Portland General Electric Company

Bart D. Withers Vice President

July 7, 1982

Trojan Nuclear Plant
Docket 50-344
License NPF-1

Director of Nuclear Reactor Regulation
ATTN: Mr. Robert A. Clark, Chief
Operating Reactors Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Clark:

$F_{\Delta H}$ Analysis for LCA 87

Pursuant to a request by M. Chatterton of the NRC staff, the attached "Analysis For a Revised $F_{\Delta H}$ Limit At Less Than Rated Thermal Power" is being submitted in support of LCA 87 dated May 10, 1982 for the Trojan Nuclear Plant. This submittal also includes the Trojan specific drawing that was requested during the telephone conversation between PGE, Westinghouse, and the NRC on June 29, 1982.

Sincerely,

B. D. Withers
Vice President
Nuclear

Attachment

c: Mr. Lynn Frank, Director
State of Oregon
Department of Energy

A001

ANALYSIS FOR A REVISED $F_{\Delta H}$ LIMIT AT LESS THAN RATED THERMAL POWER

Historically, increasing the allowable $F^N_{\Delta H}$ with decreasing power has been permitted for all previously approved Westinghouse designs. The increase is permitted by the DNB protection setpoints and allows for radial power distribution changes with rod insertion to the insertion limit.

The results of the Trojan $F^N_{\Delta H}$ Tech Spec limit analysis indicate that the limit may be modified by changing the limit slope from 0.2 and 0.3 at reduced power, resulting in the following relationship:

$$F^N_{\Delta H} \leq 1.49\ [1.0 + .3\ (1\text{-}P)]$$

where P = fraction of rated thermal power. Note that the only change from the current $F^N_{\Delta H}$ Tech Spec is the multiplier on the quantity (1-P) from 0.2 to 0.3. No change is made in the $F^N_{\Delta H}$ limit at full power.

This change is recommended for Trojan to allow optimization of the core loading pattern by minimizing restrictions on the $F^N_{\Delta H}$ at low power. This change will also minimize the pr bability of making rod insertion limit changes to satisfy peaking factor criteria at low power with the control rod banks at the insertion limit.

Trojan core limits and axial offset limits for an increased allowable $F^N_{\Delta H}$ at reduced power levels were determined. The core limits at 1775, 2000, and 2250 psia remain unchanged from the current limits. At 2400 psia the proposed core limits are slightly more limiting below 100 percent power. The core limits have these minimal changes because at most conditions

below full power, the restriction that the average enthalpy at the vessel exit is less than the enthalpy of saturated liquid is more limiting than DNB considerations. This vessel exit enthalpy limit is not core peaking factor dependent.

No change to the K_1, K_2, K_3, K_4, K_5 or K_6 factors is required in Section 2.2 of the Technical Specifications, as a result of the new core and axial offset limits. Therefore, no changes to the overpower and overtemperature ΔT setpoints are necessary and hence no accident reanalysis is required. Also, the current $f(\Delta I)$ function bounds the new axial offset limits, and therefore no change to $f(\Delta I)$ function in Section 3/4.2 of the Technical Specification is required. The slope of the increased allowance in $F_{xy}(z)$ at reduced power is also changed to 0.3 to simplify the Technical Specifications.

These modifications were made in WCAP-9500 and approved by the NRC with the additional technical supporting information supplied by NS-TMA-2323, (letter from Anderson to Miller, dated October 24, 1980). The attached figure showing $F_{\Delta H}$ versus Power is similar to the one in WCAP-9500, but is Trojan specific. The current and proposed $F_{\Delta H}$ Technical Specification limits have been included in this figure to show the additional margin that the proposed change will provide.

LSP/4jr2A8

TROJAN (POR) CYCLE 5
CONSERVATIVE CALCULATION OF ENTHALPY RISE
FACTOR WITH POWER LEVEL AND TECHNICAL
SPECIFICATIONS LIMITS