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June 17, 1992
PY-CEI/NRR-1507 L

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

Perry Nuclear Power Plant
Docket No. 50-440
Response to Unresolved Item
50-440/92008-02

Gentlemen:

This letter acknowledges receipt of the Unresolved Item contained within Inspection Report 50-440/92008 dated May 8, 1992. The report identified areas examined by Region III Inspector S. Orth from April 20 - 24, 1992.

Our response to Unresolved Item 50-440/92008-02 is provided in Attachment 1.

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

Sincerely,

Michael D. Lyster

MDL:APP:ss

Attachment

cc: NRC Project Manager
NRC Sr. Resident Inspector
NRC Region III

IE01
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Restatement of Unresolved Item

The testing procedure for operability of the EOF and TSC HVAC systems were defined in PTI-M52-P003 and PTI-M53-P002, respectively. The procedures indicated a frequency of performance of 366 days. However, records reviewed indicated that a period of 18 months and 16 months had elapsed prior to the latest tests of the EOF and TSC system, respectively. In addition, documentation of the last two test performances in the EOF indicated partial system failures but did not indicate a successful re-performance of the PTI as required. The licensee indicated that there may have been a rationale for the excessive time between testing and that the proper work orders and testing may have been completed following the PTI failures. Further, the licensee indicated that they had begun a design change procedure to improve the operability of the systems. At the time of the inspection, documentation concerning justification for delaying testing and documentation for performing followup testing was not available. The licensee was requested to provide this documentation and documentation of any followup corrective actions. Pending a response by the licensee, this item will remain as an Unresolved Item (50-440/92008-02).

EOF HVAC System Testing Information

Sequence of Events

Periodic Test Instructions (PTIs) for the Emergency Operations Facility were prepared in September, 1988, in accordance with Plant Administrative Procedures (PAP-0518), "Preparation of Periodic Test Instructions," and (PAP-1105), "Surveillance Test Control." Accordingly, PTI-M53-P0002, "Emergency Operations Facility Ventilation System Emergency Isolation Mode Functional Test," was successfully performed on February 2, 1989, to demonstrate operability requirements of the EOF HVAC System.

Periodic Test Instruction PTI-M53-P0002 was also performed several times during the time period of February 2, 1989, through April, 1992. These performances demonstrated the ventilation equipment to run properly; however, since the PTI required smoke stick verification of zero leakage at several points, the test results were unacceptable due to minor leakage, usually at one location of minor differential pressure. The PTI's were annotated 'unacceptable' by the technicians performing the test, and an engineering review was initiated, as required by PAP-1105.

The responsible system engineer determined that a 100% neutral air distribution was not needed for this system, based on the requirements of NUREG-0696 and the fact that the EOF is equipped with double door entry points and/or locked isolation doors, when in the Emergency Isolation Mode of operation. Any resulting air leakage would be minimal. Additionally, the EOF HVAC system had performed satisfactorily in the Emergency Isolation Mode during Emergency Plan drills and exercises throughout this period of time.

Although the analysis was performed, no instruction revision was initiated to eliminate smoke stick and differential pressure acceptance criteria. Moreover, scheduled dates were not always met, and a Test Verification Sheet, the appropriate administrative device for PTI deferral, was not processed in all cases.

During performance of PTI-M53-P0002 on October 2, 1991, a defective actuator was found that disabled operation in the Emergency Isolation Mode. The actuator was repaired on October 18, and the system was retested by the responsible system engineer on October 28, 1991. In accordance with Plant Administrative Procedure (PAP-0905), "Work Order Process", retest requirements were specified by the responsible system engineer, and verbally communicated to the appropriate technicians. Additionally, the Responsible System Engineer personally verified the functionality of the system by placing the system in the Emergency Isolation mode of operation and verifying proper operation. Test Verification Sheets were submitted on October 10, 1991, and February 7, 1992, as allowed by PAP-1105, to extend the scheduled reperformance date to August, 1992. Rescheduling justification was based upon the engineering judgment that the system was properly functioning within its design parameters, and the performance of the system during E-Plan drills. Additionally, the engineer recognized that the one year testing frequency was not required by any commitment or license requirement (most other HVAC systems are tested on a ten-year interval). This rationale was included on the Test Verification Sheet.

Analysis

NUREG-0696 provides Functional Criteria for Emergency Response Facilities which include both the Emergency Operations Facility (EOF) and Technical Support Center (TSC). The EOF design is required to function in a manner similar to the control room and TSC systems but need not be seismically qualified, redundantly instrumented, automatically activated, or equipped with charcoal filtration systems. The EOF shall be a 'well engineered' building/system as determined by the Uniform Building Code. The EOF HVAC system was designed and built to meet the NUREG requirements.

An additional evaluation was performed by design engineers in May, 1992. This evaluation included analysis of the EOF HVAC system design basis from both a radiological and functional standpoint. This evaluation determined:

1. The system, as designed, meets the requirements of NUREG-0696.

2. Use of fan operation, damper position, and door closure is adequate to determine proper Emergency Isolation Function.

3. Use of smoke stick and differential pressure as an acceptance criteria is not required for this facility.

4. The EOF is comparable to the Control Room HVAC system based upon ability to operate in an Emergency Isolation Mode, use of radiation monitoring and use of HEPA filters.

