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SUBJECT: Discusses minor rev to DPC TR DPC-NE-1004A, "DPC Nuclear Design Methodology Using CASMO-3/SIMULATE-3P."

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**DUKE POWER**

December 12, 1995

U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Duke Power Topical Report DPC-NE-1004A; Minor Revision

Reference: Duke Power Company, Nuclear Design Methodology Using  
CASMO-3/SIMULATE-3P, DPC-NE-1004A, November 1992

As part of Duke Power Company's continuing effort to improve its reload design methods, the CASMO-3/SIMULATE-3P power distribution uncertainty factors have been re-evaluated using measured data from recent Catawba and McGuire fuel cycles. In addition, the benchmarking included an increase in the number of SIMULATE-3P axial nodes from the 12 axial nodes used in the above Reference to 24 axial nodes. The increased axial nodalization will allow explicit modeling of axial blanket fuel segments.

The results of the new benchmarking analysis are shown below in the Table. The Observed Nuclear Reliability Factors (ONRFs) for the assembly radial, axial, and total peaking are compared with the ONRFs documented in the Reference. This comparison shows that the axial and total peaking uncertainty factors decreased for the new benchmarking and the assembly radial power peaking increased slightly from 1.017 to 1.020. The statistical treatment used in this analysis is identical to that described in the above referenced Topical Report and the calculations are documented in a safety related calculation.

Observed Nuclear Reliability Factors

Type	Original Factors DPC-NE-1004A	24 Level/ Recent Cycles
Radial	1.017	1.020
Axial	1.053	1.031
Total	1.057	1.037

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The more recent cycles include cores that are longer in cycle length, have higher fuel enrichments, and contain more burnable poisons than earlier cores. One cycle also includes fuel with natural  $\text{UO}_2$  axial blankets. The cores used in this benchmarking were McGuire 1 Cycle 9, McGuire 2 Cycle 9, Catawba 2 Cycle 6, Catawba 1 Cycle 7, and Catawba 2 Cycle 7.

Duke Power is planning to use the ONRF values listed in the second column of the above table with 24 axial level SIMULATE-3P models for McGuire and Catawba. This model would first be used on the Catawba 1 Cycle 10 fuel cycle design.

If additional information is needed before this minor change is implemented, please call Scott Gewehr at (704) 382-7581.

Very truly yours,



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