



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

DEC 13 1976

MEMORANDUM FOR: J. Knight, Assistant Director for Engineering, Division
of Systems Safety

FROM: D. Eisenhut, Assistant Director for Operational Tech-
nology, Division of Operating Reactors

SUBJECT: CRYSTAL RIVER UNIT NO. 3, DOCKET NO. 50-302 - EVALUATION
OF VITON-A SEAL MATERIAL FOR REACTOR COOLANT PUMP SNUBBERS

The Engineering Branch, Operational Technology, Division of Operating Reactors has reviewed Florida Power Corporation's request for approval of Viton-A seal material for the reactor coolant pump snubbers at the Crystal River Unit No. 3 Nuclear Power Plant. We recommend that Viton-A be approved for use, and the Crystal River Unit No. 3 Technical Specification 4.7.9.1(b) be amended to exclude the reactor coolant pump snubbers. Our evaluation is attached.

A handwritten signature in cursive script, appearing to read "D. G. Eisenhut".

D. G. Eisenhut, Assistant Director
for Operational Technology
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Enclosure:
As stated

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CRYSTAL RIVER UNIT NO. 3 NUCLEAR POWER PLANT

DOCKET NUMBER 50-302

EVALUATION OF VITON-A SEAL MATERIAL FOR
REACTOR COOLANT PUMP SNUBBERS

Background

The Crystal River Unit No. 3 Technical Specification 4.7.9.1(b) specifies ethylene propylene as a seal material for hydraulic snubbers. Snubber seal material not fabricated from ethylene propylene requires a visual inspection at least once per 31 days unless approved as such by the NRC. The reactor coolant pump snubbers at Crystal River Unit No. 3 contain seals made of Viton-A material. The Florida Power Corporation has requested NRC's approval to use this material until the snubber seals can be replaced with ethylene propylene.

The operating environment in the area of the snubber installation is 150°F to 170°F at a radiation level of approximately 2.63×10^5 rads per year. The hydraulic fluid in the reactor coolant pump snubbers is Versilube F-50 Silicone lubricant.

Evaluation

The fluorocarbon elastomer, Viton-A, material is stable at temperatures in the range of -20°F to +400°F. The gamma radiation stability of Viton-A is relatively good up to approximately 4.5×10^6 rads at 212°F. At 10^7 rads, Viton-A has a 66.7% deterioration in compression set, a 32% loss in elongation, and a 1% increase in hardness. These property changes relate to ambient temperature tests after radiation exposure at 96°F to 112°F in an inert atmosphere. However, Viton-A does not degrade as rapidly when immersed in silicone fluids.

Conclusion

We consider the Viton-A seal material is acceptable for use in the operating environment of the reactor coolant pump snubbers at Crystal River Unit No. 3. The material should maintain its integrity during the first 10 years of

service life. Viton-A may have a useful service life for 20 years in the operating environment of the reactor coolant pump snubbers at Crystal River Unit No. 3. We believe there is no significant safety hazard with the Viton-A seal material application in the reactor coolant pump snubbers at Crystal River Unit No. 3. Technical Specification 4.7.9.1(b) could be amended to exclude the reactor coolant pump snubbers.