5. Charcoal filtration is not required (per NUREG-0696 Table 2).

Based upon this engineering evaluation, PTI-M53-P0002 was revised on May 21, 1992, to allow for testing within the parameters of the EOF HVAC system design basis. Specifically, smoke testing and differential pressure verification were removed from the acceptance criteria. This revised PTI was successfully performed on May 21, 1992. In addition, a review of past PTI performances determined that previous partial PTI-M53-P0002 performances would have been acceptable under the criteria set forth in the revised PTI, with the exception of the single performance on October 2, 1991, for which corrective actions were completed in a reasonable time frame.

PAP-1105 allows postponement of Periodic Test Instructions providing Test Verification Sheets are initiated. In several instances related to EOF ventilation testing, Test Verification Sheets were not filled out in a timely manner. Test failures on subsequent test performances occurred while evaluation of unnecessary acceptance criteria was ongoing. In retrospect, the more administratively correct course of action would have been to eliminate the overly restrictive smoke stick and differential pressure testing. This would have allowed subsequent performances of the test to satisfy acceptance criteria. From a technical standpoint, however, both the Responsible System Engineer and the Design Engineer desired a thorough evaluation of the mechanism for failure as well as the bases for the acceptance criteria.

TSC HVAC System Testing Information

Sequence of Events

Periodic Test Instructions (PTI's) for the Technical Support Center were prepared in accordance with Plant Administrative Procedure (PAP-0518), "Preparation of Periodic Test Instructions." Accordingly, PTI-M52-P0003, "TSC Ventilation System Recirculation Mode Functional Test", was successfully performed on October 17, 1988, demonstrating operability of the system in the Emergency Recirculation Mode. Additionally, PTI-M52-P0003, was performed on August 23, 1989. During this performance, air leakage was noted at one door when this door to the Service Building Stairway was cracked open, in accordance with the PTI. No air flow was present with the door in its normal closed position, verifying that the door seals were performing their intended function. The root cause of the leakage was determined to be the recent installation of the Service Building Hot Shop HVAC System and associated changes to the Service Building HVAC system made in accordance with a design change. When PTI-M52-P0003 was performed, the Service Building HVAC System was still unbalanced, leading to pressurization of the stairwell and resulting in the leakage noted during performance of the PTI on August 23, 1989.

Further investigation determined that the door is maintained closed in the event of an emergency, due to accountability purposes. Therefore, a 'cracked open' door would not need to be considered for the Technical Support Center HVAC System. This evaluation was included in the documentation package for the PTI, as required by PAP-1105. Although important for informational purposes, this data should not have been included in the PTI as acceptance criteria.

Based upon this information, the responsible system engineer pursued rebalancing of the Service Building HVAC System, as the appropriate solution to correcting the leakage observed on August 23, 1989. The Periodic Test Instruction was successfully reperformed on December 17, 1991, following rebalancing of the Service Building HVAC System. During the interim time frame, verification of system functionality was conducted at Emergency Plan Drills, when the Technical Support Center HVAC System was required to be placed in the Emergency Recirculation Mode. Verification of proper equipment operation on the associated TSC Ventilation Control Panel was performed; however, this was not documented on a PTI.

Analysis

NUREG-0696 provides Functional Criteria for Emergency Response Facilities which include both the Emergency Operations Facility (EOF) and Technical Support Center (TSC). The TSC is required to have a ventilation system similar to the Control Room although it need not be seismically qualified, redundant, instrumented in the Control Room or automatically activated. It shall have particulate (HEPA) and charcoal filtration systems in addition to being equipped with radiation monitoring equipment to provide early warning to TSC personnel of adverse conditions that may affect the habitability of the TSC. Perry's TSC Heating Ventilation and Air Conditioning (HVAC) system is designed to meet these criteria.

With respect to 'unacceptable' leakage results during performance of PTI-M52-P0003, "TSC Ventilation System Recirculation Mode Functional Test", on August 23, 1989, the Responsible System Engineer did review the "unacceptable" data and determined based on the aforementioned system unbalance that the test was acceptable. He did fail to fill out a Test Verification Sheet for PTI credit.

Corrective Action

With respect to TSC Ventilation testing, PTI-M52-P0003 will be revised to provide further clarification of acceptance criteria associated with closure of the door during testing. The door will only be open in the test for informational purposes to provide the Responsible System Engineer with information on the performance of the Service Building HVAC system.

To address concerns with the appropriate use of Test Verification Sheets for postponement of PTI's, Perry Quality Assurance Section personnel performed a surveillance in June, 1991, which resulted in the issuance of an Action Request. The Action Request stated that Periodic Test Instructions had been postponed without the generation of Test Verification Sheets. Additionally, the Action Request pointed out that existing Test Verification Sheets needed to be updated and re-evaluated. System Engineering personnel initiated and updated appropriate Test Verification Sheets, and the Action Request was closed. However, a followup Quality Assurance Surveillance will be performed to ensure that Test Verification Sheets are currently being utilized in accordance with Plant Administrative Procedures.

System Engineering Section personnel have been involved in the evaluation of these events, and are aware of the errors made. A final corrective action that will be taken to preclude recurrence of a similar event in the future is training of all responsible system engineers regarding these events, and the proper use of Test Verification Sheets, in accordance with PAP-1105.