



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 119 TO FACILITY OPERATING LICENSE NO. NPF-41
AND AMENDMENT NO. 119 TO FACILITY OPERATING LICENSE NO. NPF-51
ARIZONA PUBLIC SERVICE COMPANY, ET AL.
PALO-VERDE NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2
DOCKET NOS. STN 50-528 AND STN 50-529

1.0 INTRODUCTION

By letter dated October 6, 1998, Arizona Public Service Company (APS or the licensee) requested changes to the Technical Specifications (Appendix A to Facility Operating License Nos. NPF-41, NPF-51, and NPF-74) for Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2 and 3. The Arizona Public Service Company submitted this request on behalf of itself, the Salt River Project Agricultural Improvement and Power District, Southern California Edison Company, El Paso Electric Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority.

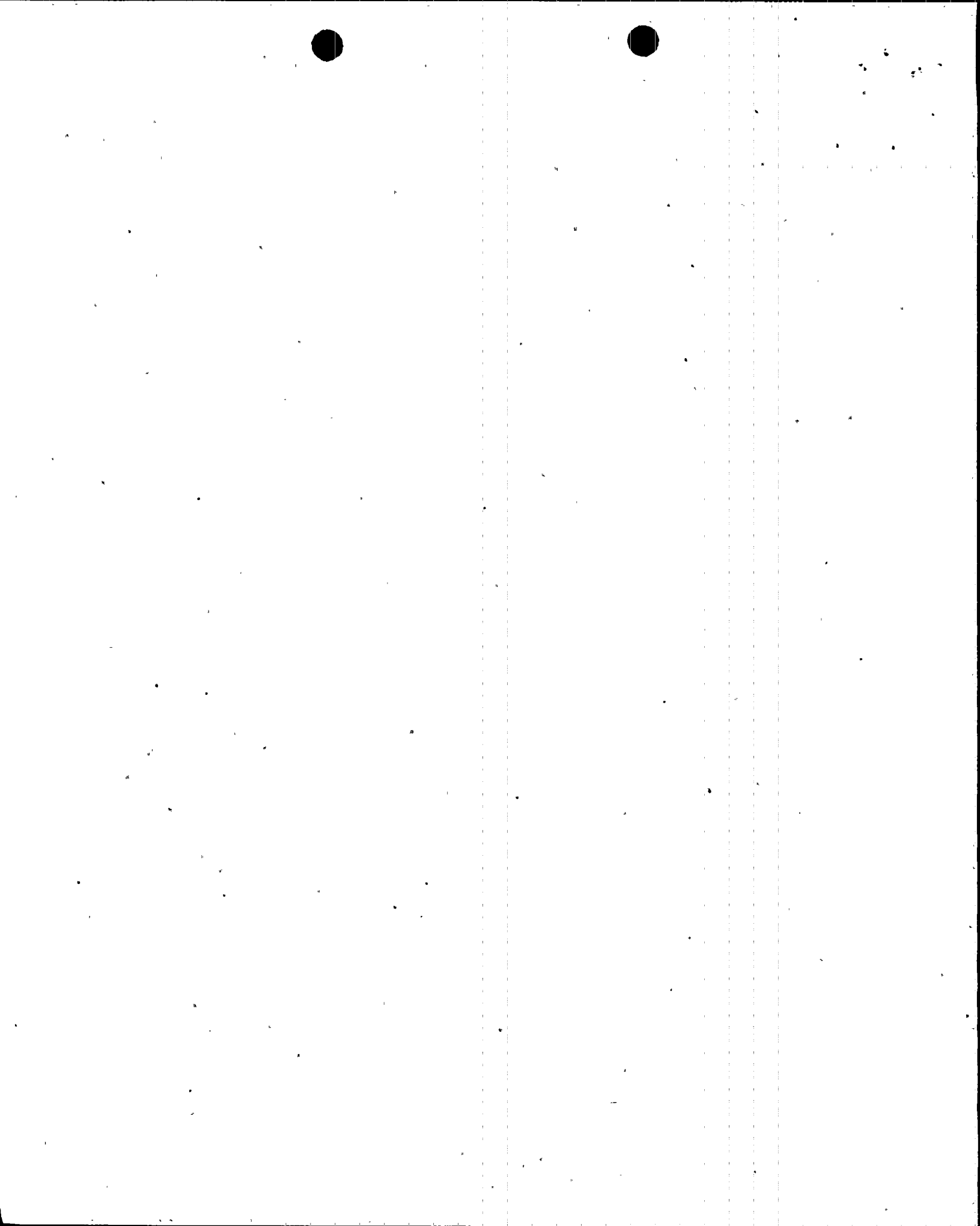
The proposed changes would modify TS 3.3.1, "Reactor Protective System (RPS) Instrumentation - Operating," and TS 3.3.2, "Reactor Protective System (RPS) Instrumentation - Shutdown," to clarify the power level threshold at which certain RPS instrumentation trips must be enabled and may be bypassed, and clarify that this level is a percentage of the neutron flux at rated thermal power (RTP). The bypass power level, 1E-4% RTP, would be specified as logarithmic power instead of thermal power.

