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 SORENSEN, G.C.    Washington Public Power Supply System  
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SUBJECT: Application for amend to License NPF-21, revising Tech Spec  
 3/4.2.6 & 3/4.2.7.

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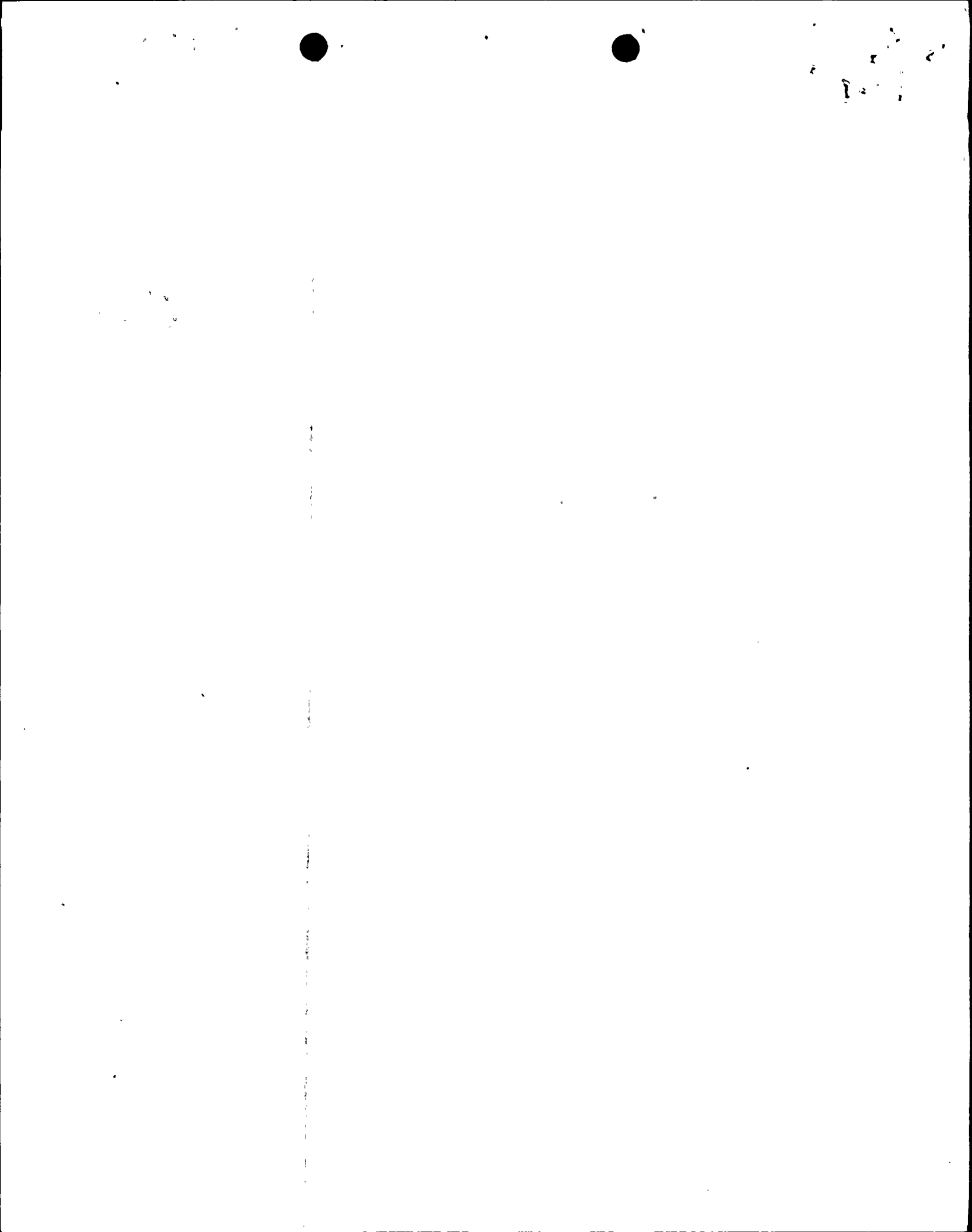
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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

