



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 151 TO FACILITY OPERATING LICENSE NO. NPF-21
WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2
DOCKET NO. 50-397

1.0 INTRODUCTION

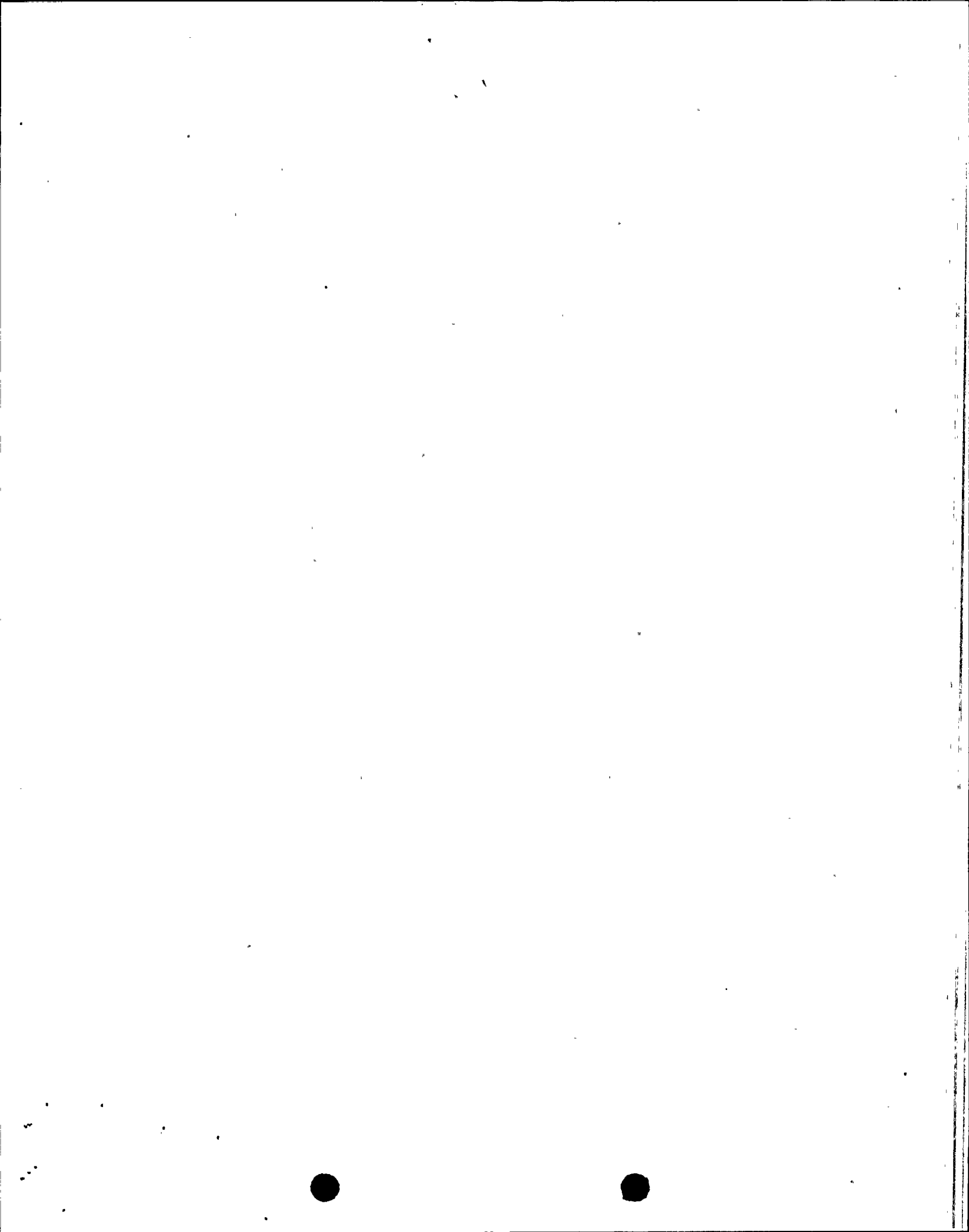
By letter dated May 20, 1997 (Reference 1), as supplemented by letter dated June 6, 1997 (Reference 2), and letter dated July 3, 1997, Washington Public Power Supply System (WPPSS, the licensee) proposed changes to the Technical Specifications (TS) for the Washington Nuclear Project, Unit 2 (WNP-2) Cycle 13 operation. The proposed TS changes revise the minimum critical power ratio (MCPR) safety limits for Siemens Power Corporation (SPC) ATRIUM-9x9 fuel which is coresident with Asea Brown Boveri (ABB) SVEA-96 fuel. The WNP-2 Cycle 13 core has 764 fuel assemblies which consist of 112 unirradiated SVEA-96, 104 irradiated SVEA-96, and 548 irradiated ATRIUM-9x9. NRC staff review of the proposed amendment was performed in conjunction with NRC inspection 50-397/97-11 of the WNP-2 plant conducted during June 2-6, 1997. This review also includes the input of our inspection consultants (PNL and ORNL) based on their evaluation of the WNP-2 responses (References 3, 4 and 5) to TS change related issues identified during the inspection. Reference 2 stated that the proposed changes would apply to Cycle 13 operation only and also withdrew the addition of a reference to Section 5.6.5 of the TS that had been proposed in Reference 1. Reference 2 does not change the scope of the staff's original no significant hazards consideration determination published in the Federal Register on May 29, 1997 (62 FR 29160). References 3, 4, and 5 provided additional information as a result of the NRC inspection and also did not change the scope of the staff's original no significant hazards consideration determination. The letter dated July 3, 1997, formalizes a commitment contained in Reference 4, for inclusion in Appendix C of Facility Operating License NPF-21 and is within the scope of the Commission's original no significant hazards consideration determination.

