

June 24, 1987

Docket Nos.: 50-280
and 50-281

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Mr. W. L. Stewart
Vice President - Nuclear Operations
Virginia Electric and Power Company
Post Office Box 26666
Richmond, Virginia 23261

Dear Mr. Stewart:

SUBJECT: PROPOSED AMENDMENT FOR REDUCING THE REQUIRED NUMBER OF THIMBLES FOR FLUX MAPPING WITH THE INCORE MOVABLE DETECTOR SYSTEM SURRY POWER STATION, UNITS NO. 1 AND NO. 2 (Surry 1&2)

By letter dated April 15, 1985, the Virginia Electric and Power Company (VEPCO) proposed a change to the Technical Specifications for Surry-1&2. Specifically, the proposed change would reduce the minimum number of thimbles required for taking flux maps with the incore movable detector system from 75% to 50%.

The NRC staff has completed its review of the proposed amendment request as well as the VEPCO Topical Report "A Study of the Effects of a Reduced Number of Thimbles on the Results of Incore Flux Map Analysis" VEP-NOS-8, dated October 1983. As stated in the enclosed Safety Evaluation, the staff has determined that the proposed change by VEPCO is unacceptable at this time. Therefore, we are closing out the Technical Assignment Control (TAC) Numbers 57471 and 57472 regarding this subject for Surry-1&2.

Also enclosed is a Notice of Denial of Amendments to Facility Operating Licenses and Opportunity for a Hearing, which has been forwarded to the Office of the Federal Register for publication.

Sincerely,

Chandu P. Patel, Project Manager
Project Directorate II-2
Division of Reactor Projects I/II

Enclosures: As stated

cc: See next page

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Mr. W. L. Stewart
Virginia Electric and Power Company

Surry Power Station

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ENCLOSURE 1
SAFETY EVALUATION
REDUCED NUMBER OF THIMBLES FOR FLUX MAPPING
SURRY POWER STATION UNIT NOS. 1 AND 2

INTRODUCTION

By letter dated April 15, 1985 Virginia Electric and Power Company (VEPCO) proposed an amendment in the form of changes to the Technical Specifications to Operating Licenses DPR-32 and DPR-37 for Surry Power Station Unit Nos. 1 and 2. The proposed Technical Specification changes would reduce the minimum number of thimbles required for monthly surveillance flux mapping from 75% to 50%. In support of the requested amendment, VEPCO provided a Topical Report, "A Study of the Effects of a Reduced Number of Thimbles on the Results of Incore Flux Map Analysis" VEP-NOS-8, October 1983.

EVALUATION

Westinghouse reactors operating with Standard Technical Specifications have a Specification requiring availability of at least 75% of the detector thimbles. Older plants have varying requirements. However, we advocate maintenance of as close to 100% operability of the incore detector system as is possible. We believe that this is required to be able to identify and evaluate possible power distribution or reactivity anomalies which might occur during the operation of power plants. An example is the burnable poison rod leaching problem that occurred in St. Lucie 1 where the incore instrumentation was essential in identifying and understanding the problem.

The 75% operability requirement was chosen to allow a reasonable amount of failures of the incore detectors, but to encourage the licensees to strive for as near to 100% as possible. Technical Specification changes to reduce the number to 50% might result in a lack of incentive to keep the system operating as close to 100% as possible. This could result in an unacceptably degraded

ability to detect anomalous conditions in the core. We find the proposed change unacceptable primarily for this reason.

A recent study by our consultants at BNL* on the impact of failed detectors on the ability to detect abnormal conditions indicates that the number of thimbles provided in the reactor design is marginal for detection of some core abnormalities. Worst conditions involve low detector density and location of the abnormality in the same area of the core. These results strongly support the conclusion that a reduction in the number of detector thimbles required to be operable is not prudent.

The Surry reactors, not being Standard Technical Specification power plants, do not have an explicit Specification requiring 75% of the detector thimble locations to be available. Instead, the number ≥ 38 thimbles appears on basis page TS 3.12-15. This number (rounded up) is 75% of the 50 thimbles provided in the Surry design. From the language of this amendment, the licensee apparently regards the number ≥ 38 as a requirement. The proposed change would allow a minimum of 26 (50%, rounded up) thimbles to obtain a flux map for routine monthly surveillance of hot channel factors. The uncertainty allowance for the number of thimbles between 26 and 38 is increased by 2% for F_Q measurements and 1% for $F_{\Delta H}$ measurements. These uncertainty increases are the result of the analysis contained in VEP-NOS-8.

If the hot channel factors are exceeded with these uncertainty allowances (in addition to the normal uncertainty allowances), or if a hot channel factor measurement is required for a quadrant tilt in excess of its limit or for a misaligned rod, then at least 38 thimbles would be required for an incore map in the proposed change. In each of these options, however, an incore map is not mandatory so the reactor could continue to operate (for some options at reduced power) with 26 thimbles available. Further, with the power distribution control system being used at the Surry reactors, involving constant axial offset control and cycle specific peaking factor analyses, it is not possible for a steady state incore flux map to indicate the F_Q limit has been exceeded.

* Memorandum from P. Neogy and A. Prince (BNL) to J. F. Carew (BNL), "Impact of Failed Detectors on the Measurement of Normal and Anomalous Power Distributions," August 8, 1986.

