THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

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Al Kaplan

VICE PRESIDENT
NUCLEAR GROUP

December 14, 1989
PY-CEI/NRR-1074 L

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
Technical Specification
Change Request on Turbine
Control Valve Test Frequency

Gentlemen:

The Cleveland Electric Illuminating Company (CEI) requests amendment of Facility Operating License NPF-58 for the Perry Nuclear Power Plant, Unit 1. In accordance with the requirements of 10 CFR 50.91(b)(1), copy of this request for amendment has been sent to the State of Ohio as indicated below.

This amendment changes Technical Specification 4.3.8.2, turbine control valve test frequency, from weekly to monthly in order to minimize plant power changes. The probability of turbine missile generation remains the same as that accepted in the NRC Safety Evaluation of our turbine maintenance program (Colburn to Kaplan, August 23, 1989) since that analysis conservatively assumed monthly control valve testing.

Attachment 1 provides a Summary, Safety Analysis, Significant Hazards Analysis and Environmental Impact. Also attached is a copy of the proposed changes to the Technical Specification.

Should you have any questions, please feel free to call.

Very truly yours,

Al Kaplan
Vice President
Nuclear Group

Attachments

AK:njc

cc: P. Hiland
T. Colburn
J. Harris (State of Ohio)
USNRC Region III

A001
1/1

TECHNICAL SPECIFICATION CHANGE FOR INCREASE IN PNPP TURBINE CONTROL VALVE TEST INTERVAL

Summary

The proposed amendment increases turbine control valve test interval from weekly to monthly. Considering in-service experience with nuclear turbine steam valves, the turbine vendor has determined that this increase does not materially affect turbine protection system reliability.

The recently submitted inspection schedule (submitted by PY-CEI/NRR-0977 L, dated March 20, 1989) of six years for the low pressure turbine wheels was based on calculations of turbine missile generation probability. These calculations conservatively assumed monthly control valve testing, therefore, the turbine missile probability remains unchanged, at a risk level in compliance with NRC acceptance criteria. This change will (1) minimize reactor power reductions to accommodate turbine valve cycling, with the attendant safety advantages to reduced perturbations from steady state design conditions, and (2) will reduce the number of half scrams which are taken when control valves are tested, with attendant safety advantages to potential scram frequency reduction.

Safety Analysis

The subject change request is based on the probability of turbine missile generation, which the NRC limited to 1E-5 per turbine operating year in the PNPP Safety Evaluation Report Supplement 3 (SSER 3) Section 3.5.1.3. Just prior to the time of issuance of SSER 3, the NRC's emphasis on turbine missile protection shifted from an assessment of missile consequences to prevention of missile generation.

Accordingly, the NRC has set guidelines for turbine missile generation probabilities which in turn determine (1) frequencies of turbine disk inservice inspections and (2) maintenance and testing schedules for turbine control and overspeed protection systems. This shift in emphasis helped improve turbine generator system reliability by focusing on review and evaluation of the probability of missile-generating turbine failure and, in the process, provides a logically consistent method for establishing inservice inspection and testing schedules.

From the turbine vendor's (General Electric) perspective, the emphasis is now on rotor crack propagation as the dominant contributor to missile generation. Inservice inspection concentrates on detecting defects in the rotor which are most likely to lead to wheel burst; TIL 1008-3 (6/15/87) provides detailed guidance on inspection method/locations/frequency in this regard.

GE also provided extensive guidance on rotor inspection when they described their analysis of turbine missile probability in "Probability of Missile Generation in General Electric Nuclear Turbines," January 1984. It is concluded in this report that "in the unlikely event that a missile is generated, the source of this missile is most likely to be an intermediate wheel of the low-pressure turbine," and failure is most likely to be at normal running speed - not at an overspeed condition potentially attributable to control valve malfunctions.

TIL 969 (5/22/84) further concludes that the overall probability of turbine missiles is increased "only a negligible amount" by increasing control valve test interval to monthly. Contributions to overall turbine missile probability include (1) design, fabrication, inspection, and testing of turbine components, (2) other mechanical and electrical overspeed protection design features, (3) extraction steam non-return stop valves and low pressure turbine intercept valves which minimize additional rotor torque after generator trip, and (4) periodic volumetric examinations of rotating components for defects that, continuing in service undetected, could lead to a wheel burst.

The General Electric Company methodology for calculating turbine missile generation probability is described in a proprietary report entitled "Probability of Missile Generation in General Electric Nuclear Turbines" by the General Electric Company Large Steam Turbine-Generator Department. This report has previously been reviewed and approved by the NRC for referencing as an acceptable method for use in establishing maintenance and inspection schedules for specific turbine systems. Using this methodology, PNPP calculations for all three stages of the PNPP low pressure turbine showed that the probability of external missile generation is 6.2 E-6 per year after six years of actual turbine operations (PY-CEI/NRR-0977L, March 20, 1989), which satisfies the SER criterion of 1E-5 per year. GE assumed a monthly turbine control valve test frequency in this calculation. Therefore, the value of 6.2 E-6 per year is applicable to this change request, and the probability continues to be within the acceptance criterion.

The proposed reduction in control valve test frequency improves operational safety for two reasons, reduced perturbations to reactor operating conditions and reduced scram signals. During PNPP startup tests, stop valve testing at 93% of rated power was performed to determine the maximum power level at which the plant could be operated during single stop valve stroke testing without producing a reactor scram. Test results indicated that reactor thermal power level could approach or remain at 100% for this test; a survey of other plants indicates a power capability in the 95%-100% range for stop valve testing. We presently reduce power to $\leq$ 90% on a weekly basis because of the more limiting control valve cycling. Limiting the power reduction to less than half that now required would reduce perturbations to reactor operating conditions, including feedwater flow, reactor pressure and neutron flux, as well as allowing the plant to continue running at, or closer to, its nominal design conditions. In addition, the present weekly control valve test results in a 1/2 scram signal when the control valves are cycled. Reducing the frequency of control valve tests to monthly would reduce the potential for plant scram from this source.

Significant Hazards Analysis

The standards used to arrive at a determination that a request for amendment requires no significant hazards consideration are included in the Commission's Regulations, 10 CFR 50.92, which state that the operation of the facility in accordance with the proposed amendment would not (1) 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, or (3) involve a significant reduction in a margin of safety. CEI has reviewed the proposed change with respect to these three factors.

The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated. Using the methodology described in their January 1984 report, the value GE calculated for PNPP turbine missile probability remains unchanged at a value previously accepted by the NRC in the Colburn to Kaplan letter of August 23, 1989.

The proposed change does not create the possibility of a new or different kind of accident. Previous evaluations have addressed potential control valve failure modes and their effects; the vendor has recommended the proposed increase in test interval in part to reduce plant transients resulting from the reactor power/turbine load reductions necessary to conduct this test.

The proposed change does not involve a significant reduction in the margin of safety. As noted above, the NRC acceptance criterion of 1E-5 turbine missile probability is still satisfied, with no change in the calculated value previously reported for Perry or its associated margin.

Therefore, CEI has concluded that this proposed amendment involves no significant hazards considerations.

Environmental Impact

The Cleveland Electric Illuminating Company has reviewed the proposed Technical Specification change against the criteria of 10 CFR 51.22 for environmental considerations. As shown above, the proposed change does not involve a significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, CEI concludes that the proposed Technical Specification change meets the criteria given in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.

NJC/CODED/2698