March 31, 1989  
G02-89-051

Docket No. 50-397

U. S. Nuclear Regulatory Commission  
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Gentlemen:

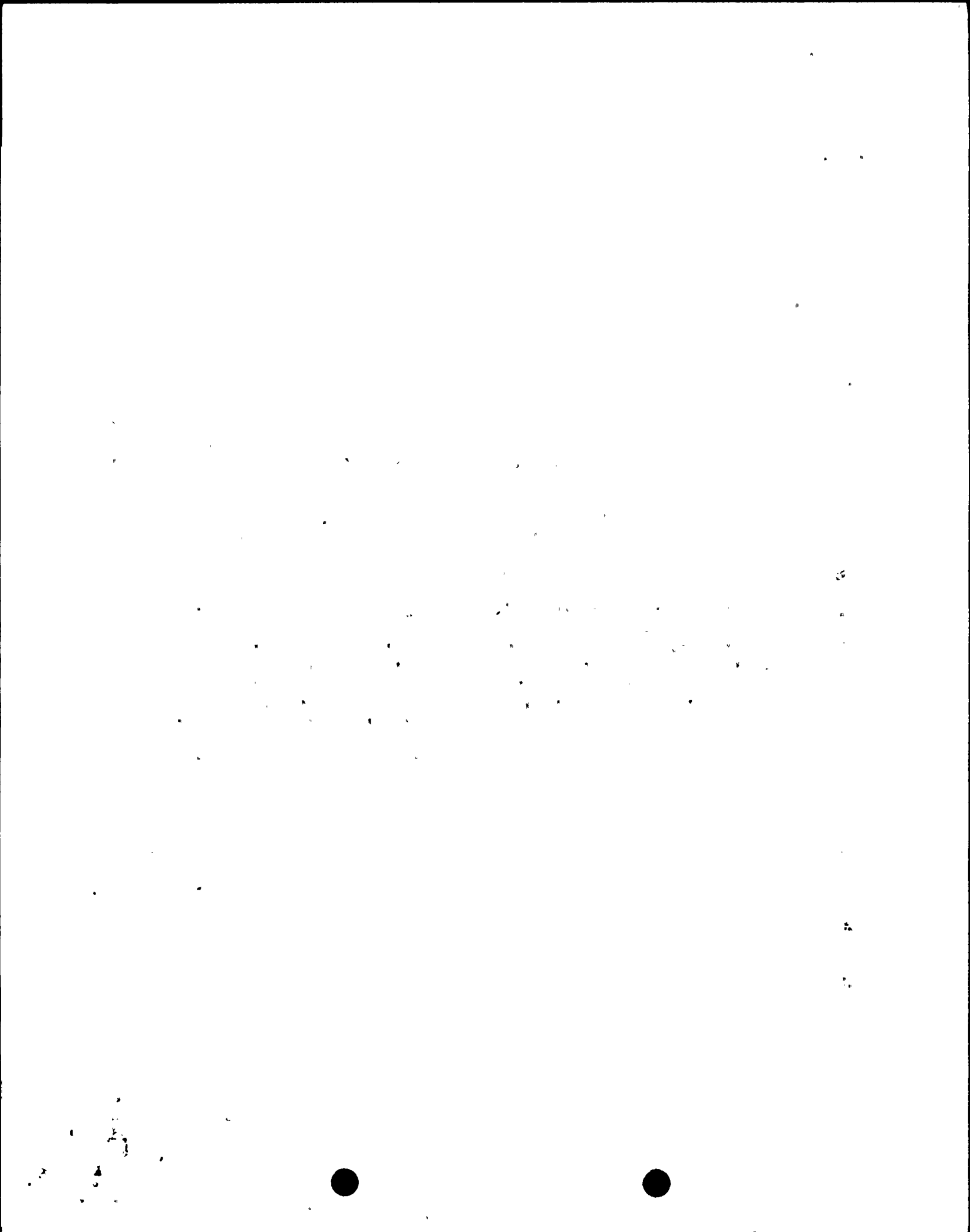
Subject: NUCLEAR PLANT NO. 2  
OPERATING LICENSE NPF-21, REQUEST FOR AMENDMENT TO  
TECHNICAL SPECIFICATIONS 3/4.2.6, POWER FLOW INSTABILITY  
AND 3/4.2.7 NEUTRON FLUX NOISE MONITORING IN SUPPORT OF  
THE SUPPLY SYSTEM RESPONSE TO IEB 88-07, SUPPLEMENT 1

Reference: 1) IE Bulletin 88-07, Supplement 1, "Power Oscillations  
in Boiling Water Reactors (BWRs)", dated 12/30/88  
2) Letter, G02-89-030, GC Sorensen (SS) to NRC, "Response  
to IE Bulletin 88-07, Supplement 1", dated 3/3/89  
3) Letter, G02-89-029, GC Sorensen (SS) to NRC, "Request  
for Amendment to Technical Specifications Reload License  
Amendment (Cycle 5)", dated 3/3/89

The response to IEB 88-07, Supplement 1 (reference 1) provided in reference 2 stated in part that the Supply System would submit a proposed technical specification amendment to replace the existing detect-and-suppress technical specifications with specifications based on the Advanced Nuclear Fuels (ANF) ANNA Stability Monitoring System. The current specifications require evaluation of neutron signal noise against a baseline noise level. The ANNA system provides a much stronger, faster, more sophisticated means of monitoring the stability of the reactor core.

