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PWR-2 Reading
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POOR ORIGINAL

D. F. Ross, Chief, Core Performance Branch, L

CLAD COLLAPSE TIME CALCULATIONS FOR OCONEE 1

B&W told us in Lynchburg that for Oconee 1 fuel, they calculate
a time to collapse of 26850 hrs using their CRECOL code. We
calculated 19200 hrs with BUCKLE using the same assumptions.
Both values are based on an increase of internal pressure due
to gas release during that period. Using a constant BOL
pressure of 775 psi throughout the operation, we calculate
15000 hrs, which probably will reduce to about 14500 hrs
if we use as wall thickness = average - 2 .

At present, we are looking at Oconee 1 first cycle only (about
7500 hrs). I think we can conclude that no collapse will
occur. However, the next B&W cores we have to look at (Oconee 2,
TMI-1) have a first cycle of 460 days (11000 hrs), which the
applicants would present at about 15000 hrs to allow for
uncertainties. B&W is considering this operating time, also,
for Oconee 1; not necessarily as a first cycle, but as a
method to get it reviewed by us now and avoid delays for
upcoming reviews. The approach seems reasonable. However,
15000 hrs is about what we calculate with BUCKLE. That cal-
culation is based on the conservative assumption of no pressure
increase, and we could conclude that no collapse will occur
during 12000 hrs of operation for Oconee 1 cladding and for
other plants with similar cladding.

This conclusion, however, would solely be based on our BUCKLE
calculation since Sang finds the B&W CRECOL code at present
not acceptable. He, also, has reservations on the use of
BUCKLE exclusively, particularly for predicted collapse times
greater than about 12000 hrs. He feels that if we conclude
no collapse for 12000 hrs, B&W will not exert a major effort
in revising CRECOL or developing a new code.

I propose (1) that we find the first cycle of Oconee 1 with
7500 hrs acceptable, (2) that we find the cladding of the
Oconee 1 type acceptable for a maximum of 12000 hrs, and
(3) that we request B&W to revise CRECOL or develop a new code
that is acceptable to us. For the last item, we should
initiate action to get B&W moving.

Attached is a comparison of collapse times calculated for
various conditions.

OFFICE ▶	PWR-2		15/		None
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SURNAME ▶			PWR Project Branch No. 2		
	3/ /73		Directorate of Licensing		
DATE ▶					

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CODE	t (wall)	T (clad)	P (internal)	t (collapse)
CRECOL	.0265	657°F	775 BOL[1]	26850 hrs
BUCKLE	.0265	657°F	775 BOL[1]	19200 hrs
BUCKLE	.0265	657°F	775 Const	15000 hrs
BUCKLE	.02612[2]	657°F	775 Const	14500 hrs
BUCKLE	.024[3]	657°F	775 Const	9300 hrs

(1) increased P internal over core life due to gas release

(2) .02612 = .0265 - 2σ.00019
    .0265 = mean wall thickness
    .00019 = standard deviation,

(3) .024 = minimum wall, specified