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PSEG
Nuclear LLC

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LR-N00-0410
LCR S00-08

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

SUPPLEMENTAL INFORMATION FOR A REQUESTED CHANGE TO THE TECHNICAL SPECIFICATIONS - BEACON CHANGES
SALEM GENERATING STATION
FACILITY OPERATING LICENSES DPR-70 and DPR-75
DOCKET NOS. 50-272 AND 50-311

This letter provides supplemental information concerning a request submitted June 14, 2000 by Public Service Electric and Gas Company (PSE&G) for approval of changes to the Salem Generating Station Technical Specifications (TS) to permit use of the Best Estimate Analyzer For Core Operations – Nuclear (BEACON) system at Salem to perform core power distribution measurements. BEACON is a core power distribution monitoring and support system based on a three dimensional nodal code. The system is used to provide data reduction for incore neutron flux maps, core parameter analysis and follow, and core prediction.

Attachment 1 of this letter contains PSEG Nuclear's response to NRC staff questions which were discussed during a telephone conference on October 10, 2000. Attachment 2 contains replacement insertion text for marked up Technical Specification pages that reflect the information provided in our response to the NRC staff's questions.

Salem Unit No. 2 Technical Specification Amendment No. 212, issued July 25, 2000, affected some of the TS pages included in the previous submittal. Changes to the proposed wording for Surveillance Requirements 4.2.2.2.b, 4.2.2.3 and 4.2.3.3 are necessary to conform with Amendment 212. These changes are editorial in nature and are included in replacement marked up pages in Attachment 2.

PSEG Nuclear has concluded that the information contained in this letter and its attachments does not alter the conclusions reached in the 10CFR50.92 No Significant Hazards analysis previously submitted with LCR S00-08. Should you have any questions regarding this request, please contact Mr. Paul Duke at 856-339-1466.

Sincerely,

D. F. Garchow

A001

D. F. Garchow
Vice President – Technical Support

Affidavit
Attachments (2)

PRD

C Mr. H. Miller, Administrator - Region I
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REF: LR-N00-0410
LCR S00-08

STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

D. Garchow, being duly sworn according to law deposes and says:

I am Vice President - Technical Support of PSEG Nuclear LLC, and as such, I find the matters set forth in the above referenced letter, concerning Salem Generating Station, Units 1 and 2, are true to the best of my knowledge, information and belief.

David F. Garchow

Subscribed and Sworn to before me
this 12 day of October, 2000

Sheri L. Huston
Notary Public of New Jersey

My Commission expires on

SHERI L. HUSTON
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires 12/08/2003

ATTACHMENT 1
SALEM GENERATING STATION
FACILITY OPERATING LICENSES DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311
SUPPLEMENTAL INFORMATION FOR A REQUESTED CHANGE TO THE TECHNICAL SPECIFICATIONS - BEACON CHANGES

NRC Question 1:
The Insert A and Insert B changes to the TS are written so that above 25% thermal power the Beacon PDMS, if operable, must be utilized. Why aren't the changes written so that use of either the PDMS or the incore detectors is optional? Unit 2 SR 4.2.4.2 change is written as an option.

PSEG Nuclear Response to NRC Question 1:
The intent of the proposed change is to permit use of BEACON as a power distribution monitoring system (PDMS) to augment the functionality of the flux mapping system in performing power distribution surveillances when thermal power is greater than 25% of rated thermal power (RTP). Insert B revises Surveillance Requirement (SR) 4.2.2.2.b for evaluating the Heat Flux Hot Channel Factor ($F_Q(Z)$) when thermal power is greater than 25% of RTP. To make it clear that either PDMS or the incore detectors can be used to satisfy SR 4.2.2.2.b, Insert B is being revised to read:

> Using the PDMS <u>or the moveable incore detectors</u> when THERMAL POWER is > 25% of RATED THERMAL POWER, and increasing the measured $F_Q(Z)$ by the applicable manufacturing and measurement uncertainties as specified in the COLR.

In order to conform with changes that were approved in Unit 2 TS Amendment No. 212, separate inserts are provided for Units 1 and 2.

NRC Question 2:
Unit 2 TS 3/4.3.1 is changed, and not a comparable unit 1 TS. What is the difference between units 1 and 2 that does not necessitate a similar change in unit 1 TS?

PSEG Nuclear Response to NRC Question 2:
The current Unit 2 Technical Specification Table 3.3-1 Action 2.d requires use of movable incore detectors in four pairs of symmetric thimble locations to confirm the indicated quadrant power tilt ratio (QPTR) is consistent with the normalized symmetric power distribution when one power range nuclear instrumentation system channel is inoperable and thermal power is greater than 75% of RTP. Action 2.d is redundant to Unit 2 SR 4.2.4.2 which addresses the same plant conditions and requires the same actions.