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REQUEST FOR AMEND. TO TS 3/4.2.6 POWER FLOW INSTABILITY AND  
3/4.2.7 NEUTRON FLUX NOISE MONITORING IN SUPPORT OF THE  
SUPPLY SYSTEM RESPONSE TO IEB 88-07, SUPPLEMENT 1

As described in reference 2, the Supply System has implemented the General Electric Interim Operating Recommendations as requested in reference 1. This implementation includes the definition of Regions A, B and C as defined in the recommendations. The Supply System proposes a reduction in Region B (a region where operation is prohibited) and a corresponding increase in Region C (a region where operation is allowed under controlled conditions). The basis for this proposal is that the use of the stronger monitoring capabilities represented in the ANNA system compensates for an enlarged allowable operating region, such that the present safety margin is maintained. This approach was discussed with L. Phillips and H. Ritchings of your staff on January 31, 1989. Hence, in accordance with the Code of Federal Regulations, Title 10, Parts 50.90 and 2.101, the Supply System hereby submits a request for amendment to the WNP-2 Technical Specifications. Specifically, the Supply System is requesting that the subject Technical Specifications be modified, as attached, to reflect the enhanced operating capabilities of the ANNA system over the present detect-and-suppress stability monitoring capabilities.

The proposed Technical Specification changes are intended to be implemented within the framework of the Interim Operating Recommendations. The recommendations will be modified to the extent that Region C is enlarged, and the ANNA system will support SIL 380 methods for detecting the onset of core instability. The basis for enlargement of Region C is as follows: Those portions of Region B which fall outside a region of 0.9 decay ratio as calculated by Advanced Nuclear Fuels (ANF) (in support of reload license applications) will be redefined as part of Region C, where operation is allowed under a controlled manner when fuel preconditioning is required. Those areas below the 100% rodline for which the calculated decay ratio is greater than 0.9 will remain defined as Region B, where planned operation is prohibited. For cycle 5 operation, decay ratio calculations indicate no value of 0.9 or greater exists for points beneath the 100% rodline. Therefore this application, which is being made in support of, and subsequent to, the cycle 5 reload license application, provides for complete replacement of Region B with Region C (as they are currently defined in the Interim Operating Recommendations). For future cycles in which decay ratio values of 0.9 or greater are calculated for points below the 100% rodline, the allowable region will be modified accordingly.

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REQUEST FOR AMEND. TO TS 3/4.2.6 POWER FLOW INSTABILITY AND  
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SUPPLY SYSTEM RESPONSE TO IEB 88-07, SUPPLEMENT 1

Although the proposed changes are to be implemented within the framework of the Interim Operating Recommendations, the Supply System has structured the proposed Technical Specifications to be applicable to a viable long-term solution with a minimum number of additional changes. This solution incorporates a stability monitor for maneuvering in conjunction with additional automatic protection for power operation, and is one of the final solutions currently under consideration by the BWROG Stability Committee.

The current Technical Specifications incorporate the recommendations of General Electric Service Information Letter (SIL) No. 380 Revision 1 and the Staff's Safety Evaluation Report of GE Topical Report NEDE-24011 amendment 8. The current specifications define a "detect-and-suppress" region. Prior to entry into this region, a baseline set of neutron signal noise values must be established. When operating in the region, neutron signal values must periodically be compared to these baseline values. If noise levels exceed baseline levels by a specified amount, action must be taken to exit the region. The basis for this "detect-and-suppress" approach is that neutron signal noise has been demonstrated to increase as the core decay ratio increases. The limits for acceptable noise are selected such that action will be taken before the onset of an instability results in limit cycle operation.