2.0 EVALUATION

The licensee requested a change to the WNP-2 Cycle 13 Technical Specifications in accordance with 10 CFR 50.59, 50.90, and 2.101. The proposed revision of Technical Specification 2.1.1.2 and its associated Bases is described below.

The safety limit MCPR (SLMCPR) in TS 2.1.1.2 is proposed as follows: for ATRIUM-9X fuel the MCPR changes from 1.07 to 1.13 for two recirculation loop operation and from 1.08 to 1.14 for single recirculation loop operation; for all other fuel, the MCPR shall be ≥ 1.07 for two recirculation loop operation

9707160069 970703
PDR ADOCK 05000397
P PDR



or ≥ 1.08 for single recirculation loop operation; and the MCPR limits for the ATRIUM-9X fuel are applicable to Cycle 13 only when the reactor steam dome pressure is ≥ 785 psig and core flow ≥ 10 percent rated core flow. The Bases 2.1.1.2 is proposed to add a reference - Letter HDC:97:033 dated April 18, 1997, "Interim Use of Increased ANFB additive Constant Uncertainty," to describe the interim use of increased ANFB additive constant uncertainty for the SPC ATRIUM-9x9 fuel during Cycle 13.

The staff has reviewed the proposed TS changes and its associated Bases (References 1 and 2). Two areas of concern were identified as follows: (1) the validity of the methodology used for the mixed core MCPR calculation for the WNP-2 Cycle 13 design operation, and (2) the applicability of the proposed SLMCPR for ATRIUM-9x9 fuel to Cycle 13 operation based on the Cycle 11 core conditions. These areas of concern were the focus of our request for additional information during Inspection 50-397/97-11. A description of our review of these issues follows.

