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Gentlemen:

In the Matter of) Docket Nos. 50-260
Tennessee Valley Authority)

BROWNS FERRY NUCLEAR PLANT (BFN) - CORRECTIVE ACTION PLAN TO DISPOSITION CONCERNS RELATED TO INSTRUMENT SENSING LINES

This letter provides TVA's corrective action plan for instrument sensing line issues at BFN. These issues were identified in Volume 3 of the TVA Nuclear Performance Plan. The enclosure to this letter outlines the program being implemented at BFN to resolve these issues and provides the current status of the program.

If there are questions or further information is needed, please contact J. L. Turner at (205) 729-2853.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

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Enclosures
cc: See page 2

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U.S. Nuclear Regulatory Commission

OCT 19 1988

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ENCLOSURE

Browns Ferry Nuclear Plant (BFN)
Instrument Sensing Lines Corrective Action Plan

Introduction

This submittal addresses various issues related to instrument sensing lines at BFN. Volume 3 of the TVA Nuclear Performance Plan has previously provided information on this subject. Separation, slope, and quality classification are the three issues which are being tracked by Condition Adverse to Quality Reports. This enclosure presents the approach TVA is taking to disposition the three issues. TVA intends to resolve the issues utilizing lessons learned from Sequoyah Nuclear Plant where applicable.

Overview of Corrective Action Plan

Based on the current investigation, sufficient justification exists to resolve the separation and quality classification issues without further field evaluations. This was concluded because of present programs directly and indirectly related to their resolution.

The following approach was utilized in the resolution of the slope issue. A review of BFN operating history was performed to determine if problems attributable to improper slope were evident. This was followed by a calculation to identify the safety-related instruments that are required to function during and after an accident that have sensing lines and could be affected by improper slope. This population of instruments was evaluated by the walkdown team against the present installation requirements of the Engineering Requirements Specification (ERS) which are 1/4 inch per foot for pipe and one inch per foot for tubing. Diagrammatic isometrics were prepared which provided detailed information for any lines that did not meet the ERS requirements. These isometrics were used by TVA to evaluate the acceptability of the instrument lines. TVA evaluated the amount of slope present in each line and its effect on instrument performance. Pressures and temperatures that the line would be subjected to when the instrument is required to function were also reviewed to determine if outgassing would be present. Work was initiated for any line that was determined to be deficient either from the engineering evaluations or from other miscellaneous deficiencies found during the walkdowns (i.e. loose hardware, missing bolts, etc.). Upon completion of the work, TVA will review the results to ensure acceptability. A parallel effort will take place to ensure that the ERS has been fully implemented.

Status of Corrective Action Plan

Separation:

This issue considered a potential problem with documentation to demonstrate that instrument lines are sufficiently separated to meet FSAR requirements. Paragraph 7g of FSAR Sections 7.2.2 and 7.3.3 require that the reactor protection system (RPS) and emergency core cooling system (ECCS) instrumentation have sufficient separation between redundant channels monitoring the same variable to prevent environmental factors, electrical transients, and physical events from inhibiting the ability of the system to respond. Investigations to resolve the issue have demonstrated that separation of instrument lines is adequate to meet the above FSAR requirements.

Although there existed no quantitative separation requirements for instrument lines when BFN was licensed, other considerations provide a high degree of assurance that the existing instrument line separation is adequate. The existing plant layout provides an inherent separation of redundant ECCS and RPS instrument lines. Redundant systems or subsystems are located on opposite sides of the containment structure and in general, instrument lines that interface with the containment or reactor vessel are approximately 180 degrees apart from their redundant counterpart. In addition, a number of postulated events (i.e. high energy line breaks, fires, heavy loads, and seismic events) which could result in damage to safety-related equipment have been analyzed. These analyses have demonstrated that the plant can achieve safe shutdown with the existing equipment. By assuring a safe plant response through the analysis of the effect of specific hazards, adequate equipment protection can be assured in the absence of quantitative separation criteria.

The investigation discussed above provides assurance that instrument sensing line separation is adequate to satisfy the FASR and no further action is required. All future instrument installations are controlled by the ERS which includes separation requirements.

Slope:

This issue considered a potential problem with the installed slope of safety-related instrument lines. Specifically, this issue involved the lack of sufficient evidence that field-routed, safety-related instrument lines had been installed in accordance with design criteria requirements relating to in-line valve stem orientation and instrument line slope. Previous evaluations performed by the Employee Concerns Program had confirmed the existence of this problem, requiring resolution before unit 2 restart.

The first step in the resolution of this issue was to perform a review of BFN operating history to determine if problems attributable to improper slope were evident. The results of this review found no abnormal conditions in existence that had not been previously addressed. The isolated problem with the reactor vessel water level instrument lines

had been previously identified and is being handled as a separate task although it was not conclusively determined to be a slope problem. Based on this review, the next step was to perform a calculation which identified the safety-related instruments required to function during and after an accident that had sensing lines. This population of instruments was evaluated by the walkdown teams against the slope criteria in the ERS. An isometric of each line was prepared and included detailed slope information for any portion of a line that did not meet these requirements. These isometrics were then evaluated by TVA to determine what action was required to ensure proper functioning of the instrument. Of the approximately 118 instruments evaluated, only four instrument lines required cutting to correct improper slope. These four instrument lines were a pressure transmitter in the reactor core isolation cooling system, a flow transmitter in the residual heat removal system, a pressure switch in the recirculation system and pressure differential transmitter in the feedwater system. In addition to these four lines, ten work items were generated to address other miscellaneous deficiencies found during the field walkdowns that could affect the performance of the instrument, i.e. loose or missing support hardware. Field work associated with these work items is currently being implemented. Future instrumentation installations are controlled by the ERS which includes instrument line slope requirements.

Quality Classification:

This issue considered a potential problem with the designation of quality classifications relating to requirements in FSAR Sections 1.5.1.6.1 and 1.5.2.6.1.5.

The approach being utilized to resolve this issue involves a review of the material, fabrication, inspection, and examination requirements in effect at BFN during initial construction and subsequent modifications. Currently, the investigation has determined that the material used met the applicable USAS B31.1-67 and General Electric requirements. Based on this, only instrument lines that had special requirements due to location or function need to be addressed. The various seismic programs presently in place to address small bore and tubing lines have evaluated these lines and addressed any modifications that are required to ensure seismic adequacy. Special requirements due to function were evaluated in the slope program when the instruments with sensing lines were identified in the calculation for safety-related instruments. These instruments were reviewed to ensure that they would perform their safety-related function. These reviews provide sufficient assurance that the question of quality classification has been adequately addressed.

Conclusion

As stated in the TVA Nuclear Performance Plan Volume 3, the plan to disposition concerns related to instrument sensing lines will be implemented before unit 2 restart.