A stability monitoring system such as the ANNA system represents a significant improvement in monitoring the stability of a reactor core. The ANNA system performs a sophisticated noise analysis technique to calculate the decay ratio of each of multiple neutron signals (LPRM and APRM). These calculations are performed automatically, such that peak-to-peak and decay ratio data is presented in near real-time. As a result, the ANNA system provides information more rapidly than existing methods, and without the distractions to control room staff imposed by current methods. In addition, the decay ratio information available through the ANNA system is a primary indicator of the state of the core stability, whereas the current indicator, neutron signal noise level, is an indirect, less reliable means. Through use of the ANNA system a much more quantitative measure of the margin to instability exists, i.e. how close the measured decay ratio is to 1.0. This significant improvement in detecting the approach to a region of instability is the justification for the proposed enlargement of Region C. The Supply System has reviewed this amendment request per 10 CFR 50.92 and has determined that it does not represent an unreviewed safety question or a significant hazard because it does not:



[The text in this section is extremely faint and illegible. It appears to be a list or a series of entries, possibly organized in a table with multiple columns. The content is too light to transcribe accurately.]

Page Four,

REQUEST FOR AMEND. TO TS 3/4.2.6 POWER FLOW INSTABILITY AND  
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- 1) Involve a significant increase in the probability or consequences of an accident previously evaluated because, as discussed above, the ANNA system represents a substantial improvement in the capability to detect-and-suppress, such that the present safety margin is preserved for operation in an expanded Region C. The enlarged Region C represents a region in which operation was allowed for WNP-2 until recently when the Interim Operating Recommendations were implemented. As discussed above, operation in this region was allowed provided detect-and-suppress noise monitoring requirements were satisfied. No instability events have been detected during operation at WNP-2. Recently, a portion of this region became prohibited from planned operation through adoption of the Interim Operating Recommendations. These Interim Operation Recommendations were made in response to GE calculations which showed, particularly for the later classes of GE plants, less margin to the MCPR safety limit may exist than was previously evaluated for a certain class of limit cycle instability events. These recommendations were made in order to provide assurance that plants would not enter a region of unstable operation and experience limit cycle events which could violate the safety limit. The use of the ANNA system provides greatly improved ability to detect the approach to a region of instability. It is the Supply System's judgement that this improved detection capability more than compensates for the enlargement of Region C such that the present safety margin is preserved and in fact increased. Hence, the probability or consequences of previously evaluated accidents are not increased by this change.
  
- 2) Create the possibility of a new or different kind of accident from any accident previously evaluated because the design basis function, to detect-and-suppress core instability events, remains the same and is enhanced by the ANNA system. The enlargement of the allowable operating region does not introduce any new or different kind of accident, either stability or non-stability related. Enlargement of the region does necessitate justification that the probability of occurrence of an instability event is not increased. This issue has been addressed above. The ANNA system is very similar to the current method in terms of the equipment employed to monitor the core. Both systems involve use of computer software. The ANNA system therefore does not introduce any new failure modes over existing detect-and-suppress methods. In fact, the specific manner in which WNP-2 is implementing ANNA will reduce the risk of postulated computer failures, in that completion of an operability surveillance is required prior to entry into the region. In addition, the ANNA system automatically provides a warning in the event of a failure. Hence a new or different kind of accident due to implementation of ANNA and enlargement of Region C is not credible.



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REQUEST FOR AMEND TO TS 3/4.2.6 POWER FLOW INSTABILITY AND  
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- 3) Involve a significant reduction in a margin of safety because as discussed above, the implementation of ANNA provides improved detection capability which more than compensates for the enlargement of Region C. Hence, there is no reduction in the margin of safety due to this proposal.

As discussed above, the Supply System considers that this change does not involve a significant hazards consideration, nor is there a potential for significant change in the types or significant increase in the amount of any effluents that may be released offsite, nor does it involve a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10CFR 51.22(c)(9) and therefore, per 10CFR 51.22(b), an environmental assessment of the change is not required.

This Technical Specification change has been reviewed and approved by the WNP-2 Plant Operations Committee (POC) and the Supply System Corporate Nuclear Safety Review Board (CNSRB). In accordance with 10CFR 50.91, the State of Washington has been provided a copy of this letter.