During NRC Inspection 50-397/97-11 of the WNP-2 plant, the inspection team identified as the key startup issue for Cycle 13 the adequacy of the method for calculating the operating limit minimum critical power ratio (OLMCPR). The team requested that information relating to this issue be docketed in support of the WNP-2 proposed TS change amendment submitted by the licensee for NRC approval prior to Cycle 13 operation. The information documents licensee efforts to ensure that the use of the US96A7 correlation (US96A7 is an ABB/CE correlation that was developed specifically for WNP-2 coresident Siemens 9x9 fuel) will predict a conservative change in critical power ratio (CPR) during a transient. The inspection team was concerned that the licensee may not have satisfied all of the conditions set forth in the licensing safety evaluation report (SER) that approved the fuel reload methodology (CENPD-300-P-A). Specifically, the inspection team was concerned about Restriction 7 of this SER, which states: "the ABB/CE methodology for determining the OLMCPR for non-ABB/CE fuel ... is acceptable only when each licensee application of the methodology identifies the value of the conservative adder to the OLMCPR. The correlation applied to the experimental data to determine the value of the adder must be shown to meet the 95/95 criteria..."

In response to the inspection team request, WPPSS submitted to the NRC additional information (References 3, 4 and 5) that supports Cycle 13 startup using the OLMCPR determined using the ABB/CE's US96A7 correlation for non-ABB/CE coresident fuel. The three key items of information provided by WPPSS to support Cycle 13 startup are:

- (1) A comparison of CPRs predicted by the Siemens' ANFB correlation and the US96A7 correlation for all 9x9 fuel bundles at all expected operating conditions during Cycle 13 (for a total of 5276 benchmark points), which shows a standard deviation of 0.008 and a mean value of -0.021. For this comparison, WPPSS and ABB/CE used exactly the same procedures and correlations that are used to calculate the transient CPR for anticipated operational occurrences (AOO), which form the bases of the OLMCPR. These 5276 benchmark calculations provide a high level of confidence that US96A7 correlation results are conservative with respect



to the results of the ANFB correlation when a conservative multiplier factor of 0.975 is used.

- (2) A comparison of peak uncontrolled bundle powers for planned operation during all of Cycle 13 for SVEA-96 and 9x9 fuel. This comparison indicates that the reactivity for the twice-burned 9x9 fuel is low enough to result in a 15 percent peak uncontrolled bundle power reduction with respect of that of SVEA fuel for planned operation during Cycle 13, and that the peak bundle power for Cycle 13 9x9 fuel will be at least 10 percent lower than the peak bundle power during Cycle 11 for the same 9x9 fuel. Thus, any concern about uncertainties in the US96A7 correlation for 9x9 fuel are compensated by this lower reactivity of the twice-burned 9x9 fuel.
- (3) A WPPSS commitment (response to Issues 1 and 2 in Reference 4) to include a conservative adder to the delta CPR calculation based on the variability observed in the US96A7 comparison with the ANFB correlation to ensure bounding OLMCPRs are specified for the SPC fuel. This commitment will be included as a license condition and will be applied in addition to the 0.975 multiplier on the US96A7 correlation.

The inspection team was concerned that the methodology used to validate the US96A7 correlation was deficient because it could propagate absolute errors in the ANFB correlation or in the application of this correlation to obtain the data matrix used for the development of US96A7. The staff review has determined that (a) the Cycle-13 9x9 peak bundle power is expected to be at least 15 percent lower than the SVEA-96 peak bundle power, (b) the Cycle 13 specific benchmark between ANFB and US96A7 results shows that US96A7 is conservative when a 0.975 multiplier is used, and (c) corrective actions have been taken to deal with a Part 21 design defect identified during a recent NRC inspection review of the ANFB correlation at Siemens, and appropriate conservatisms have been applied to its application for monitoring the safety limit for the 9x9 Siemens fuel in WNP-2 Cycle 13. Based on its review, the staff has concluded that a 0.975 conservative multiplier in the OLMCPR ABB/CE methodology for 9x9 resident fuel provides a sufficient conservative margin that the safety limit (SLMCPR) will not be challenged during Cycle 13. Thus, the staff has determined that the supporting documentation presented by WPPSS in their additional information demonstrates conformance with CENPD-300-P-A and the conditions of its SER for WNP-2 Cycle 13. In addition to evaluating the acceptability of the US96A7 methodology, the staff has reviewed the licensee responses (References 3, 4 and 5) supporting the proposed SLMCPR for ATRIUM-9X fuel Cycle 13 operation and found them acceptable. The staff has determined that the commitment identified in item (3) above should be formalized. Therefore, the licensee provided as requested by the staff, a July 3, 1997, letter proposing a license condition regarding the commitment for inclusion in Appendix C of Facility Operating License NPF-21.

