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Duke Power Company Charlotte, N. C. 28201 A. C. Thies	7-18-73	7-23-73	X			

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Mr. DeYoung	1 signed			X	X

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DESCRIPTION:

Ltr trans the following:

ENCLOSURES:

Report on Fuel Rod Cladding Study in Oconee II(FSAR Suppl)

ACKNOWLEDGED

(1 cy rec'd)

Do Not Remove

PLANT NAME: Oconee Unit 2

FOR ACTION/INFORMATION 7-24-73 AB

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DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28201

A. C. THIES
SENIOR VICE PRESIDENT
PRODUCTION AND TRANSMISSION

P. O. Box 2178

July 18, 1973

Mr. R. C. DeYoung, Assistant Director
for Pressurized Water Reactors
Directorate of Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

Re: Oconee Nuclear Station
Unit 2
Docket No. 50-270

Dear Mr. DeYoung:

The Babcock & Wilcox Company and Duke Power Company are currently considering a fuel rod irradiation program in Oconee Unit 2 Core 1. This program has been discussed with members of your staff, and based on their concurrence, we are proceeding with modification of two Oconee 2 Batch 2 fuel assemblies. The attachment provides a description of this program and will be added to the Final Safety Analysis Report as a supplement as soon as practical. In addition, the supplement will be referenced in the Final Safety Analysis Report as follows:

(1) On FSAR Page 3-63, add a note at the bottom of the page stating: "A maximum of 48 test fuel rods may be included in two Batch 2 fuel assemblies of Oconee 2; see Supplement 16."

(2) On FSAR Page 3-79 just above Table 3-24, add a note stating: "A maximum of four test orifice rod assemblies may be included in Oconee 2; see Supplement 16."

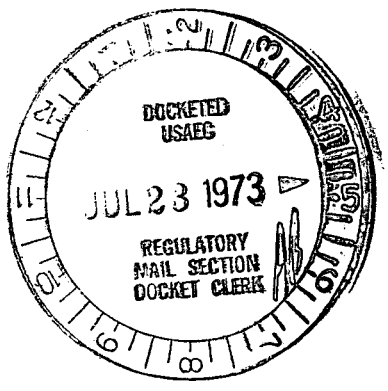
We believe that this program will enable Duke and B&W to gain a better understanding of fuel densification phenomena, pellet cladding, interaction, and Zr-4 cladding creep.

Very truly yours,

A. C. Thies

A. C. Thies

ACT:vr
Attachment



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FUEL ROD AND CLADDING STUDY IN OCONEE II

AEC LICENSE APPLICATION

FSAR SUPPLEMENT

INTRODUCTION

The Babcock & Wilcox Company proposes to irradiate 48 fuel rods and four surveillance orifice rod assemblies (ORA) in Oconee II, core 1. The fuel rods would be loaded into 24 peripheral fuel rod locations in two batch 2 fuel assemblies. The surveillance ORA's would be initially inserted into four batch 3 fuel assemblies (FA). This work is being conducted to (1) provide additional information on the effect of pellet and cladding design variables on pellet-to-cladding mechanical interaction, (2) obtain data relevent to the fuel densification phenomenon, and (3) obtain additional data on Zr-4 cladding creep and irradiation growth rates. All fueled and unfueled rods (orifice rods) will be initially characterized before irradiation. They will then be subjected to nondestructive interim and post-irradiation examination in the Oconee spent fuel storage pool as well as destructive post-irradiation examination at the B&W hot cells in Lynchburg, Virginia.

Description

A. Fueled Rods

I. Twelve of the 24 fueled rods in each identical fuel assembly contain standard Oconee II batch 2 fuel pellets. These pellets are clad with Zr-4 tubing identical to the Oconee II cladding except for mechanical properties. Equal numbers of three different types of tubing are used. The minimum yield strength and ductility (elongation percentage) of these three cladding types are:

	Yield Strength (psi)	Ductility (percent)	Test Temperature (^{o}F)
Type 1	19,000	25	650
Type 2	23,000	14	750*
Type 3	38,000	10	750*
Standard Cladding	45,000	18	650

*These tubes were purchased based on acceptable mechanical property values at 750^{o}F. However, these properties will be determined and evaluated by B&W at 650^{o}F prior to fuel rod fabrication.

II. The other twelve fueled rods in each fuel assembly contain fuel pellets designed and fabricated to minimize pellet shrinkage (thermally stable) and fuel-cladding mechanical interaction. These pellets are manufactured using standard B&W QC and QA procedures. These fuel pellets are 2.66% U-235/U enriched while standard batch 2 fuel is 2.75% U-235/U. The effect of 12 rods of lower enrichment (2.66% w/o U-235/U versus 2.75 w/o) in each of the two FA's on changing the power peaking has been computed to be less than .04%. The fuel diameter, fuel-cladding gap, fuel rod fill gas volume, and internal pressurization are the same as in the standard fuel rods in the core.

The four types of cladding used with these thermally stable pellets are identified as Type 1, 2, and 3 given above as well as the standard Oconee II fuel cladding.

The presence of these 48 fuel rods ($\sim$.1% of the total number of rods in-core) represents a minute total effect on the reactor and its safe operation and will not alter the transient, steady-state, and accident modes of reactor operation.

B. Unfueled Rods - Surveillance Orifice Rod Assemblies

The four surveillance ORA's are identical to each other and each contains 16 pieces of cladding. Twelve of these pieces are prepressurized to produce compressive loads of 1300, 1600, and 1900 lbs. on the cladding circumference at reactor operating conditions. These pressurized rods contain solid Zr-4 internal supports to prevent cladding collapse; a cladding diametral creep to 0.030 inch is permitted. After the first fuel cycle at least one of the four surveillance ORA's would be moved from the core and at least one of the remaining three in-core assemblies would be moved into a higher flux region. At least one ORA will remain in-core through three complete fuel cycles.

The presence of the four surveillance orifice rod assemblies will not alter the core nuclear, thermal, and hydraulic characteristics and they pose no safety threat during transient, steady-state or accident conditions.