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SUBJECT: Application for amends to Licenses NPF-41,NPF-51 & NPF-74, adding license condition for reactor coolant pump.

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161-00892-EEVB/JRP
March 18, 1988

Docket Nos. STN 50-528/529/530

U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Reference: Letter 161-00847-EEVB/BJA dated March 2, 1988 from E.E. Van Brunt, Jr. to the USNRC Document Control Desk

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Proposed Operating License Amendment - RCP
Vibration Monitoring Program
File: 88-A-056-026

The purpose of this letter is to request an amendment to the PVNGS Units 1 and 3 Operating License (License No. NPF 41 and NPF 74) and a change to the Confirmatory Order issued November 19, 1987 for Unit 2 (License No. NPF 51). The proposed Operating License amendment involves the addition of a license condition for a Reactor Coolant Pump (RCP) vibration monitoring program for Unit 1 and a change to the Unit 2 and 3 RCP vibration monitoring program. By the referenced letter, ANPP submitted a proposed Operating License Amendment for Unit 1, this letter supersedes the referenced letter.

Enclosed within this amendment request package are the following:

A. Description of the Proposed Amendment
B. Purpose of the License Condition
C. Need for the Operating License Amendment
D. Basis for No Significant Hazards Consideration
E. Safety Evaluation for the Proposed Amendment
F. Environmental Impact Consideration Determination
G. Marked-up Operating License Change Pages

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Pursuant to the requirements of 10CFR50.91(b)(1), and by copy of this letter, we have notified the Arizona Radiation Regulatory Agency of this request for an Operating License amendment. In accordance with the requirements of 10CFR170.12(c), the license amendment application fee of $150. is being forwarded to the Facilities Program Coordinator of LFMB.

Very truly yours,

E. E. Van Brunt, Jr.
Executive Vice President
Project Director

EEVB/JP/jle
Attachment

cc: J. G. Haynes all w/a
G. W. Knighton
E. A. Licitra
J. B. Martin
T. J. Polich
M. Davis
Director, ARRA
R. M. Diggs (w/wfd $150)

Attachment

A. DESCRIPTION OF THE PROPOSED AMENDMENT

ANPP will implement an augmented vibration monitoring program for each of the four reactor coolant pumps for all three units that includes the following elements.

a) Each pump will be continuously monitored with at least one shaft proximity vibration transducer with a control room alarm.

This section is new and has been added for clarification which allows the unit to remain at power while the operability of the affected channel is reviewed. The characteristics of an instrument failure are easily distinguishable from those of a cracked shaft by an appropriately qualified individual, e.g., rapid rise time pulses (spiking), 60 Hz frequencies and/or 120 Hz frequencies, gap voltage variations not confirmed by other sensors. In the unlikely event that two channels become inoperable, corrective action shall be implemented within one hour to restore monitoring capability in at least one channel. During the period vibration monitoring is unavailable, the loose parts vibration monitoring system channels and reactor coolant pump seal stage pressures will be monitored every four hours. The NRC shall be notified within four hours if the capability to monitor all channels is lost.

b) Monitoring and recording of reactor coolant pump vibration data every four hours.

This section has not been changed.

c) Evaluation of reactor coolant pump vibration data on a daily basis by an appropriately qualified individual.

A change to this section deleted the term "engineering" as it relates to an appropriately qualified individual. Some of the individuals who perform an evaluation of the data are technicians which are appropriately qualified.

d) Reporting requirements when the actual vibration level on any reactor coolant pump is equal to or exceeds 8 mils.

This change is similar to the clarification in section a. above in that operation may continue if the high vibration reading is caused by instrument failure.

By adding the term "if available," clarification is made. If one or more channels are inoperable, monitoring of the orbit and spectrums is not possible. Also, a statement is added on actions to be taken if other conditions exist causing vibration.

e) Reactor shutdown requirements when the actual vibration level on any reactor coolant pump reaches 10 mils or greater.

The first change allows continued operation of the unit with confirmed instrument failure, thus mitigating unnecessary plant shutdowns. If the unit has to be shutdown, entry into Mode 3 (HOT STANDBY) should be sufficient. The reactor is stable there is no chance of being in an unanalyzed condition and if further testing is needed it can be accomplished, in Mode 5 it cannot.

f) Spectrum analysis of the vibration data on a daily basis with associated reactor shutdown requirements based on the results of the analysis.

This section has been reworded basically for clarification. Also, the footnote is now incorporated into this section which allows the NRC staff ten days instead of five to review new limits or methods of monitoring prior to their implementation. As in section e. above, the unit will be shutdown and remain in Mode 3 (HOT STANDBY) for the same reasons.

B. PURPOSE OF THE LICENSE CONDITION

The augmented RCP vibration monitoring program has been previously incorporated into the Unit 2 and 3 Operating License(s). The NRC staff's reasons for imposing the license conditions are summarized in a letter from G. W. Knighton, of the NRC Staff, to E. E. Van Brunt, Jr., of ANPP, dated October 25, 1987. In this letter the NRC Staff states that, "...the European data, as well as the information obtained from Palo Verde Unit 1, indicate an increased probability of a reactor coolant pump shaft failure, as well as a potential failure mode which could involve the failure of more than one reactor coolant pump. The failure of more than one pump is an unanalyzed condition and thus beyond the current license design basis.... This (vibration monitoring) program, which is based upon documented European experience, should provide evidence of impending pump shaft failure approximately two days prior to failure, which is sufficient time to place the unit in safe shutdown condition in an orderly manner."