The licensee proposed to implement the license condition prior to exceeding 25 percent power. The staff finds this acceptable because MCPR limits are not applicable at power levels less than 25 percent per TS 2.1.1.



From the review of available data provided by the licensee and the fuel vendor for Cycles 12 and 13 during the WNP-2 50-397/97-11 inspection, and the additional information presented by the licensee, the staff reached the following conclusions:

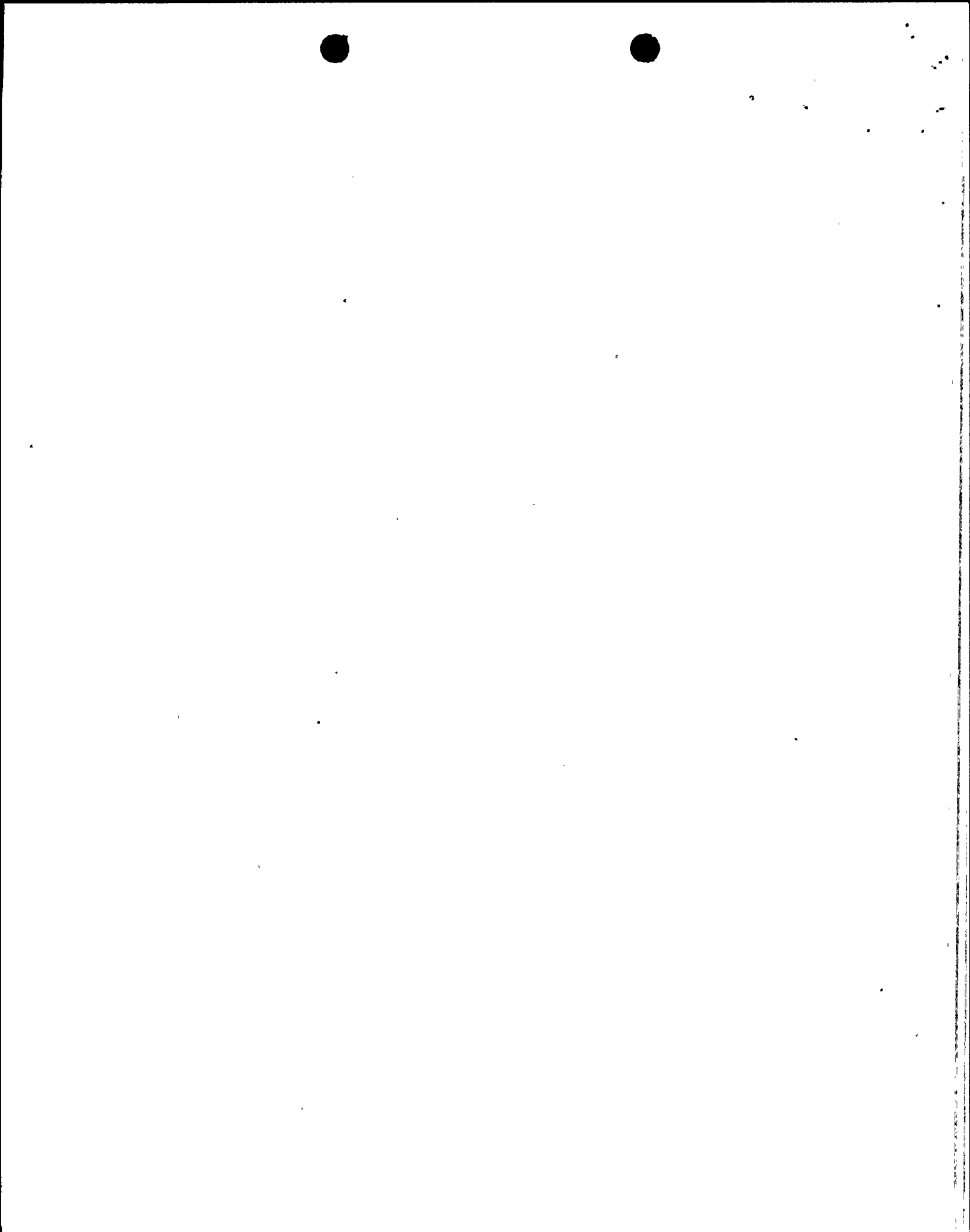
- (1) The methodology used for confirmation of the US96A7 correlation is deficient in the sense that it cannot detect absolute errors in the ANFB correlation or in the application of this correlation to obtain the data matrix used for the development of US96A7.
- (2) In consideration that:
 - (a) The Cycle 13 9x9 peak uncontrolled bundle power for planned operation is expected to be at least 15 percent lower than the SVEA-96 peak bundle power and at least 10 percent lower than the same 9x9 fuel during Cycle 11.
 - (b) The Cycle 13 specific benchmark between ANFB and US96A7 results shows that US96A7 correlation results are conservative (-0.021 ± 0.008) with respect to ANFB results when a 0.975 conservative multiplier is used, and
 - (c) Corrective actions have been implemented to deal with a Part 21 deficiency in the ANFB correlation for application to the SPC 9x9 fuel and the staff has found it to be acceptable to monitor the safety limit.

