



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 150 TO FACILITY OPERATING LICENSE NO. DPR-72

FLORIDA POWER CORPORATION, ET AL.

CRYSTAL RIVER UNIT NO. 3 NUCLEAR GENERATING PLANT

DOCKET NO. 50-302

1.0 INTRODUCTION

By letter dated May 19, 1994, Florida Power Corporation (FPC or the licensee) submitted a request for changes to the Technical Specifications (TS) for the Crystal River Unit 3 (the facility) relating to nuclear instrumentation surveillance requirements. The proposed changes would revise the neutron power level limits in the TS 3.3.9.3 and 3.3.10.3, i.e., 10^5 neutron counts per second (cps) and $1E-6$ amperes (amps) indications on the source and intermediate range instruments, respectively, for verifying overlap between them. The licensee proposed these changes on the basis that verifying one decade overlap prior to the specified neutron power limits effectively results in two decades of overlap and would challenge the functional capabilities of these neutron monitors. Additionally, the licensee stated that its previous operating history indicates that these surveillances are not achievable given the present system design and TS requirements. Associated TS Bases would also be revised to reflect the proposed neutron power limits changes.

2.0 EVALUATION

Excore neutron monitors are located in wells external to the reactor vessel and are designed to sense leakage neutron levels from the source strength to a level greater than the neutron flux corresponding to 100% power. To accurately cover this expansive range, the excore system is divided into three ranges: the source, intermediate and power ranges. The source range channels cover the shutdown and subpower neutron levels. The intermediate range channels provide coverage of the subpower operating levels as well as the entire power range. The power range channels cover the range when the reactor is critical and supplying heat to the reactor coolant system. The source and intermediate range channels provide control room indication for operator action. The power range channels provide an automatic reactor trip at 105% rated thermal power (RTP). During plant heatup when a "shutdown bypass reactor coolant system high-pressure trip" is active, the power range channel high flux trip setpoint is administratively reduced to 5% RTP. To prevent a loss of indication when one range is operating at the high end of its scale, and the next range is operating at the low end of its scale, these three ranges of neutron indication are overlapped by at least one decade.

Current TS 3.3.9.3 requires verification of overlap between the source and intermediate range neutron flux channels at a frequency of "Once each reactor

startup prior to source range counts exceeding 10^5 cps" Similarly, TS 3.3.10.3 requires verification of overlap between the intermediate and power range neutron flux channels at a frequency of "Once each reactor startup prior to intermediate range indication exceeding $1E-6$ amp" These limits are based on engineering judgment and operating history, and are not related to the design basis accident or safety analysis. The licensee proposed to revise the neutron power limits to 10^6 cps and $1E-5$ amps, for verifying overlap between the source and intermediate, and intermediate and power ranges, respectively.

A surveillance requirement for verifying at least one decade overlap between the nuclear instrumentation channels has existed since the initial operating license (OL) was issued. Specific neutron count rate and neutron power limits by which this decade of overlap must be verified were added to the facility TS when the Improved TS (ITS) were implemented by Amendment 149. This requirement is consistent with NUREG 1430, "Standard Technical Specifications (STS) for B&W Reactors."

These TS surveillances specify limits for verifying not only commencement of overlap between the nuclear range instruments but also verifying that the magnitude of the overlap between them is at least one decade. The licensee stated that the present TS neutron power limits effectively mandate two decades of overlap between the source and intermediate range neutron flux instrumentation. Licensee review of past reactor startup data indicates that there is very little margin in the plant hardware capability to accomplish this surveillance requirement.