The NRC approved these changes for Palo Verde Unit 3 on an exigent basis as indicated in its letter dated October 19, 1998. The exigent TS amendment resulted in TS pages with notes specifying different requirements between Unit 3 and Units 1 and 2. This amendment removes these notes from the affected TS pages.

2.0 DISCUSSION

Footnotes (a) and (b) in TS Table 3.3.1, "Reactor Protective System (RPS) Instrumentation - Operating," and footnote (d) in TS 3.3.2 Table, "Reactor Protective System (RPS) Instrumentation - Shutdown," identify operating bypass permissive and enable bistable values. The proposed amendments to the PVNGS TS would replace the words "THERMAL POWER" with "logarithmic power" for the 1E-4% RTP level threshold in these footnotes, and also in

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Surveillance Requirement (SR) 3.3.1.7 Note 2. The proposed amendments would also replace "RTP" with "NRTP," in Table 3.3.1-1 footnotes (a) and (b), SR 3.3.1.7 Note 2, and Table 3.3.2-1 footnotes (c) and (d). In addition, the proposed amendments would add a definition for NRTP (neutron rated thermal power) in TS Section 1.1 as the indicated neutron flux at RTP, and specify NRTP as the "ALLOWABLE VALUE" parameter for the logarithmic power level - high trip in Table 3.3.1-1.

TS 3.3.1, "Reactor Protective System (RPS) Instrumentation - Operating," provides for the operability, during plant operation, of instruments necessary to initiate a reactor trip that would protect the plant against anticipated operational occurrences and assist the engineered safety features (ESF) systems in mitigating accidents. Those instruments are specified in Table 3.3.1-1.