Unit 1 Technical Specification Table 3.3-1 does not contain Action 2.d. Instead, SR 4.2.4.c applies when one power range nuclear instrumentation system channel is inoperable and thermal power is greater than 75% of RTP. The Unit 1 requirement is more restrictive than the Unit 2 requirements since it does not allow for use of the four

pairs of symmetric thimble locations. To satisfy Unit 1 SR 4.2.4.c, a complete flux map is obtained. Therefore no changes to Unit 1 TS Table 3.3-1 are required.

For both Units 1 and 2, the proposed change would permit use of PDMS to determine the QPTR is within limits when one power range nuclear instrumentation system channel is inoperable and thermal power is greater than 75% of RTP.

NRC Question 3:
The applicable manufacturing and measurement uncertainties discussed in SR 4.2.2.3 are to be specified in the COLR, rather than listed in the TS as they are now. Why are they to be specified in the COLR; do they vary from cycle to cycle?

PSEG Nuclear Response to NRC Question 3:
The BEACON methodology's treatment of power distribution uncertainty is described in Section 5 of WCAP-12472-P-A (Topical Report for BEACON). Uncertainty components determined by BEACON include: assembly power, model calibration interval, inoperable movable detector thimbles, inoperable thermocouples, power to reaction rate, peak to assembly power, axial peak, and grid factor uncertainties. The model calibration interval, inoperable movable detector thimbles, and inoperable thermocouple uncertainties all have the ability to change as a function of cycle exposure and from cycle-to-cycle. BEACON automatically determines these uncertainties, performs the convolution of uncertainties as described in the topical report and applies them to the measured peaking factors. The Core Operating Limits Report (COLR) will reference WCAP-12472-P-A for determination of measurement uncertainties for $F_{\Delta H}$ and F_Q. The manufacturing uncertainty for F_Q and F_{xy} does not change from 1.03. The measurement uncertainties for incore flux mapping will not change from 1.04 for $F_{\Delta H}$ and 1.05 for F_Q and F_{xy}.

ATTACHMENT 2
SALEM GENERATING STATION
FACILITY OPERATING LICENSES DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311
SUPPLEMENTAL INFORMATION FOR A REQUESTED CHANGE TO THE TECHNICAL SPECIFICATIONS - BEACON CHANGES

REPLACEMENT MARKED UP TECHNICAL SPECIFICATION PAGES

INSERT A1

1. When THERMAL POWER is ≤ 25%, but > 5% of RATED THERMAL POWER, or

2. When the Power Distribution Monitoring System (PDMS) is inoperable;

and increasing the Measured $F_Q(Z)$ by the applicable manufacturing and measurement uncertainties as specified in the COLR.

INSERT A2

3. When THERMAL POWER is ≤ 25%, but > 5% of RATED THERMAL POWER, or

4. When the Power Distribution Monitoring System (PDMS) is inoperable;

and increasing the Measured $F_Q(Z)$ by the applicable manufacturing and measurement uncertainties* as specified in the COLR.

INSERT B1

Using the PDMS or the moveable incore detectors when THERMAL POWER is > 25% of RATED THERMAL POWER, and increasing the measured $F_Q(Z)$ by the applicable manufacturing and measurement uncertainties as specified in the COLR.

INSERT B2

Using the PDMS or the moveable incore detectors when THERMAL POWER is > 25% of RATED THERMAL POWER, and increasing the measured $F_Q(Z)$ by the applicable manufacturing and measurement uncertainties* as specified in the COLR.

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 F_{xy} shall be evaluated to determine if $F_Q(Z)$ is within its limit by:

a. Using the movable incore detectors to obtain a power distribution map ~~at any THERMAL POWER greater than 5% of RATED THERMAL POWER.~~

INSERT A1

b. ~~Increasing the measured F_{xy} component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% to account for measurement uncertainties.~~

INSERT B1

c. Comparing the F_{xy} computed (F^C_{xy}) obtained in b, above to:

1. The F_{xy} limits for RATED THERMAL POWER (F^{RTP}_{xy}) for the appropriate measured core planes given in e and f below, and

2. The relationship:

$$F_{xy}^L = F_{xy}^{RTP} [1-PF_{xy} (1-P)]$$

where F^L_{xy} is the limit for fractional THERMAL POWER operation expressed as a function of F^{RTP}_{xy}, PF_{xy} is the power factor multiplier for F_{xy} in the COLR, and P is the fraction of RATED THERMAL POWER at which F_{xy} was measured.

d. Remeasuring F_{xy} according to the ~~following~~ core schedule:

