



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOR JOSEPH M. FARLEY UNIT 2

BORON MIXING AND NATURAL CIRCULATION COOLDOWN TESTS  
FOR LICENSE CONDITIONS 2.C.(9)(b) AND 2.C.(12)(c)

Introduction

By letter dated July 8, 1982, supplemented on October 21, 1982, Alabama Power Company (APCo) notified us that boron mixing and natural circulation cooldown test results at other plants are applicable to the Farley Nuclear Plant, Unit 2. On this basis, APCo contends that this action obviates the license requirement to run a natural circulation cooldown test with boron mixing on Farley 2.

Discussion and Evaluation

NUREG-0737 Item I.G.1 Training During Low Power Testing has been addressed in our Safety Evaluation Report (SER) Supplement No. 5, March 1981, section 22.3. This SER was issued when Farley Unit 2 was licensed. Briefly, the SER supplement described the operator training accomplished during a special low-power test program. The program included a set of nine tests on Farley Unit 2. The first seven tests were completed during initial plant startup. The eighth test was accomplished during simulator training of Farley Unit 2 operators. Thus, our last test consideration relates to test number nine, a test of natural circulation cooldown with boron mixing.

By letter dated July 8, 1982, APCo refers to tests conducted at North Anna (a three-loop design similar to Farley Unit 2) and at Salem and Sequoya (four-loop designs) which demonstrate the capability to mix boric acid and to cooldown the plant under natural circulation conditions. These test results have been previously provided to and reviewed by the NRC staff. APCo also notes the following relative to the adequacy of the tests done at other plants:

1. North Anna and Farley plants exhibit effectively identical natural circulation behavior.
2. All 3- and 4-loop plants exhibit very similar behavior on natural circulation.
3. The tests verify that natural circulation cooldown and boron mixing can be established at very low power levels (and flow).

4. Test results at all plants reveal the capability to cooldown with approximately a 50°F per hour cooldown on natural circulation. Westinghouse emergency procedures require 25°F per hour; therefore, test data is conservative.
5. Pressurizer boration during natural circulation is adequate when using the auxiliary pressurizer sprays.
6. No core temperature distribution anomalies were induced by the addition of boric acid while on natural circulation.
7. An approved Emergency Operating Procedure, "EOP-7, Loss of All AC Power" includes a procedure for the natural circulation cooldown with boron mixing. The operating training and qualification program at Farley Plant includes this procedure. By letter dated October 21, 1982 APCo confirmed that EOP-7 has been satisfactorily reevaluated against the "lessons learned" from the other plants which have performed the test. No changes were needed for EOP-7.

#### Conclusion

Based on our review of the information provided by APCo as discussed above and the evaluation in our SER Supplement No. 5, we agree with APCo that the test results at other similar plants have demonstrated direct applicability to Farley Unit 2. On this basis, we conclude that full compliance with License Conditions 2.C.(9)(b) and 2.C.(12)(c) has been demonstrated. These conditions will be deleted from the license on a routine basis at a later date.

Date: November 10, 1982

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