 MWD/MTM between the TAFY and GAPCON results. These discrepancies were suspected to be due in large part to inaccuracies in certain GAPCON models and also to uncertainties in the input used for the GPUSC analysis.

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Director of Nuclear Reactor Regulation
Attn: Mr. R. W. Reid, Chief

July 15, 1977
GQL 0925

Further investigation, following our March 4, 1977, letter, revealed that GAPCON was generating significantly higher amounts of fission gas than TAFY or other fuel performance codes considered generally reliable. The source of this discrepancy was traced to the algorithm in the program which evaluates the fission gas production. This algorithm, which is unique among the fuel performance programs with which we are familiar, is thought to be in error since its gas production is significantly different from the other programs. GAPCON gas production was therefore adjusted to match that of TAFY. Also, discussions with B&W provided more accurate input information, particularly in regard to the power level and history assumed for the peak rod.

Results of the current GPUSC analysis show that the internal pin pressure of the peak burnup rod for TMI-1, Cycle 3 will not exceed system pressure (2185 psi) at expected end-of-life exposure ($\sim 34,000$ MWD/MTM). This conclusion is in accord with the B&W reported results.

Because there is some question as to the appropriateness of incorporating the models of one code into another without more general modeling adjustments, the GAPCON code was also run for the TMI-1 peak rod using the original GAPCON gas release model with the proposed NRC burnup enhancement. Since the GAPCON gas release already has a slight burnup dependence, the model was adjusted in accordance with NRC recommendations (i.e., the original burnup variable is limited to 20,000 MWD/MTM). Results confirmed that the peak rod internal pressure remains below system pressure at end-of-life and, in fact, gave pressures consistently lower than those reported by B&W.

Comparisons of the pin pressures calculated by the TAFY and GAPCON codes, both with and without the proposed NRC model, indicate that the differences among the results are within the variation limits expected among state-of-the-art fuel performance codes. The largest effect of increased pressures using the NRC enhancement is given by the GAPCON code with the TAFY gas release model. As in the preliminary GPUSC results, this version of GAPCON gave pressures whose differences from corresponding TAFY pressures increased with burnup. GAPCON results using the original GAPCON gas release model showed pressure increases due to the NRC model that were much more consistent with the TAFY values. Predicted pressures at end-of-life for the TMI-1 peak rod with and without the proposed NRC model are shown in Attachment 1. As can be

1491 060

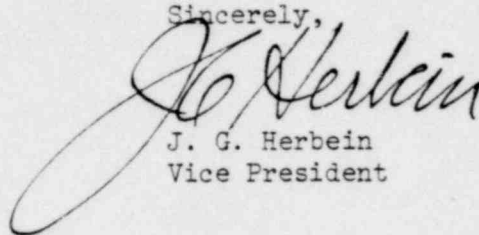
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Attn: Mr. R. W. Reid, Chief

July 15, 1977
GQL 0925

seen all of the results show end-of-life pressures below TMI-1 system pressure and therefore preclude the necessity of discussing the consequences of operation with tensile stresses in the cladding.

Sincerely,

A handwritten signature in cursive script, appearing to read "J. G. Herbein".

J. G. Herbein
Vice President

JGH:JMC:jag

Attachment: Predicted End-Of-Life Pressures

1491 061

Attachment No. 1

PREDICTED END-OF-LIFE* PRESSURES, PSI

	<u>Without NRC Model</u>	<u>With NRC Model</u>
TAFY (B&W Results)	1457	1702
GAPCON w TAFY Release Model	1288	2000
GAPCON w GAPCON Release Model	1135	1452

*EOL maximum expected rod average burnup = ~34,000 MWD/MTM

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