FENOC
FirstEnergy Nuclear Operating Company

Perry Nuclear Power Plant
10 Center Road
Perry, Ohio 44081

William R. Kanda
Vice President - Nuclear

440-280-5579
Fax: 440-280-8029

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Perry Nuclear Power Plant
Docket No. 50-440
Sixty Day Response to Generic Letter 2003-01, "Control Room Habitability"

Ladies and Gentlemen:

This letter provides information in response to Generic Letter 2003-01, "Control Room Habitability", dated June 12, 2003.

The Generic Letter requests information concerning compliance with the Control Room habitability licensing and design bases. A schedule for completion of actions being taken in response to this request at the Perry Nuclear Power Plant (PNPP) is provided in the attachment to this letter.

The Generic Letter also requested description of any compensatory measures that were in place prior to issuance of the Generic Letter in order to maintain Control Room habitability. No such compensatory measures were in place at PNPP.

If you have questions or require additional information, please contact Mr. Vernon K. Higaki, Manager - Regulatory Affairs, at (440) 280-5294.

Very truly yours,

Attachment

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III

A102

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Generic Letter (GL) 2003-01 requested that information on Control Room Habitability issues be provided within 180 days, or, if all the requested information could not be provided within 180 days, the GL requested a response within 60 days. The purpose of a 60-day response is to provide a description of ongoing activities to support the final response, the schedule for completing these actions, and the basis for the acceptability of the alternative response schedule. This attachment provides the requested 60-day response for the Perry Nuclear Power Plant (PNPP). This 60 day response is being submitted because performance and completion of analysis and testing involves vendors, and therefore is dependent on the schedule for the bid process (in 2003) and the availability of qualified vendors for these efforts in 2004. These efforts extend beyond 180 days.

1. Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases.

60-Day Response:

This confirmation will include engineering reviews, walkdowns, analyses, and tests which are scheduled to be performed during the remainder of 2003 and into 2004. Many of these reviews will be completed by the end of 2003, in order to support subsequent activities in 2004. The remaining confirmatory reviews, walkdowns, analyses, and tests are expected to be complete by the end of 2004. The requested confirmation that the Control Room meets the applicable regulatory requirements and the PNPP design and licensing basis will be provided in a final response to this Generic Letter. Currently, the final response to the Generic Letter is scheduled to be submitted within three months after the above reviews, walkdowns, analyses, and tests are completed. Further details are provided below based on currently available information.

Emphasis should be placed on confirming:

(a) That the most limiting unfiltered inleakage into your CRE (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for control room habitability. Describe how and when you performed the analyses, tests, and measurements for this confirmation.

60-Day Response:

Filtered inleakage – Filtered inleakage is not applicable to PNPP, since the emergency mode of the PNPP Control Room ventilation system (called the Control Room Emergency Recirculation System) is a neutral pressure system which does not depend on pressurization using air from outside the envelope.

Unfiltered inleakage – At PNPP, a high confidence exists that the unfiltered inleakage into the Control Room Envelope (CRE) is no more than the limiting value assumed in the current design basis radiological analyses for Control Room habitability [1375 cubic feet per minute (cfm)].

However, to provide further confirmation of the acceptability of the CRE, additional radiological analyses and tests are planned. Details on these analyses and tests are provided at the end of this discussion.

The proposed schedule for performance of the additional confirmatory analyses and tests is acceptable because of:

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1. the proactive testing of the CRE using an ASTM E 741 tracer gas test during the PNPP startup test program in 1985,
2. the additional design basis margin that resulted from several recent radiological dose calculations which included determination of allowable inleakage into the Control Room for a design basis LOCA and a Fuel Handling Accident, and
3. the ongoing maintenance and testing of the CRE performed subsequent to the 1985 tracer gas test, which has essentially maintained the original CRE inleakage conditions, despite the higher inleakage determined to be acceptable by the newer design basis radiological dose calculations.

Since the PNPP Control Room Emergency Recirculation System (CRERS) is a neutral pressure system rather than a positive pressure system, a decision was made in 1984 to use a tracer gas dilution method to determine the inleakage value during the pre-operational test, rather than a pressurization test alone. The concept of performing the test in accordance with ASTM E 741-83, "Measuring Air Leakage Rate by the Tracer Dilution Method", was described to the Nuclear Regulatory Commission (NRC) in a conference call on June 7, 1984, and in a letter dated June 29, 1984 (PY-CEI/NRR-0121L). The NRC responded in a letter dated November 13, 1984, accepting the use of the tracer gas method for the pre-operational test. The test was completed in the fall of 1985, and consisted of establishing a pre-determined concentration of Helium inside the Control Room with the system operating in the Emergency Recirculation mode. The decrease (dilution) of the helium concentration was monitored and directly converted (by calculation) to cfm inleakage.

This test determined that the inleakage into the Control Room was less than 90 cfm. The value of 90 cfm then became the design and licensing basis value used at the time of initial plant licensing in the radiological calculation for inleakage into the Control Room in the event of a design basis LOCA. Note that Control Room dose calculations were not required to be performed for any radiological events other than a LOCA at the time of PNPP licensing.