The licensee proposed to revise the neutron power limits from 10^5 cps to 10^6 cps, and from $1E-6$ amps to $1E-5$ amps for source and intermediate range monitors, respectively. The proposed 10^6 cps on source range corresponds to $1E-9$ amps on the intermediate range. The licensee stated that, based on its operation record, the proposed $1E-5$ amps in the intermediate range corresponds to 15% RTP on the power range channels. Specifying a value of 10^6 cps will continue to ensure that the intermediate range indication is on-scale at least one decade prior to the source range instruments going off-scale high and de-energized. When the power range instrumentation comes on scale, the intermediate instrumentation is not de-energized but continues to remain on scale overlapping the entire scale of power range channels. This ensures that the power range is responding as expected. Therefore, during the entire region of reactor operation, neutron level indication would continue to be available with at least one decade overlap between the three ranges of neutron monitors.

In addition to the source and intermediate range instrumentation channels, the facility design includes redundant fission chamber nuclear instruments providing wide-range neutron flux indication from 10% to 125% reactor power. These instruments, which are Regulatory Guide 1.97-qualified instruments, provide a functionally equivalent level of indication to the source and intermediate range, and thus, ensure a continuity of nuclear instrumentation for neutron flux level indication. Surveillance requirements included within TS 3.3.1 "RPS Instrumentation" provide additional assurance of the proper function of the power range nuclear instrumentation.

Based on the above discussion, the staff finds the licensee proposed TS changes acceptable.

3.0 STATEMENT OF EMERGENCY CIRCUMSTANCES

The licensee, in its May 19, 1994 application, requested that the proposed TS change be approved on an emergency basis. The licensee stated that a failure to satisfy the current TS surveillance requirement would prevent the facility from "resumption of operation or of increase in power output up" to its licensed level. The licensee also stated that the complexity of implementation of the "Improved Technical Specifications," the short period of operational experience with the document, and associated human factors considerations were the causes for not discovering the limiting nature of the neutron instrumentation overlap surveillance requirements in time to allow a normal license amendment. We concur with the licensee's reasons for the emergency request.

4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility, in accordance with the amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

Surveillance requirements in the current TS 3.3.9.3 and TS 3.3.10.3 require verification of overlap between source and intermediate range, and between intermediate and power range neutron flux channels. The upper limits, prior to source range counts exceeding 10^5 cps and intermediate range indication exceeding $1E-6$ amp, by which the nuclear instrumentation indication overlap must be verified, are not assumed in any design basis accident (DBA). These limits are administrative in nature and are provided to prevent abuse of the provisions of TS for performing surveillances. Revising these limits to 10^6 cps and intermediate range indication exceeding $1E-5$ amp have no bearing on the safety analysis. Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed changes are administrative in nature and do not involve a change in the configuration or operation of the plant. The proposed changes only address the point in plant operation where a particular visual verification is to be performed. During the entire region of reactor operation, neutron level indication would continue to be available with at least one decade overlap between the three ranges of neutron monitors. The specifics of the required verification remain

unchanged with this request. Therefore, the proposed changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Involve a significant reduction to the margin of safety.

The TS will continue to require at least one decade of overlap to exist between the source/intermediate range and the intermediate/power range nuclear instrumentation. The proposed change only affects when the required verification must be performed. The CR-3 design also includes redundant fission chamber nuclear instruments providing indication from 10^{-8} to 125% reactor power. These Regulatory Guide 1.97-qualified instruments are indicated on the main control board and would provide a functionally equivalent level of indication to the source and intermediate range. Thus, these instruments provide additional indication further ensuring a continuity of nuclear instrumentation neutron flux level indication. Also, surveillance requirements included within LCO 3.3.1 "RPS Instrumentation" provide additional assurance of the proper function of the power range nuclear instrumentation. Therefore, the proposed changes do not involve a significant reduction to the margin of safety.

5.0 STATE CONSULTATION

Based upon the written notice of the proposed amendments, the Florida State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards consideration finding with respect to this amendment. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

7.0 CONCLUSION

Based on the staff evaluation in Section 2.0 above, the staff concludes that the proposed Technical Specifications changes are acceptable.

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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AMENDMENT NO. 150 TO FACILITY OPERATING LICENSE NO. DPR-72
CRYSTAL RIVER UNIT 3

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