1. When F^C_{xy} is greater than the F^{RTP}_{xy} limit for the appropriate measured core plane but less than the F^L_{xy} relationship, additional power distribution ~~maps~~ measurements shall be taken and F^C_{xy} compared to F^{RTP}_{xy} and F^L_{xy}:

a) Either within 24 hours after exceeding by 20% of RATED THERMAL POWER or greater, the THERMAL POWER at which F^C_{xy} was last determined, or

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 F_{xy} shall be evaluated to determine if $F_Q(Z)$ is within its limit by:

INSERT A2

a. Using the movable incore detectors to obtain a power distribution map ~~at any THERMAL POWER greater than 5% of RATED THERMAL POWER.~~

b. ~~Increasing the measured F_{xy} component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5%* to account for measurement uncertainties.~~

INSERT B2

c. Comparing the F_{xy} computed (F^C_{xy}) obtained in b, above to:

1. The F_{xy} limits for RATED THERMAL POWER (F^{RTP}_{xy}) for the appropriate measured core planes given in e. and f., below, and

2. The relationship:

$$F^L_{xy} = F^{RTP}_{xy} \quad [1 + PF_{xy}(1-P)]$$

where F^L_{xy} is the limit for fractional THERMAL POWER operation expressed as a function of F^{RTP}_{xy}, PF_{xy} is the power factor multiplier for F_{xy} in the CORL, and P is the fraction of RATED THERMAL POWER at which F_{xy} was measured.

d. Remeasuring F_{xy} according to the following schedule:

1. When F^C_{xy} is core greater than the F^{RTP}_{xy} limit for the appropriate measured core plane but less than the F^L_{xy} relationship, additional power distribution ~~maps~~ measurements shall be taken and F^C_{xy} compared to F^{RTP}_{xy} and F^L_{xy}:

a) Either within 24 hours after exceeding by 20% of RATED THERMAL POWER or greater, the THERMAL POWER at which F^C_{xy} was last determined, or

b) At least once per 31 EFPD, whichever occurs first.

* For Cycle 11, when the number of available movable detector thimbles is greater than or equal to 50% and less than 75% of the total, the 5% measurement uncertainty shall be increased to [5% + (3-T/14.5)(1%)] where T is the number of available thimbles.

SURVEILLANCE REQUIREMENTS (Continued)

Core

2. When the F^C_{xy} is less than or equal to the F^{RTP}_{xy} limit for the appropriate measured core plane, additional power distribution ~~maps~~ measurements shall be taken and F^C_{xy} compared to F^{RTP}_{xy} and F^L_{xy} at least once per 31 EFPD.

e. The F_{xy} limit for Rated Thermal Power (F^{RTP}_{xy}) shall be provided for all core planes containing bank "D" control rods and all unrodded core planes in the COLR per specification 6.9.1.9.

f. The F_{xy} limits of e., above, are not applicable in the following core plane regions as measured in percent of core height from the bottom of the fuel:

1. Lower core region from 0% to 15%, inclusive.
2. Upper core region from 85% to 100%, inclusive.
3. Grid plane regions at 17.8% ± 2%, 32.1% ± 2%, 46.4% ± 2%, 60.6% ± 2% and 74.9% ± 2%, inclusive.
4. Core plane regions within ± 2% of core height (± 2.88 inches) about the bank demand position of the bank "D" control rods.

g. Evaluating the effects of F_{xy} on $F_Q(Z)$ to determine if $F_Q(Z)$ is within its limit whenever F^C_{xy} exceeds F^L_{xy}.

Core measurement

4.2.2.3 When $F_Q(Z)$ is measured pursuant to specification 4.10.2.2, an overall measured $F_Q(Z)$ shall be obtained from a power distribution ~~map~~ and increased by ~~3% to account for~~ manufacturing ~~tolerances~~ and ~~further increased by 5%* to account for~~ measurement ~~uncertainty.~~

the applicable

uncertainties* as specified in the COLR

* For Cycle 11, when the number of available movable detector thimbles is greater than or equal to 50% and less than 75% of the total, the 5% measurement uncertainty shall be increased to [5% + (3-T/14.5)(1%)] where T is the number of available thimbles.

4.2.3.1 $F^N_{\Delta H}$ shall be determined to be within its limit by ~~using the movable incore detectors to obtain~~ a power distribution ~~map~~.

a. Prior to operation above 75% of RATED THERMAL POWER after each fuel loading, and

b. At least once per 31 Effective Full Power Days.

c. The provisions of Specification 4.0.4 are not applicable.

4.2.3.2 The measured $F^N_{\Delta H}$ of 4.2.3.1 above, shall be increased by ~~4%* for measurement uncertainty~~

* For Cycle 11, when the number of available movable detector thimbles is greater than or equal to 50% and less than 75% of the total, the 4% measurement uncertainty shall be increased to [4% + (3-T/14.5)(1%)] where T is the number of available thimbles.