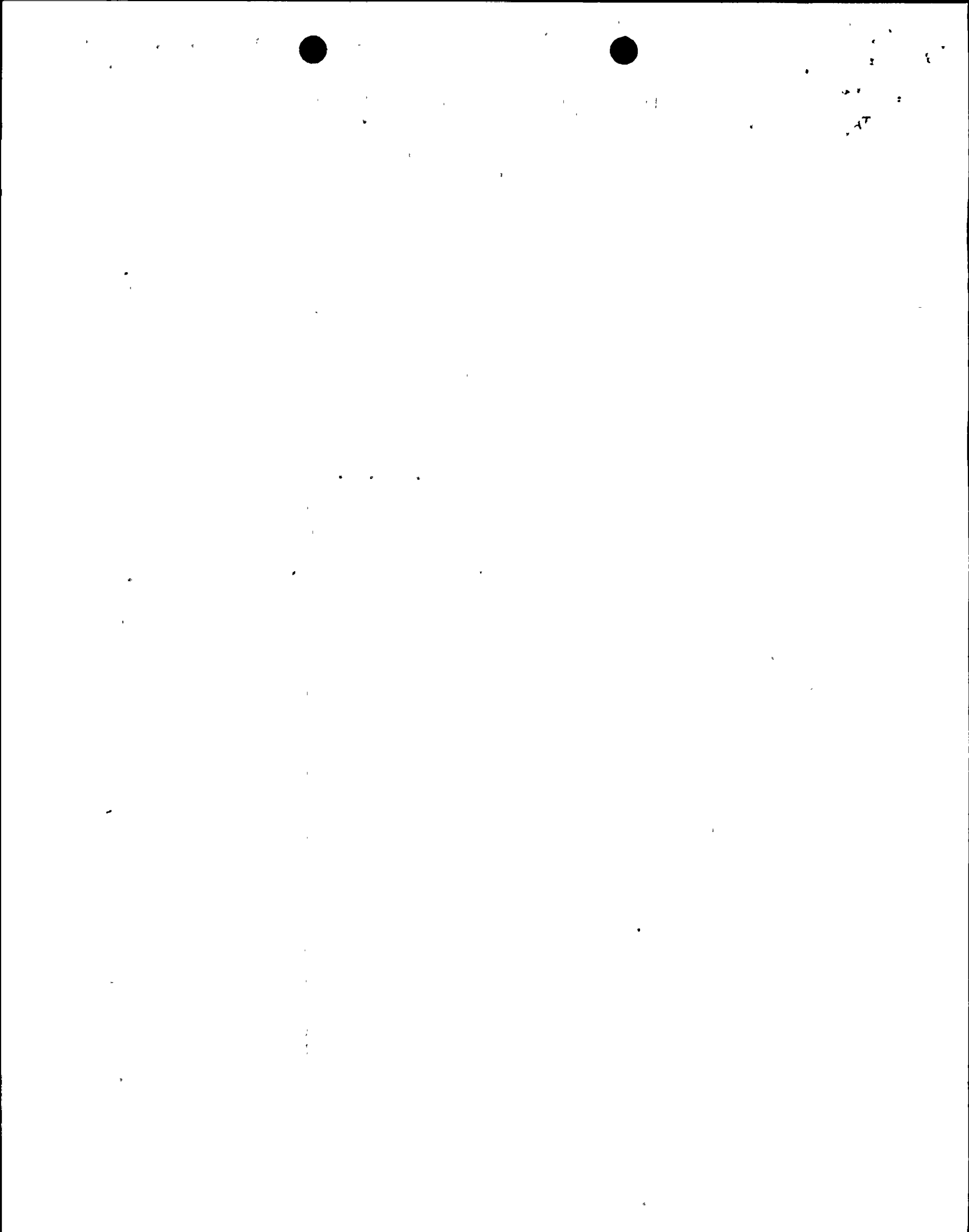
Very truly yours,



G. C. Sorensen, Manager  
Regulatory Programs

PLP/bk  
Attachments

cc: C Eschels - EFSEC  
JB Martin - NRC RV  
NS Reynolds - BCP&R  
RB Samworth - NRC  
DL Williams - BPA/399  
NRC Site Inspector - 901A



STATE OF WASHINGTON )  
                                  )  
COUNTY OF BENTON    )

Subject: Request For Amend. T/S 3/4.2.6  
and 3/4.2.7

I, G. C. SORENSEN, being duly sworn, subscribe to and say that I am the Manager, Regulatory Programs, for the WASHINGTON PUBLIC POWER SUPPLY SYSTEM, the applicant herein; that I have full authority to execute this oath; that I have reviewed the foregoing; and that to the best of my knowledge, information and belief the statements made in it are true.

DATE 31 MARCH, 1989

G. C. Sorensen  
G. C. SORENSEN, Manager  
Regulatory Programs

On this day personally appeared before me G. C. SORENSEN to me known to be the individual who executed the foregoing instrument and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

GIVEN under my hand and seal this 31st day of March, 1989.

Deana J. Robinson  
Notary Public in and for the  
State of Washington  
Residing at Richland, WA  
My commission expires 7/14/91.





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