UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

50-440

January 5, 1999

LICENSEE: Cleveland Electric Illuminating Company

FACILITY: Perry Nuclear Power Plant, Unit No. 1

SUBJECT: SUMMARY OF DECEMBER 4, 1998 MEETING ON FEEDWATER ISOLATION PROVISIONS

On December 4, 1998, NRC staff met with representatives of The Cleveland Electric Illuminating Company (CEI) in Rockville, Maryland. The purpose of the meeting was to discuss proposed changes to the design and licensing basis of the containment isolation provisions for the feedwater system. A list of the meeting participants is included as Enclosure 1. The meeting handouts are included in Enclosure 2.

The meeting, which was a followup to the meeting held on November 19, 1998, between the staff and the licensee on the same subject, received increased management attention. The licensee described the feedwater check valve history and their intentions to resolve this problem in advance of the seventh refueling outage. The feedwater check valves are 20-inch valves which are not designed to be leak tight in the 8 psi post-LOCA containment environment. The licensee stated that for all accidents other than a feedwater line break, feedwater flow will be maintained to the reactor vessel and the check valves will not be required to close. While describing their efforts to maintain the check valves leak tight, the licensee noted the associated high costs and man-rem exposures. In particular, potentially hazardous situations are involved when personnel are required to hang upside down in order to polish valve seats.

The staff reiterated several of their positions that were made during the meeting of November 19, 1998. Specifically, Supplement 7 to the original Safety Evaluation Report does not preclude the single active failure of the outside gate valve to close; dual isolation barriers would be needed to satisfy General Design Criterion 56 for the feedwater penetration; an exemption to Appendix J of 10 CFR 50 would be needed if the feedwater isolation valves would not be leak rate tested; and the staff still considered injection of the feedwater leakage control system between the three isolation valves of the feedwater system to be desirable in order to maintain a water seal thus precluding air leakage.

Discussions focused on a permanent fix as opposed to a one-time scheduler exemption from the local leak rate testing requirements of Appendix J that was recommended by the staff during the meeting of November 19, 1998. Any such action would be precedent setting and would receive close review by the staff. While the staff and licensee did not reach a final resolution, any submittal would need to include exemptions from the appropriate regulations, most, if not all of the modifications proposed by the licensee in the original submittal (e.g., dual power supplies to the outside gate valves, and rerouting of the feedwater leakage control system to the stem of the outside gate valves), and a risk-informed discussion justifying the proposed actions. The risk-informed discussion would need to address the probability and consequences of the outside gate valve failing to close.

DFO1

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Following the meeting, the licensee informed the staff of their intent to prepare a new submittal that would supercede their previous proposal. The licensee expected to make this submittal at approximately the end of the month.

Douglas V Pickett

Douglas V. Pickett, Senior Project Manager
Project Directorate III-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosures: List of Meeting Participants
Meeting Handouts

cc w/encls: See next page

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Original signed by:

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MEETING ATTENDEES

NRC AND CLEVELAND ELECTRIC ILLUMINATING COMPANY

FEEDWATER ISOLATION PROVISIONS

DECEMBER 4, 1998

CLEVELAND ELECTRIC ILLUMINATING CO.

