DEC 21 1973

Docket No. 50-424
50-425
50-426
and 50-427

V. A. Moore, Assistant Director for Light Water Reactors Group 2, L

REACTOR SAFETY INPUT TO VOGTLE NUCLEAR PLANT, UNITS 1, 2, 3 AND 4

Plant Name:	Vogtle Nuclear Plant, Units 1, 2, 3 & 4
Licensing Stage:	CP
Docket No.:	50-424, 50-425, 50-426, and 50-427
Responsible Branch and Project Manager:	LWR 2-2 L. P. Crocker
Requested Completion Date:	December 21, 1973
Technical Review Branch Involved:	Core Performance Branch
Description of Review:	SER Input

The attachment contains the evaluation performed by the Core Performance Branch on Section 4.3, "Nuclear Design," of the PSAR submitted by the subject applicant.

Original Signed by
Victor Stello

Victor Stello, Jr., Assistant Director
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Attachment:
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DATE ▶	12/20/73	12/20/73	12/20/73	12/21/73		

4.3 Nuclear Design

The nuclear design of Vogtle Nuclear Plant, Units 1, 2, 3 & 4 (VNP, 1-4) is the same as that used in the Catawba, Units 1 & 2. The VNP, 1-4 units will use 17 x 17 pin fuel assemblies while the earlier units were designed for 15 x 15 fuel assemblies. The information available in RESAR concerning 17 x 17 fuel indicates that the change in fuel design will improve safety by lowering the linear power density (LPD).

The 17 x 17 fuel assembly furnishes more linear feet of fuel in a fixed reactor size. Since the power level has not increased, the peak and average LPD is reduced. For VNP, 1-4, the core average LPD at full power is 5.43 kw/ft, the same as for Catawba. The VNP, 1-4 LOCA analysis indicates that with the design peaking factor of 2.4 and for 102% of full power, the LPD of 13.3 kw/ft would produce a peak clad temperature in a LOCA less than 1900°F compared to 2080°F for Catawba which has ice-condenser containment instead of dry containment as in the VNP, 1-4 units. Thus, the design does not require low peaking factors to be maintained for full power operation and leaves margin for fuel densification penalties should this problem remain at the time of OL application.

The 17 x 17 fuel assembly will be used in a number of reactors now being reviewed for operating licenses. Additional information on the design and nuclear characteristics of this fuel have been received from Westinghouse and is being reviewed. Should any generic safety problems be uncovered in connection with these other reviews, the solutions (such as fall back to 15 x 15) could likewise be applied to the VNP, 1-4 units at its OL stage. We therefore conclude that the nuclear design of the VNP, 1-4 plant is satisfactory.

We have reviewed the nuclear instrumentation which will be provided to measure the core power distribution. The reactor will be provided with two types of monitoring systems: a system of movable incore fission chamber detectors and a system of fixed ion chambers located symmetrically around the core outside of the reactor pressure vessel. The movable incore detectors will be capable of measuring the fuel rod peaking factor to within 5% and will be used to make periodic incore maps of the power distribution. The ion chambers to be located outside the reactor pressure vessel will provide total power as measured by neutron flux, relative power in each quadrant of the core, and the relative power in the top and bottom of the core. The axial power offset, as measured from the relative power in the top and bottom of the core, will be used to maintain the core peaking factor below 2.40.

We conclude that the nuclear instrumentation systems are acceptable for the monitoring of the reactor core power distribution.