CENTERIOR ENERGY

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

Perry Nuclear Power Plant
Docket No. 50-440
Response to Inspection Followup
Item 440/93018-01

Gentlemen:

This letter provides the response to Inspection Followup Item 440/93018-01 discussed in Inspection Report 50-440/93018 dated September 17, 1993. The report documented the results of the Emergency Operating Procedures (EOP) Followup Inspection led by Mr. R. Langstaff August 22-27, 1993.

Inspection Followup Item 440/93018-01 requested a summary of engineering analyses and corrective actions associated with containment venting, and any necessary corrections to the Perry unique analysis for emergency containment venting previously submitted to the NRC. Response to the request is contained in Attachment 1.

If you have questions or require additional information, please contact Henry Hegrat - Regulatory Affairs, at (216) 280-5606.

Very truly yours,

RAS:LKR:sc

Attachment

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

S1CC44

Operating Companies
Cleveland Electric Illuminating
Toledo Edison

IE01

RESPONSE TO INSPECTION FOLLOWUP ITEM 440/93018-01

I. RESTATEMENT OF INSPECTION FOLLOWUP ITEM

To fully address concerns associated with containment venting, the licensee planned to perform additional engineering analyses. The inspectors requested the licensee to submit the following information upon completion of the analysis: (1) a summary of the engineering analysis results and planned corrective actions; and (2) any necessary corrections to the Perry unique analysis for emergency containment venting previously submitted to the NRC.

II. RESPONSE TO INSPECTION FOLLOWUP ITEM

Response to Followup Item Number 1:

Issue Description:

Each of the containment vent paths specified by the Emergency Operating Procedures (EOP) vent to the fuel pools in the fuel handling building. Preliminary calculations showed that during certain accident scenarios, steam flow rates during containment venting would be substantially in excess of the fuel handling building's exhaust ventilation system capability. In addition, ventilation system dampers held open with fusible links could close and isolate the exhaust ventilation system due to high temperatures. Consequently, the potential for overpressurization of the fuel handling building was identified. Interim corrective actions had been established to provide instruction to open a roll up door in the fuel handling building prior to containment venting to provide an unobstructed vent path.

Summary of Analysis:

Analysis to determine the potential for pressurization of the fuel handling building (FHB) was performed using the Modular Accident Analysis Program (MAAP) to estimate temperature and pressure response of the FHB for a worst case scenario; Anticipated Transient Without Scram, with ten minute decay heat generation. Plant inspections and review of drawings were performed to provide the required input for the MAAP code regarding plant configuration with respect to room sizes, ventilation paths, doors, penetration seals, floor drains, and routes which the steam from a containment vent evolution could take throughout the plant.

FHB inspection results indicated that there are four personnel doors that open outward into other areas. Test data from the plant flooding analysis revealed that the door latch pins will fail and allow the door to swing open when pressure exceeds 0.63 psi. Test data regarding the BISCO seals installed in the shield building between the FHB and the containment annulus was also reviewed to determine the pressure at which the BISCO seals would fail and result in pressurization of the containment annulus.

The differential pressure at which the seals would fail was determined to be higher than the differential pressure at which the personnel door latch pins would fail. The MAAP code was modeled to open one personnel door when the FHB reached 0.63 psi. The FHB roll-up door was assumed to be closed. FHB ventilation system exhaust dampers were assumed to close at the fusible link failure point of 160 degrees F. The analysis also accounted for containment venting discharge through the Fuel Pool Cooling and Cleanup surge tanks vent and drain lines. The results were that Fuel Handling Building pressure remains slightly above ambient pressure, with one personnel door secured open prior to containment venting.

Evaluation of changing the fusible links in the FHB ventilation system exhaust fire dampers to a higher temperature rating, above that of expected FHB temperatures during a containment venting evolution, was also performed. Evaluation results indicate that containment atmosphere volumetric flow rate during initial and potential subsequent containment venting surges could be in excess of the FHB exhaust system capacity. Therefore only changing the fusible links in the exhaust dampers to a higher temperature rating would not provide adequate assurance that the exhaust path would be capable of preventing pressurization of the FHB.

Corrective Actions:

Plant Emergency Instructions currently include actions to open the FHB roll-up door and steel security door as a prerequisite to containment venting. Based on MAAP analysis performed to determine the potential for pressurization of the FHB during containment venting, securing open a personnel door rather than the roll-up door would provide a sufficient unobstructed vent path. Instruction PEI/SPI is being revised to remove the requirement to open the roll-up and security doors, and include a requirement to secure open a personnel door.

Issue Description:

Increased radiation levels and environmental conditions adverse to personnel safety were identified during review of conditions caused by containment venting into the intermediate building. Specifically, venting from a surge tank was identified as a concern, but no interim corrective action was deemed necessary since there was no need for personnel to enter the surge tank area during containment venting. Additional reviews were planned to further assess potential adverse impact on personnel safety and equipment.

