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VICE PRESIDENT - NUCLEAR

July 15, 1992
PY-CEI/NRR-1517 L

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
PNPP Level 2 PRA Submittal

Gentlemen:

Enclosed for your review and assessment is a copy of Cleveland Electric Illuminating (CEI's) Level 2 Probabilistic Risk Assessment (PRA) prepared for the Perry Nuclear Power Plant (PNPP), Unit 1. The analysis and summary report were developed pursuant to Generic Letter 88-20, including supplements 1 through 3. As noted in the executive summary, CEI did not identify any Level 1 or Level 2 "vulnerabilities", however, a number of insights were gained which resulted in the identification of potential improvements discussed below and tabulated on Attachment 1.

This analysis has been under preparation for 3 years with the majority of the work being performed at the PNPP site by CEI personnel, with assistance from consultants in modeling development, some specialized analysis, and report preparation. A project approach was developed early in the effort to assure management oversight and the proper integration of technical disciplines, including operations and engineering for review. Frequent communications were established with other similar BWR/6 nuclear facilities, and most industry workshops and forums on PRA development were attended to aid the overall process. The basic goal of our structure and development process was, to the extent practical, have CEI personnel intimately involved in the PRA development to assure the accuracy of the modeling/inputs, to become familiar with the PRA techniques, and to understand/utilize the results from this analytical program. As required by Generic Letter 88-20, CEI conducted a technical peer review to assure the accuracy of the modeling and techniques used throughout the process. This review was conducted by Reliability and Performance Associates (RAPA) and ERIN Engineering for the methodology and internal personnel for detailed modeling inputs and assumptions.

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Operating Companies
Cleveland Electric Illuminating
Toledo Edison

It is our intent to retain the resultant IPE model/analysis as a "living document" for purposes of maintaining a capacity to evaluate plant conditions, operating configurations, proposed plant modifications, and other potential circumstances for potential impacts on overall plant safety and optimal regulatory compliance.

The results of our PRA analysis are contained within the enclosed report which is a comprehensive documentation of the program structure, modeling techniques, basic assumptions and inputs, system descriptions, accident sequences, and analytical results. Our Level 1 "results" for PNPP are summarized in Attachment No. 2 and are identified as a "Base Case." For the Base Case the PNPP total core damage frequency (TCDF) is a point estimate of $1.17X10^{-5}$, excluding flooding. Our Level 2 containment analysis identified a vessel breach and early containment failure with pool bypass frequency of $2.04x10^{-6}$.

The Base Case has a general model representing the plant design as of 01/01/90 and current operating practices. During the development process some early "insights" were gained that resulted in the implementation of some procedural changes which were incorporated into our program without waiting until conclusion of the analysis as was suggested in Generic Letter 88-20. Those implemented items are listed in Attachment 1 and are incorporated in the PRA model Base Case.

The Base Case also models plant enhancements which are either being incorporated into the physical plant and procedures, or are presently being engineered for incorporation. These items are also listed on Attachment 1. These enhancements were selected as first order changes which provided significant improvements to the preliminary analytical CDF estimates and were reasonable actions to implement. Beyond these Base Case enhancements, other potential enhancements are being evaluated, however careful analysis is required before any further improvements beyond the Base Case are made. These items are also listed on Attachment 1.

It should be noted that the report references 6 Appendices which are not incorporated into the submittal which provide details beyond the Generic Letter. They are available upon request and are as follows:

Appendix A	System Fault Trees
Appendix B	Success Criteria
Appendix C	Data Analysis
Appendix E	Functional Fault Trees
Appendix F	Sequence Qualification
Appendix G	Internal Flooding

CEI feels confident that the Enclosed Report is a complete response to the IPE Generic Letter (excluding Supplement 4 addressing external events) and demonstrates a significant utility commitment to evaluate the plant's relative safety configuration for improved plant management. This report has been prepared with a cross-sectional support of PNPP personnel and is believed to be

an accurate representation of the plant configuration (including improvements under development) and operation practices. Because this is a living document, we are embarking upon an independent verification program as defined by our QA program and engineering criterion for technical practices. This effort should be completed by January 1, 1993 and is considered necessary to allow utilization of the PRA as an approved methodology for review and analysis. No significant errors are anticipated, however any substantial differences identified will be brought to your attention and minor corrections may be incorporated.

Should you have any questions or desire more information in relation to this analysis, please contact us.

Sincerely,

Michael D. Lyster

MDL:MJH:ss

Attachments

cc: NRC Project Manager
NRC Resident Inspector Office
NRC Region III

PLANT IMPROVEMENTS MADE DUE TO IPE INSIGHTS

Loss of Offsite Power Instruction

(1) - Retention of RCIC isolation bypass for high steam tunnel temperature

(1) - Enhanced process for crosstieing Unit 1 and Unit 2 batteries

(1) - Enhanced process for offsite power recovery to HPCS and alternate injection system buses

Flooding Instructions

(1) - Enhanced response instructions to flooding scenario

Maintenance

(1) - Reduction of Out-of-Service Time for certain critical components

PLANT IMPROVEMENTS PROCEEDING DUE TO IPE INSIGHT

(1) - "Fast Firewater" tie between Fire Protection and HPCS

(1) - Permanent Division 3 to Division 2 "quick" crosstie

POTENTIAL IMPROVEMENTS UNDER EVALUATION

(1)(2) - ADS automatic initiation (other than ATWS)

- Passive Containment Vent

- ATWS/ADS Automatic Inhibit

- ATWS/Feedwater runback between MSCWL and Level 2 and MSIV isolation bypass

- Alternate Boron injection

POTENTIAL IMPROVEMENTS REJECTED

- Reliable power to hydrogen ignitors

(1) Base Case Incorporated
(2) Requires Industry (BWROG) Emergency Procedures Guidelines Committee approval and may require USNRC approval. Total Core Damage Frequency (TCDF) will not increase if this modification is not implemented as specific plant operating experience will more than compensate.

SUMMARY OF CORE DAMAGE FREQUENCY BY INTERNAL EVENTS INITIATOR

Internal Events Initiator	Frequency	Percentage
ATWS	4.74×10^{-6}	40.7
Transients	2.90×10^{-6}	25.0
Station Blackout	2.25×10^{-6}	19.3
Loss of Offsite Power	1.44×10^{-6}	12.4
LOCAs	3.06×10^{-7}	2.6
Total	1.17×10^{-5}	100
Flooding Alone	1.54×10^{-6}	
Total	1.32×10^{-5}	

As required by 10 CFR 73.56, I, Michael D. Lyster being duly sworn and disposed, state that (1) I am Vice President - Nuclear - Perry of the Centerior Service Company, (2) I am duly authorized to execute and file this certification on behalf of The Cleveland Electric Illuminating Company and Toledo Edison Company, and as the duly authorized agent for Duquesne Light Company, Ohio Edison Company, and Pennsylvania Power Company, and (3) the statements set forth therein are true and correct to the best of my knowledge, information and belief. The enclosed PRA submittal has been prepared in accordance with the guidelines provided in Generic Letter 88-20 and to the best of my knowledge represents PNPP Unit 1 design/operation as of January 1990 with enhancements identified in this report as "Base Case."

Michael D. Lyster

Sworn to and subscribed before me, this 15th day of July, 1992.

Gertrude A. Hall

GERTRUDE A. HALL
Notary Public, State of Ohio
My Commission Expires March 24, 1997
(Recorded in Lake County)

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