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AUTH.NAME AUTHOR AFFILIATION
KENYON,B.D. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Application for proposed Amends 67 & 20 to Licenses NPF-14 & NPF-22,respectively,revising Tech Specs to allow refueling operations to take place w/o using fuel,loading chambers. Justification for proposed amends encl.Fee paid.

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PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Bruce D. Kenyon
Vice President-Nuclear Operations
215/770-7502

APR 9 1985

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENTS 67 to NPF-14 AND 20 TO NPF-22
ER 100450 FILE 841-8 Docket Nos. 50-387
PLA-2445 50-388

Dear Mr. Schwencer:

The purpose of this letter is to request an exigent change to the Susquehanna SES Unit 1 Technical Specifications per 10CFR50.91(a)(6).

BACKGROUND

During the Susquehanna SES Unit 1 full core off-load at end-of-cycle 1, fuel loading chambers (FLCs) were being used to perform the source range monitoring function. As discussed in the attached report, the FLCs produced anomalous readings which have been attributed to a detector saturation condition caused by the high gamma flux from the irradiated fuel. Subsequent investigation and analysis has provided a basis for the proposed changes, mark-ups of which are also attached.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

Based on the analysis provided in the attached report, this proposed amendment is an example of an amendment considered not likely to involve significant hazards considerations per 48FR14870, paragraph (vi).

IMPLEMENTATION

The proposed changes to the Unit 1 Specifications are required in order to allow refueling to commence on its currently scheduled date of April 26, 1985. This is the basis of our exigent request. Since the condition was first discovered in early March, 1985 and our investigation and subsequent analysis to provide a basis for the proposed changes has just recently been completed, we feel that this request has been processed in a timely fashion. With respect to the changes on Unit 2, we do not require them on an exigent basis, but have provided them for consistency between the plant's Technical Specifications.

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The appropriate fees have been enclosed per 10CFR170.22. Any questions on this request should be directed to Mr. R. Sgarro at (215) 770-7855.

Very truly yours,

B. D. Kenyon
Vice President-Nuclear Operations

Attachments

cc: M. J. Campagnone USNRC
R. H. Jacobs USNRC

T. M. Gerusky, Director
Bureau of Radiation Protection
Pa. Dept. of Environmental Resources
P.O. Box 2063
Harrisburg, PA 17120

SUMMARY REPORT: JUSTIFICATION FOR PROPOSED AMENDMENTS 67 TO NPF-14 AND 20 TO NPF-22

The purpose of these Technical Specification changes is to permit Susquehanna SES refueling operations (fuel loading and unloading) to take place without using Fuel Loading Chambers (FLCs). These changes will allow up to eight fuel assemblies to be loaded in order to attain the required (Technical Specification 3/4.9.2) count rate on the SRMs without creating any safety concern. Another Technical Specification change currently before the NRC (proposed Amendment 43 to NPF-14) will reduce Unit 1's required count rate from 3.0 to 0.7 counts per second (cps) (Section 3.9.2 and Table 3.3.6-2), which will make Unit 1 consistent with Unit 2.

The reason for these Technical Specification changes follows. During the Susquehanna SES Unit 1 end-of-cycle defueling, the FLCs, which were being used to provide neutron monitoring, produced anomalous readings which were attributed to a detector saturation condition caused by the high gamma flux from the irradiated fuel. The FLCs are B-10 lined proportional detectors which are connected to the SRM circuitry, while the SRMs are miniature fission chambers. As discussed in "Radiation Detection and Measurement" by G. F. Knoll, 1979, John Wiley and Sons, pages 521-539, B-10 lined detectors are prone to degraded and unpredictable response in a high gamma flux, whereas the SRMs are not as susceptible to the same phenomena. As a further explanation, although the energy deposited by a gamma in a B-10 detector is less than that deposited by a neutron, in a large gamma flux a pulse "pile-up" condition occurs which results in several gammas being counted together thereby producing about the same signal as a neutron; and if the detector electronics are set to reduce the pulse pile-up effect, a reduction in neutron detection efficiency occurs. On the other hand, the energy deposited by a neutron in a fission chamber is much greater than that of a gamma, thus making the neutron counts easily distinguished from the gammas. Therefore the SRM circuitry can more easily discriminate the gamma flux and thus the SRMs provide a more reliable, well characterized signal than the FLCs in a high gamma environment (i.e., in the presence of irradiated nuclear fuel).