Lew Myers
Howard Bergendahl
Bradley S. Ferrell
Henry Hegrat
Thomas Shega

NRC

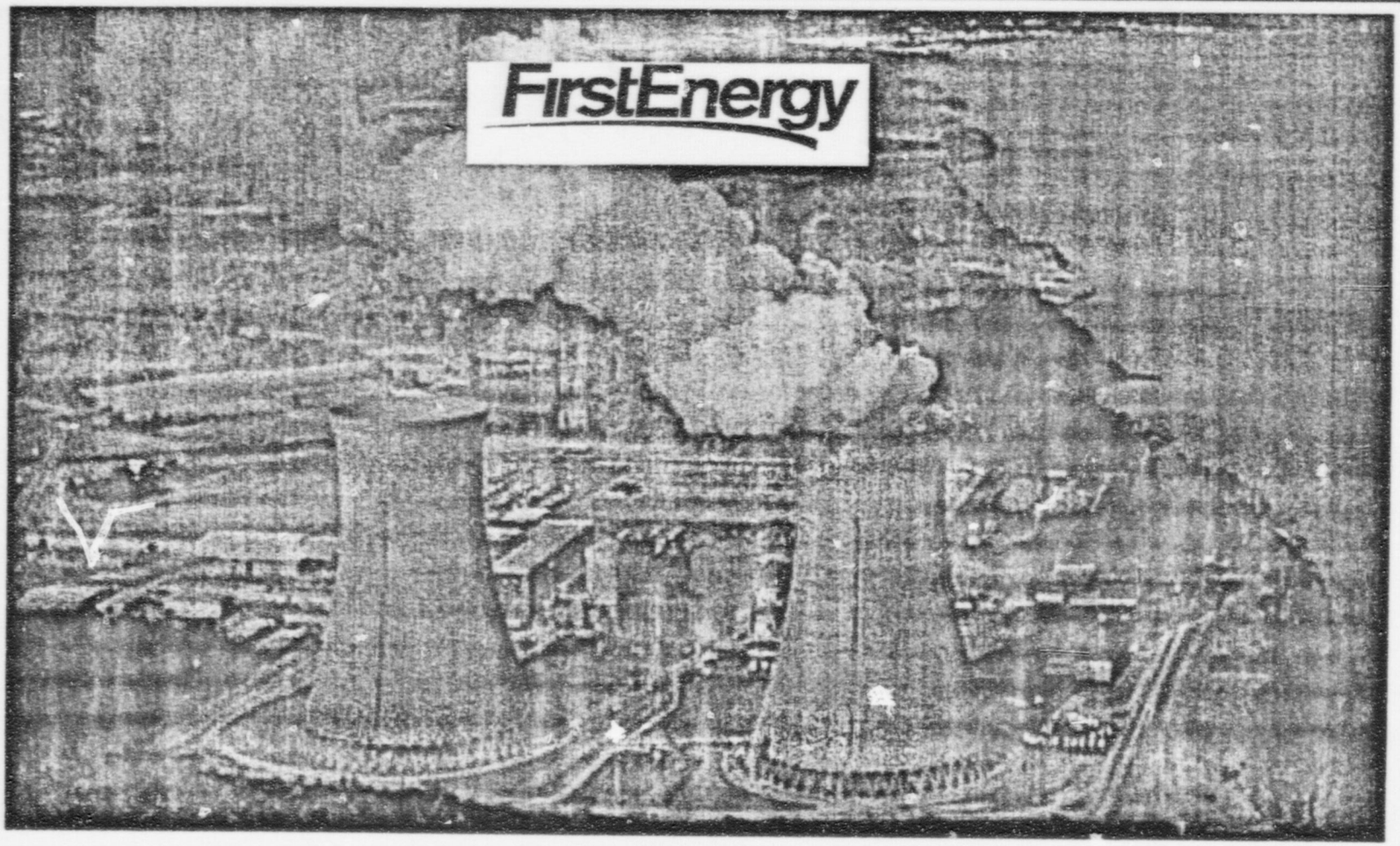
Roy Zimmerman
Bruce Boger
Scott Newberry
Carl Berlinger
Ed Throm
Adel El-Bassioni
Nick Saltos
Stuart Richards
Doug Pickett

Enclosure 1

PERRY NUCLEAR POWER PLANT

Safe - Reliable - Competitive

December 1998



Feedwater Penetration Improvement

- **Goal: Reach a mutual understanding of the Feedwater penetration improvement issue**
  - » **Summary of current licensing basis**
  - » **Review of options that were considered**
  - » **Review of the present proposal**
  - » **Review of NRC discussions at the mid-November meeting**
- **Project Goal: to improve the overall performance of the Feedwater Penetrations**
  - » **Reduce actual dose to plant workers**
  - » **Improve protection of the public**
  - » **Provide a risk-informed level of protection to achieve the above goals**

