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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 155

TO FACILITY OPERATING LICENSE NO. DPR-65

NORTHEAST NUCLEAR ENERGY COMPANY
THE CONNECTICUT LIGHT AND POWER COMPANY
THE WESTERN MASSACHUSETTS ELECTRIC COMPANY

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

1.0 INTRODUCTION

By letter dated June 14, 1991 (Ref. 1), Northeast Nuclear Energy Company (NNECO/licensee) submitted proposed Technical Specification (TS) changes to Facility Operating License No. DPR-65 for the Millstone Nuclear Power Station, Unit No. 2 (Millstone-2). The proposed changes would modify the requirement for including an explicit azimuthal power tilt correction to the total unrodded integrated radial peaking factor (F_r^T). This would cover either full-core or octant-symmetric based incore detector monitoring system measured power distribution analyses.

Specifically, the changes would affect the following TS definition, Limiting Condition for Operation (LCO), Surveillance Requirement (SR) and BASES sections:

Definition 1.29	Unrodded Integrated Radial Peaking Factor-F_r
TS 3/4.2.3	Power Distribution Limits, Total Integrated Radial Peaking Factor - F_r^T
TS 3/4.2.4	Power Distribution Limits, Azimuthal Power Tilt-T_q
TS 3/4.3.3	Instrumentation, Incore Detectors
B 3/4.2	Power Distribution Limits, Bases

2.0 EVALUATION

The current INCA method (Ref. 2) used to analyze in-core detector data and to infer the measured core power distribution, the radial peaking factors and the linear heat generation rate was provided by Combustion Engineering (CE), the original fuel vendor. INCA assumes octant symmetric loading and operation of the reactor core. This assumption allows the reflection of all in-core

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instruments into one core octant, with symmetric detector readings being averaged to a single value. This representative octant must then be corrected for the azimuthal power tilt by using a calculated factor to explicitly account for the peak pin power in the full core. Millstone-2 TS 1.18 defines the azimuthal power tilt (T_Q) as the maximum difference between the power generated in any core quadrant (upper or lower) and the average power of all quadrants in that half (upper or lower) of the core divided by the average power of all quadrants in that half (upper or lower) of the core. Since the basic INCA method determines the detailed power distribution for only one core octant, an estimate of the individual quadrant powers must be constructed. INCA performs this by first determining the ratio of measured-to-predicted detector powers (for each operable detector) and then fitting these ratios to an multi-term trigonometric fit as a function of core radius and azimuthal angle at each of the axial detector levels. This radial curve fit is then used to construct an estimate of the measured power distribution for each location in the full core. From this estimated full-core power distribution, quadrant power integrals and then the quadrant power tilt ratios are calculated.

The planned replacement of INCA with the INPAX in-core detector monitoring system (Ref. 3) will allow the measured power distribution to be directly determined on a full-core basis, thus including any measured azimuthal power tilt. The current Power Distribution Limits TSs contained in the LCO, SR and BASES sections state or assume that F_r^T includes the measured tilt, T_Q. This definition will be retained. The proposed revisions will only serve to modify the TS to clarify the requirement that any calculated F_r^T value must include the effect of the azimuthal power tilt. Since the proposed TS changes do not change any limits and simply support the future use of full-core methods that can more accurately monitor actual power asymmetries, they are acceptable to the staff. These changes are similar to that provided for other CE plants (e.g. St. Lucie-1) which have phased in improved full-core analysis codes.

Based on the above, the staff concludes that the proposed revision to the azimuthal power tilt correction requirement is acceptable, thus allowing the use of either full-core or octant-symmetric based incore detector monitoring systems. Note that neither the TS change request nor this safety evaluation address the uncertainty analysis required to qualify a specific incore system for application to Millstone Unit 2.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Connecticut State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to 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 previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (56 FR 31440). Accordingly, the 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 the amendment.

5.0 CONCLUSION

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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 REFERENCES

1. Letter from E.J. Mroczka (NNECO) to USNRC, "Proposed change to Technical Specifications - Total Unrodded Integrated Radial Peaking Factor," dated June 14, 1991.

2. T.G. Ober, W.B. Terney, G.H. Marks, "INCA Method of Analyzing In-Core Detector Data in Power Reactors," CENPD-145-P, April 1975.

3. G.R. Correll, "INPAX-II: A Reactor Power Distribution Monitoring Code," XN-NF-83-09, 1983.

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