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VICE PRESIDENT - NUCLEAR

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PY-CEI/OIE-0401 L

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

Perry Nuclear Power Plant
Docket No. 50-440
Response to Confirmation Action Letter

Gentlemen:

This letter is submitted in response to Confirmatory Action Letter (CAL) RIII-93-004, dated March 30, 1993, which details actions requested by your staff regarding the service water line rupture on March 26, 1993.


During the recovery phase of the March 26 event, Perry management personnel directed the formation of a Perry Incident Response Team (IRT) to coordinate the investigation and evaluation of information regarding the Service Water line failure and ensure completion of required actions.

An NRC Augmented Inspection Team (AIT) was dispatched to the site on March 27, 1993. Perry IRT members interfaced with the AIT to resolve issues addressed in the AIT charter.

The subject CAL was issued on March 30, 1993 to request acknowledgment of actions to be taken by the Cleveland Electric Illuminating (CEI) Company. The attachment to this letter provides the CEI response to each of these actions.

If you have any question, please feel free to call.

Sincerely,


Robert A. Stratman

RAS:RWG:ss

Attachment

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

Operating Companies
Cleveland Electric Illuminating
Toledo Edison

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Confirmatory Action Letter (CAL No. RIII-93-004), issued on March 30, 1993, stated the expectations of the NRC for the completion of four specific items. Those items, and the associated responses, are provided below.

1. Conduct an investigation to determine the cause of the service water line failure, and to evaluate the decision making and communications associated with the event.

The investigation into the cause of the Service Water System (P41) line failure included evaluation of data and evidence by both the Perry Engineering Department staff and Fiberglass Structural Engineering, Inc. (FSE), an engineering consultant firm contracted to provide inspection, analysis, root cause determination and repair design for the March 26 piping failure. The analysis provided by FSE specifically addressed the P41 supply piping, but is also generally applicable to the return side, which has lower system loads.

Axial and hoop samples of the failed piping were analyzed for tensile and flexural performance. System loads and stresses, both general and localized, were considered in the root cause analysis. Observation and analysis indicated that significant axial bending of the piping occurred in the vicinity of the failure. The areas of the laminate around the fracture were discovered to be smooth, as opposed to the jagged edges normally resulting from unexpected fracture, indicating that a leakage path had developed, and had possibly existed for a considerable period of time.

The Summary Technical Report issued by FSE on April 27, 1993 and maintained on file at the Perry plant site, identifies the following scenario, or some similar chain of events, as the most probable root cause of the failure:

- Initial pipe cracking, due to marginal axial capability, possibly compounded by added localized stresses or defects.
- Laminate degradation due to water exposure.
- Through-wall cracking; leak path development.
- Soil erosion below pipe, loss of soil support.
- Induced axial bending and increased axial stress.
- Further laminate degradation and loss of ultimate strength capability.
- Eventual catastrophic failure.

The findings established in the FSE Report and concurred with by the Perry Engineering staff are in general agreement with the findings of the NRC Augmented Inspection Team, as documented in Inspection Report 50-440/93006(DRS).

Technical and operational decision making and communications associated with the event were evaluated by plant staff. Operator response to the event was evaluated as excellent in an internal report developed by Operations Section management. Because the break occurred near the time of shift turnover, an additional operating crew was available to assist in the identification of the leakage. Notifications of plant management were prompt, and communications to the Emergency Response Organizations were completed in accordance with regulatory and procedural requirements.

All operating instructions utilized to mitigate the effects of the event were reviewed, and experience from this event will be incorporated into the instructions as appropriate. One instance of procedural misinterpretation, regarding guidance for securing Hotwell Pumps due to loss of pump seal cooling, resulted in the premature shutdown of the condensate system, and the intrusion of steam into the Offgas System charcoal beds. The issue is being addressed through the site corrective action program, and corrective actions for revision of instructions or personnel training will be completed as necessary.

Plant Emergency Instructions (PEIs, Perry-specific Emergency Operating Instructions) were utilized for control of reactor pressure and temperature, containment, and suppression pool level and temperature. No problems were observed with PEI usage.

In accordance with site procedures, a critique of Emergency Plan activities was performed by the Emergency Planning Unit. The event was conservatively classified as an ALERT, and all provisions of the Emergency Plan and Implementing Instructions were appropriately implemented. No problems regarding communications were identified.

2. Maintain documentary evidence of your investigation effort, and make this available to the Augmented Inspection Team.

All requested documentation was provided to the Augmented Inspection Team during their inspection activities at the Perry site from March 27 through April 2, 1993. Additional information generated by the Perry Incident Response Team, responsible for the investigation and documentation of the event, will be maintained on site in accordance with records capture requirements.

3. Evaluate the service water line rupture in light of past service water and circulating water line (fiber glass lines) failures to determine if additional actions are necessary.

The performance and repair history of the P41 system was investigated and considered in the cause analysis and corrective action determination for the March 26 event. In recognition of previous system failures, a comprehensive inspection and repair plan is being implemented to ensure the satisfactory operation of the P41 System until Refueling Outage 6 (RF06). Further engineering evaluation will be performed to determine appropriate long-term corrective action, if required, to ensure satisfactory performance of the system beyond RF06.

A previous event involving a catastrophic rupture of fiberglass piping occurred on December 22, 1991. The 1991 event was reported to the NRC in LER 91-027 and the Perry response to Confirmatory Action Letter (CAL) 91-016A, (PY-CEI/OIE-0388 L) dated February 3, 1992.

The cause for the 1991 event was attributed to a pre-existing construction defect, combined with a degraded pipe support, resulting in undesirable loading stresses being placed on a fiberglass elbow. The December 1991 event involved an above ground transition point between the fiberglass and steel piping for an auxiliary condenser. The specific causal factors associated with the recent event involving the Service Water pipe rupture appear to be unique and unrelated to the previous failure of the Circulating Water System piping.

4. Provide within 30 days to NRC Region III a documented evaluation of the above issues including corrective actions you have taken or plan to take.

The responses provided herein, and those identified in LER 93-010, satisfy the above request. Additional corrective actions may be identified as a result of ongoing evaluation activities, and will be tracked through appropriate site corrective actions procedures.