C. NEED FOR THE OPERATING LICENSE AMENDMENT

The need for the requested Operating License amendment is the change will mitigate unnecessary plant shutdowns and clarify elements of the augmented vibration monitoring program.

To more fully explain unnecessary plant shutdowns, on March 6, 1988 Unit 1 was in Mode 2 ascending to Mode 1 after its first refueling outage. At 1950 hours an RCP shaft displacement alarm was received on RCP 1B. Readings taken on the loose parts vibration monitoring system (LPVMS) cabinet indicated (x) channel to be stable at 2-3 mils, whereas (Y) channel appeared erratic with general readings at 3-5 mils with spiking

up to approximately 12 mils, strongly indicating instrument failure. It was at this time Unit 1 management, Instrument and Controls Engineering (I&C) and the vibration group was notified. After consultation, Unit 1 operators initiated action to place the Unit in Mode 3 which was accomplished at 0147 on March 7, 1988. RCP 1B was then secured at 0226. Pursuant to the augmented vibration monitoring program the NRC was notified within the prescribed time via the Emergency Notification System.

After securing the pump, investigation by I&C found the output lead from the amplifier module for the RCP 1B (Y) channel to be loose. It was tightened and all other accessible connections were checked. After further discussions with Unit 1 management and the Resident Inspector, concurrence was given to restart RCP 1B to retest the (Y) channel vibration circuit. The pump was restarted at 0605 and the (Y) channel vibration readings all appeared normal.

D. BASIS FOR NO SIGNIFICANT HAZARDS CONSIDERATION

1. The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10CFR50.92. A proposed amendment to an Operating License for a facility involves no significant hazards consideration if operation of the facility in accordance with a proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (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. A discussion of these standards as they relate to the amendment request follows:

Standard 1 -- Involve a significant increase in the probability or the consequences of an accident previously evaluated.

Basis -- The proposed Operating License amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated. This amendment will impose an additional restriction on Unit 1 operations by adding a license condition requiring RCP vibration monitoring. The additional RCP vibration monitoring will not increase the probability of occurrence of any of the previously analyzed accidents. This amendment would also clear up ambiguity in the program.

The additional RCP vibration monitoring program imposed by this amendment and the clarification afforded will not affect the consequences of the previously analyzed RCP sheared shaft event.

Standard 2 -- Create the possibility of a new or different kind of accident from any accident previously evaluated.

Basis -- This proposed Operating License amendment does not create the possibility of a new or different kind of accident from any accident previously analyzed. The design and operation of PVNGS Units 1, 2 and 3 is not changed by this proposed amendment. The amendment involves the addition of a augmented vibration monitoring program for Unit 1 and a change to Units 2 and 3 programs which clarifies the existing criteria.

Standard 3 -- Involve a significant reduction in a margin of safety.

Basis -- This proposed Operating License amendment does not involve a significant reduction in a margin of safety. The proposed change involves the imposition of additional restrictions on Unit 1 operations and additional clarification for Units 2 and 3. The augmented RCP vibration monitoring program is designed to provide advance warning of RCP shaft failure. This early warning will allow the reactor to be safely shutdown prior to the occurrence of a RCP sheared shaft event.

2. The Commission has provided guidance concerning the determination of whether a significant hazards consideration exists by providing certain examples (51FR7751) of amendments that are considered least likely to involve a significant hazards consideration. This proposed Operating License amendment matches example(s) (i) and (ii) of 51FR7751 in that, (i) a purely administrative change in that certain statements are clarified and (ii) a change that constitutes an additional limitation, restriction or control not presently included in the Operating License.

E. SAFETY EVALUATION FOR THE PROPOSED AMENDMENT

This proposed Operating License amendment will not increase the probability or the consequences of previously evaluated accidents nor will it create the possibility of a new or different kind of accident. The proposed amendment will impose an additional restriction on Unit 1 operations by adding a license condition requiring RCP vibration monitoring. The augmented RCP vibration monitoring program has already been incorporated into the Unit 2 License by Confirmatory Order an into the Unit 3 Operating License. This amendment will also provide clarification to ambiguous terminology in the program. The RCP vibration monitoring program is being added to provide an early warning of impending RCP shaft failure due to the shaft cracking phenomenon found at Unit 1 as well as at several European facilities. The accident analysis of primary concern in this case is the RCP sheared shaft event. The vibration monitoring program imposed on the units will decrease the probability of experiencing a sheared shaft event. Additionally, this proposed amendment will not affect the operation of the units. Therefore, the change will not increase the consequences of previously analyzed accidents nor will it create the potential for a new or different kind of accident.

This proposed Operating License amendment will not reduce the margin of safety as defined in the basis for any Technical Specification. This change adds a license condition to the Unit 1 Operating License and clarifies the Unit 2 and 3 Operating License condition. There are no existing Technical Specifications impacted by the addition of the RCP vibration monitoring program.

F. ENVIRONMENTAL IMPACT CONSIDERATION DETERMINATION

The proposed change request does not involve an unreviewed environmental question because operation of PVNGS Units 1, 2 and 3 in accordance with this change would not:

1. Result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by the staff's testimony to the Atomic Safety and Licensing Board (ASLB), Supplements to the FES, Environmental Impact Appraisals, or in any decisions of the ASLB; or

2. Result in a significant change in effluents or power levels; or

3. Result in matters not previously reviewed in the licensing basis for PVNGS which may have a significant environmental impact.

G. MARKED-UP OPERATING LICENSE CHANGE PAGES

See revised Attachment 1 of the Unit 1, 2 and 3 Operating License(s); NPF-41, NPF-51, and NPF-74.