The staff has determined that a 0.975 conservative multiplier in the OLMCPR ABB/CE methodology for 9x9-9 coresident fuel provides a sufficient conservative factor that this fuel operating at the OLMCPR will not challenge the safety limit (SLMCPR) should an AOO occur during Cycle 13. Thus, the staff concludes that the supporting documentation presented by WPPSS in its additional information demonstrates conformance, for Cycle 13, with the CENPD-300-P-A SER OLMCPR methodology and its conditions of approval.

Based on its review, the staff has determined that the proposed TS revisions and the license condition in Appendix C of the license are acceptable because the proposed changes will ensure that the fuel design safety criteria (i.e., that more than 99.9 percent of the fuel rods avoid transition boiling during normal operation as well as anticipated operational occurrences) is met.

3.0 EXIGENT CIRCUMSTANCES

Pursuant to 10 CFR 50.91(a)(6), the licensee requested the proposed amendment on an exigent basis. The proposed changes would revise the Technical Specifications (TS) for minimum critical power ratio in TS 2.1.1.2. The licensee requested approval on an exigent basis based on the refueling outage schedule for WNP-2. The requested approval date of June 15, 1997, did not



allow for a full 30-day notice in the Federal Register. The time necessary to process the licensee's request has resulted in a full 30-day notice period prior to taking the action.

Notice of the staff's proposed determination that the proposed amendment involves no significant hazards consideration was published in the Federal Register on May 29, 1997 (62 FR 29160). Given that this notice has provided 30 days notice as required by 10 CFR 50.91(a)(2), there is no need for the Commission to make a final determination that the proposed amendment does not involve a significant hazards consideration.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