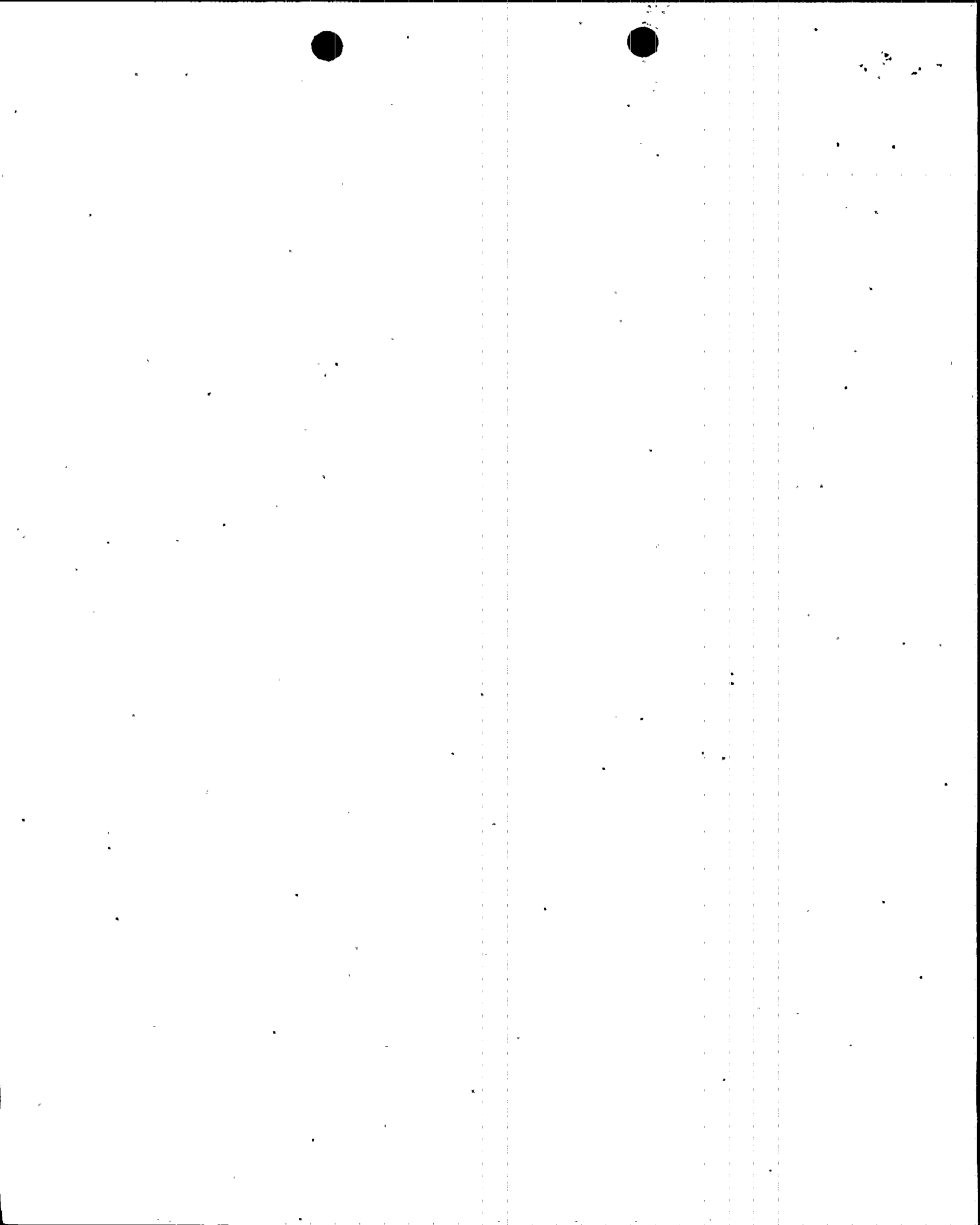
The logarithmic power level - high trip specified in TS Table 3.3.1-1 is designed to protect the integrity of the fuel cladding and help protect the reactor coolant pressure boundary in the event of an unplanned criticality from a shutdown condition. The purpose of footnote (a) is to allow the logarithmic power trip to be bypassed when neutron power is above 1E-4% NRTP, and require the trip to be automatically enabled when neutron power is at or below 1E-4% NRTP. This is permitted because the logarithmic power trip is not needed unless neutron power (indicated by logarithmic power) is 1E-4% NRTP or below. As described in the Bases for TS 3.3.1, other trips provide adequate protection for events originating when power is above 1E-4% NRTP.

The local power density (LPD) - high and departure from nucleate boiling ratio (DNBR) - low trips in TS Table 3.3.1-1 are designed to provide plant protection during certain anticipated operational occurrences and assist the ESF systems in the mitigation of certain accidents, as described in the Bases for TS 3.3.1. The purpose of footnote (b) is to allow the LPD-high and DNBR-low trips to be bypassed when neutron power is below 1E-4% NRTP, and require the trips to be automatically enabled when neutron power (indicated by logarithmic power) is at or above 1E-4% NRTP. This is permitted because, as described in the Bases for TS 3.3.1, plant conditions when power is below 1E-4% NRTP do not warrant the trip protection of these trips.

SR 3.3.1.7 requires a channel functional test be performed on each RPS channel at a frequency of 92 days to assure that the instruments will be operable. Note 2 of this SR allows the functional test of the logarithmic power level channels to be deferred until two hours after reducing power below 1E-4% NRTP, since the logarithmic power trip is not needed unless neutron power (indicated by logarithmic power) is at 1E-4% NRTP or below.

TS 3.3.2, "Reactor Protective System (RPS) Instrumentation - Shutdown," provides for the operability, during plant shutdown, of instruments necessary to initiate a reactor trip that would protect the plant against anticipated operational occurrences and assist the ESF systems in mitigating accidents. Those instruments are specified in Table 3.3.2-1.