There have been two requests to reduce the number of thimbles required by the Technical Specifications in recent years, one by Duquesne Light for Beaver Valley Unit 1 and the other by Omaha Public Power District for Ft. Calhoun. These were found unacceptable in letters from L. S. Rubenstein to G. Lainas, "Beaver Valley Unit 1, Evaluation of Thimble Deletion Technical Specification Change", August 17, 1983 and L. S. Rubenstein to G. Lainas, March 22, 1983, respectively. In other related actions, there have been occasions, for various reasons, when failures in operating PWRs have approached or exceeded 25%, and relaxation of the 75% requirement has been permitted for the duration of affected reactor cycles. This has generally been allowed either with increased surveillance of some sort (such as increased frequency of flux mapping), or in most cases because there is substantial margin (usually late in a cycle) to Technical Specification peaking factor limits. Other than such requests for temporary relaxation of the Technical Specification requirements, we are not aware of any problem in meeting the 75% requirement. We therefore believe that temporary relief could be provided in any situation requiring it, and prefer to do that rather than allowing a permanent change in detector availability requirements.

The above conclusion has been reached on the basis that we do not know if a thorough study of detector failures has ever been conducted. We do not know detector failure rates, problems encountered at specific plants, frequency of thimble cleaning required, etc. The answer to such questions should be determined before any further consideration is given to relaxation of detector availability requirements. In addition, we would recommend that any further consideration of a permanent change in detector requirements should be done on a generic basis.

In our review of the Topical Report provided in support of the VEPCO amendment request, we find three areas of difficulty. The report provides a statistical basis for determining the increase in uncertainty allowance to be applied to the measurement of F_0 and $F_{\Delta H}$ with a reduced number of detectors. Our finding of unacceptability of the proposed amendment is on another basis. We believe that the flux mapping system can provide information about conditions that are not normal, which is not related to the routine measurement of the peaking factors.

The three problems with the report relative to determining anomalous conditions, are: 1) The uncertainties are determined for a variety of core conditions, all statistically combined. We would expect larger uncertainties for the most abnormal conditions considered alone, which is the time we would really want the best information. 2) The uncertainties for various failure locations and numbers of failures are statistically combined. This washes out the large uncertainty for the case where the failures occur around an area in which there is an abnormal condition. At one time Westinghouse reported at a meeting that they were working on a system which determined that uncertainty based upon the number of failures in a given area of the core. Such an approach would seem more acceptable. 3) The study does not address non-random failures of the detectors.

CONCLUSION

As discussed above, our difficulties with the proposed reduction in the number of incore thimbles required by the Technical Specification are:

1. We are concerned that the ability to detect anomalous conditions in the core will be seriously degraded.
2. The language of the proposed change would allow the system to be degraded indefinitely.
3. There are technical problems with the statistical treatment supporting the increased uncertainty allowance for reduced detector availability.
4. Operating data are not available to indicate whether there is a plant specific or generic problem involved with maintaining detector thimble availability.
5. The licensee could obtain temporary Technical Specification relief if needed when the number of available detectors thimbles approached the limit.

For these reasons, but primarily the first listed, we find the proposed Technical Specification change unacceptable.

UNITED STATES NUCLEAR REGULATORY COMMISSION
DENIAL OF AMENDMENTS TO FACILITY OPERATING LICENSES
AND OPPORTUNITY FOR A HEARING
VIRGINIA ELECTRIC AND POWER COMPANY
DOCKET NOS. 50-280 AND 50-281

The U.S. Nuclear Regulatory Commission (the Commission) has denied a request by Virginia Electric and Power Company (the licensee) for amendments to Facility Operating License Nos. DPR-32 and DPR-37, issued to the licensee for operation of the Surry Power Station, Unit Nos. 1 and 2 (the facilities) located in Surry County, Virginia.

The proposed amendments would have reduced the minimum number of thimbles required for taking flux maps with the incore movable detector system from 75% to 50%. Notice of Consideration of Issuance of these amendments was published in the FEDERAL REGISTER on May 21, 1985 (50 FR 20996). The licensee's application for the amendments was dated April 15, 1985.

The request was found unacceptable due to the fact that the ability to detect anomalous conditions in the core would be seriously degraded. Technical Specification changes to reduce the number of thimbles required for taking flux maps with the incore movable detector system to 50% might result in a lack of incentive to keep the system operating as close to 100% as possible, and could result in an unacceptably degraded ability to detect anomalous conditions in the core. Therefore, the proposed change to the Technical Specifications is denied.

The licensee was notified of the Commission's denial of this request by letters dated June 24, 1987.

By July 30, 1987 the licensee may demand a hearing with respect to the denial described above and any person whose interest may be affected by this proceeding may file a written petition for leave to intervene.

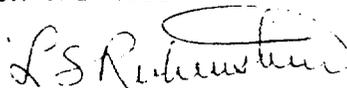
A request for a hearing or for leave to intervene must be filed with the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Services Branch, or may be delivered to the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. by the above date.

A copy of any petition should also be sent to the Office of the General Counsel - Bethesda, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, and to Mr. Michael W. Maupin, Esq., Hunton and Williams, Post Office Box 1535, Richmond, Virginia 23213.

For further details with respect to this action, see (1) the application for amendments dated April 15, 1985, and (2) the Commission's letter to Virginia Electric and Power Company dated June 24, 1987, which are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. and at the Swem Library, College of William and Mary, Williamsburg, Virginia 23185. Copies of item (2) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Reactor Projects-I/II.

Dated at Bethesda, Maryland, this 24th day of June, 1987.

FOR THE NUCLEAR REGULATORY COMMISSION



Lester S. Rubenstein, Director
Project Directorate II-2
Division of Reactor Projects-I/II