Based on previous SRM response calculations by PP&L, it is believed that one irradiated fuel assembly adjacent to a SRM will provide at least 0.7 cps, and two assemblies around a SRM will assure at least 0.7 cps. Therefore although the proposed Technical Specification changes will allow loading of up to eight fuel assemblies before requiring the necessary SRM counts, no loss of neutron monitoring capability is expected to occur.

In order to assure a safe subcritical condition during the loading of the first eight fuel assemblies, calculations were performed by PP&L assuming maximum reactivity conditions (i.e., cold, clustered, uncontrolled, peak reactivity) which concluded that eight fuel assemblies, as analyzed, would remain subcritical. These calculations were bounding for all the fuel to be used during Susquehanna SES Unit 1 Cycle 2, and will be reviewed for all future cycles as part of the normal reload design analysis and Technical Specifications review for both units.

During a typical core reloading, two irradiated fuel assemblies will be loaded around each SRM to produce greater than the minimum required count rate. Loading schemes are then selected to provide for a continuous multiplying medium to be established between the required operable SRMs and the location of the core alteration. This enhances the ability of the SRMs to respond to the loading of each fuel assembly. During a core unloading, the last fuel to be removed is that fuel adjacent to the SRMs. All the normal refueling interlocks will be required to be operable, which ensures that no more than one control rod can be withdrawn (with fuel in its control cell) during core alterations. This in itself precludes the possibility of inadvertent criticality since the core is designed to meet Shutdown Margin requirements with one control rod fully withdrawn.

Based on the above safety assessment, the proposed Technical Specification change which will permit loading of up to eight fuel assemblies to attain the necessary neutron count rate on the SRM detectors will result in improved safety because:

- The SRMs are more reliable in detecting neutrons than the FLCs in the presence of irradiated nuclear fuel;
- Conservative analyses have shown that criticality is not a problem during the loading of the first eight fuel assemblies;
- The risk of dropping loose objects into the reactor is reduced by eliminating the use of the FLCs.

Similar submittals have been accepted by the NRC for Browns Ferry, Hatch, and Vermont Yankee and the PP&L proposal is conservative with respect to those previous submittals.

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

PENNSYLVANIA POWER & LIGHT COMPANY : Docket No. 50-387

PROPOSED AMENDMENT NO. 67

FACILITY OPERATING LICENSE NO. NPF-14

SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 1

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 67 to its Facility Operating License No. NPF-14 dated July 17, 1982.

This amendment contains a revision to the Susquehanna SES Unit 1 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

B. D. Kenyon
Vice President - Nuclear Operations

Sworn to and subscribed before me
this 9th day of April, 1985.

Martha C. Barto
Notary Public

MARTHA C. BARTO, Notary Public
Allentown, Lehigh County, Pa.
My Commission Expires Jan. 13, 1986

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

PENNSYLVANIA POWER & LIGHT COMPANY : Docket No. 50-388

PROPOSED AMENDMENT NO. 20

FACILITY OPERATING LICENSE NO. NPF-22

SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 2

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 20 to its Facility Operating License No. NPF-22 dated March 23, 1984.

This amendment contains a revision to the Susquehanna SES Unit 2 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

B. D. Kenyon
Vice President - Nuclear Operations

Sworn to and subscribed before me
this 9th day of April, 1985.

Notary Public

MARTHA C. BARTO, Notary Public
Allentown, Lehigh County, Pa.
My Commission Expires Jan. 13, 1986