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Waterford 3

W3F1-93-0090
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PR

September 7, 1993

Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Technical Specification Change Request NPF-38-140

Gentlemen:

The attached description and safety analysis support a change to the Waterford 3 Technical Specifications (TS).

This proposed change concerns the incore detector Limiting Condition for Operation (LCO) 3.3.3.2 and proposes an interim change applicable for the remainder of Fuel Cycle 6. This change modifies the operability requirements for the Incore Detection System by reducing the minimum number of required incore detector locations from the current specified 75% to a proposed 50%.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that the proposed change involves no significant hazards considerations.

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The circumstances surrounding this change do not meet the NRC's criteria for exigent or emergency review. However, as described herein these circumstances may change at any time; therefore, an expeditious review is respectfully requested.

Should you have any questions or comments concerning this request, please contact Paul Caropino at (504)739-6692.

Very truly yours,

R.P. Barkhurst
Vice President, Operations
Waterford 3

RPB/PLC/dc
Attachment: Affidavit
NPF-38-140

cc: J.L. Milhoan, NRC Region IV
D.L. Wigginton, NRC-NRR
R.B. McGehee
N.S. Reynolds
NRC Resident Inspectors Office
Administrator Radiation Protection Division
(State of Louisiana)
American Nuclear Insurers

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of	)	
	)	
Entergy Operations, Incorporated	)	Docket No. 50-382
Waterford 3 Steam Electric Station	)	

AFFIDAVIT

R.P. Barkhurst, being duly sworn, hereby deposes and says that he is Vice President Operations - Waterford 3 of Entergy Operations, Incorporated; that he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached Technical Specification Change Request NPF-38-140; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

R.P. Barkhurst
Vice President Operations - Waterford 3

STATE OF LOUISIANA)
) ss
PARISH OF ST. CHARLES)

Subscribed and sworn to before me, a Notary Public in and for the Parish and State above named this 7TH day of SEPTEMBER, 1993.

Notary Public

My Commission expires WITH LIFE.

DESCRIPTION AND SAFETY ANALYSIS
OF PROPOSED CHANGE NPF-38-140

This proposed change modifies Technical Specification (TS) 3.3.3.2.a by reducing the specified minimum number of incore detector locations from 75% to 50% for the remaining portion of the current fuel cycle.

Existing Specification

See Attachment A

Proposed Specification

See Attachment B

Description

The proposed change to the Waterford 3 TS modifies the incore detection system operability requirements to allow power distribution monitoring and calibration functions to be performed with as few as 50% of incore detector locations operable. Specifically a footnote has been added to TS 3.3.3.2.a that states

"For the remainder of fuel cycle 6 the incore detection system may be considered OPERABLE with < 75% and ≥ 50% of all incore locations provided the appropriate penalties are applied to the COLSS and CPCs."

To compensate for any increased uncertainty when the number of operable detector locations falls below the existing specification of 75%, revised addressable constant values will be installed in the Core Operating Limit Supervisory System (COLSS) and Core Protection Calculator System (CPCs). In addition Waterford 3 will evaluate the core power distribution once every 15 days, which is twice as often as the TS now require.

A similar license amendment request has been reviewed by the staff as indicated in Federal Register Vol. 58, No. 51 page 14594 dated March 18, 1993, Baltimore Gas & Electric Co.

The purpose of incore detection instrumentation is to provide inputs for determination of core power distributions, perform validation of the CPC power distribution, and provide inputs to the COLSS. The Waterford 3 fixed incore detection system consists of 56 incore detector locations within selected fuel

assemblies of the reactor core. Each location contains a string of five self-powered, Rhodium neutron detectors positioned axially at elevations corresponding to 10, 30, 50, 70, and 90% of core height.

Currently, four detector locations (which accounts for 20 detectors) are not functional due to the instrumentation thimble being cut off (2) or the instrument being broken off inside the thimble (2). At this point in Fuel Cycle 6, an additional 30 detector failures have occurred. These 30 detector failures combined with the 20 non-functional detectors, have caused 12 of the detector locations to be inoperable. At present, 78.6% of the detector locations are operable. However, there are two locations where a single detector failure will render the location inoperable and should these failures occur 75% of the locations will be operable.

The TS requires four of the five detectors in a string to be operable for the location to be operable and that 75% of all detector locations be operable. Additionally, "a minimum of two quadrant symmetric incore detector locations per core quadrant" are required.