Feedwater Penetration Improvement

Present Licensing Basis:

- **Check Valves primarily for FW break outside containment**
- **Other event is LOCA. For dose calculations, we depend on mitigation by closure of the gate valves (licensing post-LOCA dose calcs only consider the gate valve leakage, not the checks)**
- **Gate valve seats have been very leak tight - no rework**
- **Check valve leakage criteria of < 1 gpm is required to meet the <u>current</u> FWLCS design function of filling the pipe within one hour, not for dose calc reasons**
- **Workers were exposed to > 5 rem to work on the check valve seats in RFO6; plus dose from testing**

Feedwater Penetration Improvement

- **Options considered**
  - » **Add Soft-seats to the Check Valves, and maintain the current licensing basis (CLB)**
  - » **Various design changes to seat Check Valves more tightly at low dP's, or install a different kind of check valve, and maintain CLB**
  - » **Maintain current FWLCS injection point, and increase allowable Check Valve leakage**
  - » **Provide alternate power supply to existing gate valves, & relocate FWLCS to gate valve bonnet**
  - » **Design & install a new "sister" gate valve in each line**

Feedwater Penetration Improvement

- **Benefits of new design**
  - » **Improves the probability of the Feedwater lines getting a water seal within the currently licensed period of time after a LOCA due to relocated FWLCS**
  - » **Improves the probability of closure of the currently licensed high integrity gate valves, after a LOCA/LOOP/Div. 1 failure, due to new provisions for an alternate power supply**
  - » **Reduces the dose received by workers who have been performing maintenance and testing of the checks**
  - » **Proposal continues to provide protection for a postulated Feedwater Line Break Outside Containment**

Feedwater Penetration Improvement

- **Difficulties with other options**
  - » **Soft seated check valves**
  - » **Various design changes to seat existing check valves more tightly, or to replace with a different style check valve**
  - » **Maintain current FWLCS injection point, and increase allowable check valve leakage**
  - » **Design & install a new safety-related, Class 2 "sister" gate valve in each line (See next page for more details on the difficulties with this concept)**

Feedwater Penetration Improvement

- **Difficulties with other options (continued)**
  - » **Design & install a new safety-related, Class 2 "sister" gate valve in each line**
    - Would provide very little benefit to the post-LOCA reliability of the penetration as compared to the proposed change (proposed change will provide an alternate power supply to the existing gate valves, and give the operators more time to start FWLCS).
      - Frequency of Core Damage from all internal initiating events is 1.4E-5 per year (Baseline CDF)
      - Frequency of Core Damage from LOCA is 5E-8.
      - Frequency of Core Damage from LOOP is 5.7E-6.
      - Probability of failure to establish a water seal within one hour of Core Damage Accident is:

	Offsite Power Available	With LOOP
Current Design*	0.27	0.28
Proposed Design	0.042	0.069
Two MOV Design	0.036	0.048

* for the "Current Design" numbers, it was conservatively assumed that a water seal between the check valves, with the gate valve open, is a "success"

Feedwater Penetration Improvement

- **Difficulties with other options (continued)**
  - » **Design & install a new safety-related, Class 2 "sister" gate valve in each line (continued)**
    - – Would not factor in to the analysis of the Feedwater line break outside containment.
    - – No room for a new valve in the current Class 2 piping boundary. Area just outside of Class 2 is very tight.
    - – Would require relocation of the Feedwater venturies, huge pipe restraints, substantial amount of welding.
    - – Would be a high dose job, and extremely expensive.
    - – The cost-benefit ratio does not justify this change.

Feedwater Penetration Improvement

- **Conclusions**
  - » **The proposed design change will improve the reliability of the Feedwater leakage control system.**
  - » **The additional reliability benefit of the "two MOV alternative" is negligible when considered in the context of the frequency of a core damage event, which must first occur before there is any need to isolate the Feedwater penetration.**