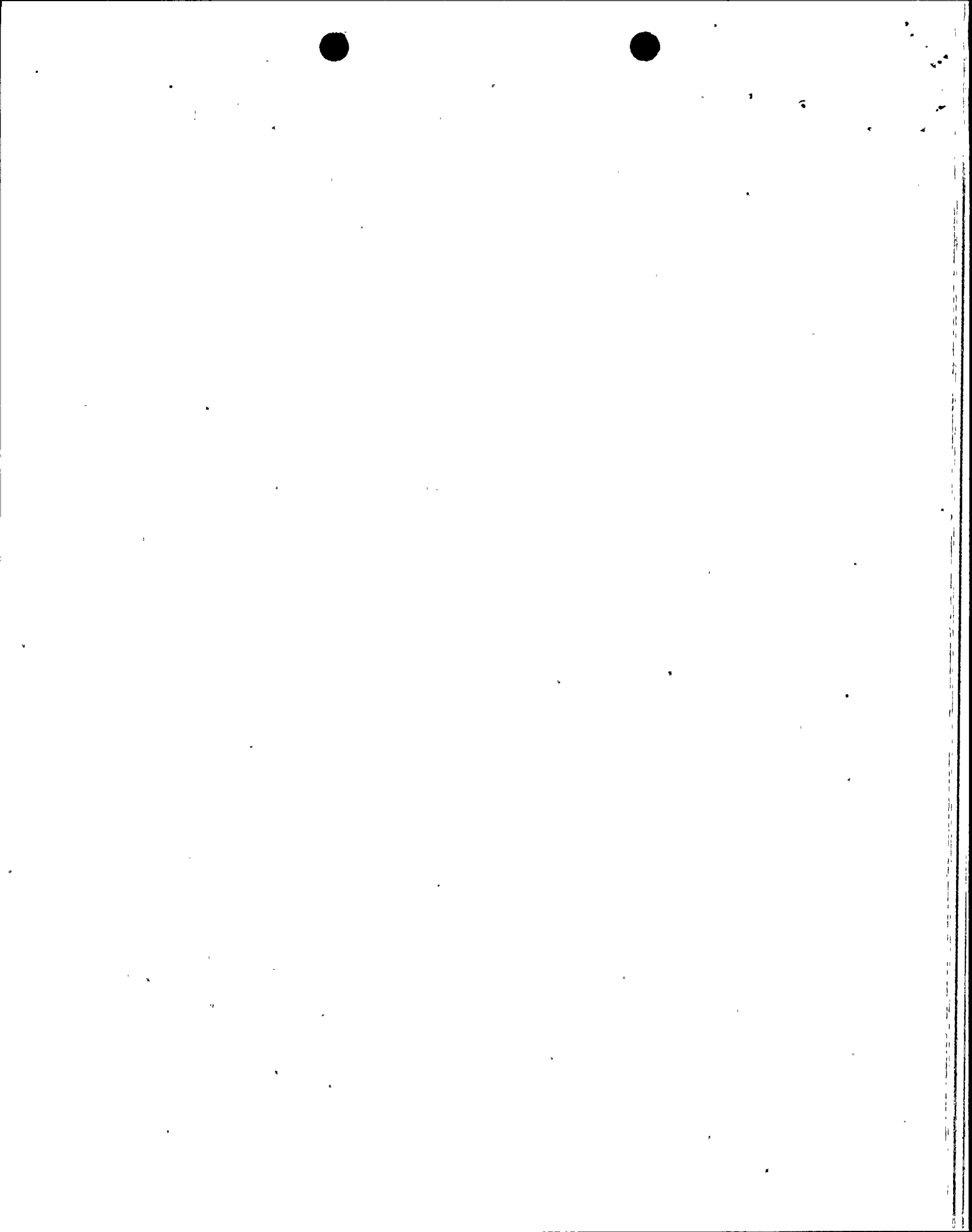
The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, 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 (62 FR 29160). 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.

6.0 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.

7.0 REFERENCES

1. Letter (G02-97-102) from P. R. Bemis to USNRC, "WNP-2 Operating License NPF-21 Exigent Request for Amendment Minimum Critical Power Ratio Safety Limits," May 20, 1997.
2. Letter (G02-97-115) from P. R. Bemis to USNRC, "WNP-2 Operating License NPF-21 Exigent Request for Amendment of SLMCPR - Modification of Request," June 6, 1997.



3. Letter (G02-97-119) from D. A. Swank to USNRC, "WNP-2 Operating License NPF-21 NRC Inspection 97-11 Submittal of Additional Information," plus attachment, June 12, 1997.
4. Letter (G02-97-121) from D. A. Swank to USNRC, "WNP-2 Operating License NPF-21 NRC Inspection 97-11 Second Submittal of Additional Information," June 20, 1997.
5. Letter (G02-97-130) from D. A. Swank to USNRC, "WNP-2 Operating License NPF-21 NRC Inspection 97-11 Third Submittal of Additional Information," June 25, 1997.

Principal Contributor: T. Huang

Date: July 3, 1997