Summary of Analysis:

Reviews were performed to assess the consequences of potential adverse environmental conditions on personnel and/or equipment important to safety resulting from potential steam flow from the Fuel Pool Cooling and Cleanup (FPCC) surge tank overflow and vent lines during containment venting. This could permit steam flow into the FPCC surge tank room and lower elevations of the Intermediate Building (IB). Flow into these areas was

considered possible because the surge tank's vent ports discharge directly into the FPCC tank room, while the overflow line discharges directly into the Sump located on the 574' elevation of the IB. Review results are as follows.

Forced opening of the FPCC Surge Tank Room personnel door could occur due to the initial pressure wave from containment venting which would allow steam into the west side of the IB near the Radiological Restricted Access entry point at the IB 599' elevation. Potential flooding of the 574' elevation of the IB could occur if the Fire Protection System sprinkler heads actuated due to high temperatures associated with the steam environment. Forced door openings in the 574' elevation of the IB could occur due to rapid depressurization caused by steam being condensed by the Fire Protection system. Access to the Post Accident Sampling Station located on the 574' elevation of the IB could also be restricted.

Corrective Actions:

Corrective actions which address the issues identified during the review are as follows.

Operations is evaluating revision to Instruction PEI/SPI to address access to IB 599' and FHB 620' elevations during a containment venting event. The evaluation will be complete by August 31, 1994.

Instruction PEI/SPI is being revised to include closing Fire Protection system valve 0P54F6355 as a prerequisite to containment venting. This action would isolate the Fire Protection system header that supplies the IB 574' elevation sprinkler heads.

No corrective actions were determined to be necessary to address potentially restricted access to the Post Accident Sampling (PAS) Station since the PAS system is not required for this beyond design basis scenarios per the USAR, and is not required by the Emergency Procedures Guidelines.

Issue Description:

Additional engineering and operations review was deemed necessary to assess the potential that spent fuel pool water level may swell above the building floor and flood lower elevations during containment venting due to venting discharge below the waterline.

Summary of Analysis:

Analysis was performed to assess the potential for flooding Intermediate Building (IB) lower elevations and adverse effects on equipment important to safety due to 'pool swell' during containment venting at maximum pressure during the vent evolution. No corrective actions were initiated as a result of this review.

Water which could be potentially ejected from the fuel pools located in the Fuel Handling Building (FHB) due to a containment vent evolution was postulated to drain from the FHB via the floor drain system into the IB sump located on elevation 574'. Calculation EPG-25 estimates that 5,632 gallons (753 ft^3) of water would exit the fuel pool and flow to the IB sump. The only equipment required for safe shutdown of the plant located on the 574' elevation is the non-safety Control Rod Drive (CRD) pumps. The floor area of the IB 574' elevation, not including the floor area in the CRD pump rooms, is 9680 sq. ft. In addition, the CRD pumps are mounted on concrete pedestals which are approximately 12 inches above the floor elevation. Given the floor area on this elevation of the IB and assuming that the sump pumps are inoperable, the water ejected from the Spent Fuel Pool which could drain to the 574' elevation of the IB during containment venting would not reach a height to which the CRD pump operability would be challenged.

Issue Description:

Previous calculations for determining the primary containment pressure limit did not consider the backpressure against containment venting caused by the head of water in the spent fuel pool above the point of venting.

Summary of Analysis:

The calculation to determine adequate vent capacity has been revised to incorporate the back pressure equal to the 20.5' head of water above the RHR Containment Spray vent outlet in the Spent Fuel Pool. The required vent area for both steam and air environments was recalculated in accordance with the original Emergency Procedures Guidelines methodology. The calculation revision also took into account that the upper containment atmosphere above the refueling floor is made up of a best estimate mixture of approximately 25% air and 75% steam. Results of the revised calculation indicate that the total vent area from the appropriate vent paths as presently identified, are adequate to vent the containment at the Primary Containment Pressure Limit of 40.42 psig. No corrective actions were initiated as a result of this analysis.

Response to Followup Item Number 2:

The Perry unique analysis for emergency containment venting as previously submitted per letter PY-CEI/NRR-0507L, dated July 29, 1986, was reviewed to identify any necessary corrections to the analysis. Results of the review indicate that no changes to the results of the analysis are required. However the review identified that the outlet into the Spent Fuel Pool for the Residual Heat Removal Containment Spray Line vent path is actually only one line and not the two lines as shown in the attachment to letter PY-CEI/NRR-0507L. Also it should be noted that the two Fuel Pool Cooling and Cleanup System surge tanks are tied together with the bottom head line, and that the potential exists that as the containment atmosphere enters the first tank it will also flow into the second tank and exhaust out of the tank's vent and drain line, as well as the fuel pool scuppers located in the fuel handling building.