Recognizing that additional detector failures could impose upon the 75% Operable location criteria, Waterford 3 is seeking temporary relief for the remainder of Fuel Cycle 6. Detector assemblies were last replaced during Refuel 4, and 42 assemblies are scheduled for replacement during Refuel 6, scheduled to begin in March 1994. Currently there are 4 operable quadrant symmetric detector locations per core quadrant. Since the TS only requires two there is no immediate concern over this requirements.

The incore detector signals are used by the off-line computer code CECOR to calculate the spatial power distribution in the core including the tilt and power peaking factors. The incore detector signals are used by the COLSS monitoring program to assist the operator in maintaining DNBR, Linear Heat Rate, Azimuthal Tilt, and Axial Shape Index, within their specified operating limits during normal operation.

If the incore detection system becomes inoperable, the Excore Detector System must be used for monitoring core power distribution. Because the Excore Detector System is more restrictive, maximum core power must be limited to approximately 90% of full power to comply with TS requirements.

Entergy Operations Inc. performed a new analysis of the overall CECOR power peaking factor measurement uncertainties to determine the effects of monitoring the power distribution with as few as 50% of the locations operable and thereby avoid the power constraint associated with using the excore system. This analysis models the present instrument failures previously

mentioned and combines them with various additional postulated failures so as to model up to 50% of the detector locations as failed. In this analysis a failed location is modeled as having all five detectors failed. Additional randomly chosen detector failures were also modeled within the bounds of the quadrant symmetric detector location requirements of the TS. From this analysis, the resultant overall uncertainty on CECOR measured planar radial peaking factors (F_{xy}) increases by less than 1% compared to the value of 6.92% given in the NRC approved CECOR Topical Report MSS-NA3-P, "Verification of CECOR Coefficient Methodology for Application Pressurized Water Reactors of the Middle South Utilities System," August 1, 1984. Additionally, the ABB-Combustion Engineering Nuclear Fuel organization has assessed the impact of the increased CECOR F_{xy} measurement uncertainty upon the calculations performed by the COLSS and CPCs. The impact will be accounted for in revised values of addressable constants input to these systems. For conservatism, a full 1% increase in the CECOR F_{xy} measurement uncertainty was utilized for the generation of the new constants. The increased accounting for the measurement-calculational uncertainties will provide assurance that actual core peaking factors are conservatively bounded by the measured peaking factors. Therefore, operating the reactor within the appropriate TS LCO will continue to assure that actual core power distributions remain within the design parameters assumed for applicable event analysis contained in the Updated Final Safety Analysis Report (UFSAR).

Safety Analysis

The proposed change described above shall be deemed to involve a significant hazards consideration if there is a positive finding in any of the following areas:

1. Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The proposed change would relax requirements for the number of operable incore detector locations. The function of the incore detectors is to verify that the core power distribution is consistent with the assumptions used in the safety analysis. Sufficient measurements will be required to adequately verify compliance with power distribution Technical Specification limits. Penalties will be applied to the COLSS and CPCs to account for the increased uncertainties of values measured by the incore detectors prior to using incore detectors to monitor Technical Specification Limits when the number of operable detector

locations falls below the current requirement. This will ensure that all current Technical Specification and fuel design limits are protected and the core power distribution assumptions in UFSAR analysis remain valid. Therefore, the proposed change will not involve a significant increase in the probability or consequences of any accident previously evaluated.

2. Will operation of the facility in accordance with this proposed change create the possibility of a new or different type of accident from any accident previously evaluated?

Response: No.

The proposed change will not alter the operation of the plant or the manner in which it is operated. Reducing the minimum number of operable incore detector locations will not introduce any new failure modes. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any accidcnt previously evaluated.

3. Will operation of the facility in accordance with this proposed change involve a significant reduction in a margin of safety?

Response: No

The proposed change will continue to protect the current Technical Specification power distribution limits. Use of increased measurement uncertainty factors are required commensurate with the reduction in the minimum number of incore detector locations. The increased measurement uncertainty factors assure that power distribution calculations based on the incore system will continue to be conservative and that the existing LCOs specified for Axial Shape Index, Azimuthal Power Tilt, Radial Peaking Factors, Local Power Density, and DNBR will not be exceeded. Therefore, the proposed change will not involve a significant reduction in a margin of safety.

Safety and Significant Hazards Determination

"Based on the above safety analysis, it is concluded that: (1) the proposed change does not constitute a significant hazards consideration as defined by 10 CFR50.92; and (2) there is a reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and (3) this action will not result in a condition which significantly alters the impact of the station on the environment as described in the NRC final environmental statement."