The logarithmic power level - high trip specified in TS Table 3.3.2-1 is designed to protect the integrity of the fuel cladding and help protect the reactor coolant pressure boundary in the event of an unplanned criticality from a shutdown condition. The purpose of the footnote (d) is to



allow the logarithmic power level - high trip to be bypassed when neutron power is above 1E-4% NRTP, and require the trip to be automatically enabled when neutron power is at or below 1E-4% NRTP. This is permitted because the logarithmic power level - high trip is not needed unless neutron power (indicated by logarithmic power) is 1E-4% NRTP or below.

3.0 EVALUATION

As stated in the previous section, the proposed TS amendments would replace the words "THERMAL POWER" with "logarithmic power" and replace RTP with NRTP in TS 3.3.1 and TS 3.3, and add a definition of NRTP to TS 1.1. As described above, the purpose of the 1E-4% NRTP threshold is to (1) specify the power, below which, the logarithmic power level trip is required to be operable and surveilled, and (2) specify the power, above which, the LPD and DNBR trips are required to be operable. For all of these purposes, the appropriate power threshold should be logarithmic power, which is the power indicated on the logarithmic nuclear instrumentation, and not thermal power. Thermal power is defined in TS Section 1.1 as the total reactor heat transfer rate to the reactor coolant, and would include decay heat. Thermal power would therefore not drop to 1E-4% RTP for a number of years after shutdown, and would not provide the plant protective function correlation required at 1E-4% NRTP. Since "THERMAL POWER" will not decrease to less than or equal to 1E-4% RTP for normal duration plant outages, TS Table 3.3.1-1, note "b," would require the LPD/DNBR trip bypasses to be removed during planned startup when the plant enters Mode 2. This condition is expected to produce a trip signal as soon as the trip bypasses are removed. Therefore strict adherence to the notes as currently written would preclude plant startups.

The PVNGS Updated Final Safety Analysis Report (UFSAR) Section 7.2.1.1.2.3 states that the excore neutron flux instrumentation provides the input signal to the RPS for the logarithmic power level - high trip and to the core protection calculator (CPC) for use in calculations for LPD-high and DNBR-low trips. Further, UFSAR Section 15.4.1.3 states that a trip generated at 1E-4% power level (when the CPC bypass is automatically removed) would cause a decrease in fission (neutron) power before the point of adding sensible heat is reached. Also, UFSAR Section 15.4.1.4 states that a reactor trip on high logarithmic power is generated before core power reaches the point of adding sensible heat. In all of these sections, it is implicit that the power being described is neutron flux power, as indicated by logarithmic power, and not thermal power, which is defined as heat transfer from the reactor core to the coolant. In addition, the TS Bases for LCO 3.3.1 for the LPD-high trip and the DNBR-low trip state that the 1E-4% RTP threshold level is "sensed by the logarithmic nuclear instrumentation."

Therefore, logarithmic power, which measures neutron flux, does provide the plant protective function correlation required at 1E-4% NRTP for the required trips as required by safety analyses. The logarithmic power level of 1E-4% NRTP nominally correlates to the neutron flux measured by the excore neutron instrumentation that is 1E-4% of the neutron flux at 100% RTP (3876 MWt) measured by the excore neutron instrumentation. Since neutron flux is, by design, the correct input process variable for the operating bypass permissive and enable bistable values described in footnotes (a) and (b) of TS Table 3.3.1-1, footnote (d) of TS Table 3.3.2-1, and Note 2 to SR 3.3.1.7, the change to replace "THERMAL POWER" with logarithmic power is acceptable to the staff.

The proposed amendments would also replace "RTP" with "NRTP," in Table 3.3.1-1 footnotes (a) and (b), SR 3.3.1.7 Note 2, and Table 3.3.2-1 footnotes (c) and (d). A definition would be added for NRTP (neutron rated thermal power) in TS Section 1.1 as the indicated neutron flux at RTP. These clarifications will reflect the fact that the logarithmic power level of 1E-4% is not a percentage of the "total reactor core heat transfer rate to the reactor coolant of 3876 MWt," as RTP is defined in TS 1.1, but is instead a percentage of the indicated neutron flux at RTP. This proposed change is acceptable to the staff.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arizona State official was notified of the proposed issuance of the amendments for the PVNGS units. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (63 FR 59586). Accordingly, the amendments meet 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 amendments.

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

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Date: December 23, 1998