Following completion of the tracer gas test, the test procedure also performed a pressurization test of the CRE. This pressurization test was performed immediately after the tracer gas test in order to establish a baseline makeup flow rate value that could be utilized in subsequent tests to verify maintenance of the CRE at the same level of integrity as existed during the tracer gas test. During this pressurization test, the system is aligned in the emergency recirculation mode, with the normal installed HVAC and emergency recirculation fans shut down. The test utilized a dedicated test fan rather than the normal installed system fans. The test fan pressurized the entire envelope, including the ductwork and fans that are outside of the main part of the Control Room. Therefore, the test avoided most of the potential masking of inleakage that can occur if test pressurization is achieved using installed fans and inlet ductwork located outside of the Control Room. Another concern raised in Regulatory Guide 1.197 is pressurized, contaminated systems which traverse the Control Room and could introduce contaminants into the envelope. The PNPP Control Room is not traversed by any such contaminated, pressurized systems. Also, the clean pressurized systems (the carbon dioxide fire protection system for the Control Room subfloor, and the breathable air system for the Control Room) could not have leaked significantly enough to affect the results of the PNPP pressurization test.

The makeup flow rate that was required during the 1985 test to maintain a constant pressure in the Control Room has continued to be utilized during testing performed at each refueling outage and following any significant changes to the CRE. It has proven effective in detecting new inleakage. For example, it detected inadequately sealed framing around a new door that was installed in 2001. When makeup flows greater than those measured in 1985 are required to maintain the test

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pressure, maintenance is performed to restore the boundary, as confirmed by a satisfactory test. Although this type of pressurization test may not fully guarantee that inleakage remains less than 90 cfm, it is believed to be very effective at detecting most types of leaks that could have developed in the CRE.

The confidence that current inleakage is less than assumed in the current design and licensing basis radiological calculations was increased even further by revisions to calculations for the LOCA and for the Fuel Handling Accident. Alternative Source Term calculations for these two events have been approved by the NRC for use at PNPP, with the following "inleakage" assumptions:

- The new LOCA analysis assumes a much higher Control Room inleakage than the original value, i.e., 1375 cfm rather than the original 90 cfm.
- The new FHA analysis assumes that the normal ventilation system continues to run (i.e., no attempt to limit inleakage). The analysis shows operator doses remain acceptable even if the radionuclides available at the outside air intake are swept into the Control Room by a 6600 cfm intake flow rate from the normal system.

Therefore, even if the pressurization test of the CRE does not guarantee that inleakage remains less than 90 cfm, a significant margin exists to the most limiting 1375 cfm value assumed in the current design basis radiological analyses.

One of the positions taken by the NRC in the recently issued Control Room Habitability Regulatory Guides is that the "most limiting" event for Control Room dose must be determined. In order to prove the LOCA event is in fact the most limiting event for Control Room inleakage, it therefore becomes necessary to perform calculations to demonstrate that the Main Steam Line Break (MSLB) Outside Containment or a Control Rod Drop Accident (CRDA) are not more limiting. Analysis of the Control Room for these two events was not previously required at PNPP. The current schedule for performance and acceptance of these calculations is:

- completion of the bid process in 2003
- completion and acceptance of the calculations in the first half of 2004.

Once these calculations are performed and accepted, it will be possible to confirm the maximum allowable inleakage value for the most limiting design basis event, and that the resultant operator doses remain below the General Design Criterion (GDC) 19 limit for all the design basis events.

An ASTM E 741 tracer gas test on the CRE will be the final step in completing the confirmations for this portion of the Generic Letter. This test will use the 2000 edition of the E 741 standard, and will address considerations discussed in Regulatory Guide 1.197 such as operation of ventilation systems adjacent to the Control Room. Completion of this tracer gas test with a measured inleakage value below the most limiting design basis inleakage value determined by the above calculations will then provide the basis for positively stating that "the most limiting unfiltered inleakage into [the PNPP] CRE ... is no more than the value assumed in [the PNPP] design basis radiological analyses for control room habitability", as requested by this item. The current schedule for completion of this testing and acceptance of the results is the second half of 2004.

(b) That the most limiting unfiltered inleakage into your CRE is incorporated into your hazardous chemical assessments. This inleakage may differ from the value assumed in your design basis radiological analyses. Also, confirm that the reactor control capability is

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maintained from either the control room or the alternate shutdown panel in the event of smoke.

60-Day Response:

The conclusions of the confirmatory reviews for this item will be provided along with the overall final response to the Generic Letter. The proposed schedule for performance of the additional confirmatory reviews is acceptable because:

- Hazardous Chemicals: The control room habitability analyses for hazardous chemicals stored or transported onsite or near PNPP do not rely on isolating the normal control room ventilation system. Therefore there are no specific requirements to limit unfiltered inleakage for a hazardous chemical event. As described in section 6.4 of the PNPP Updated Safety Analysis Report (USAR) entitled "Habitability Systems", oxygen monitors alarm on a loss of oxygen should carbon dioxide be released from the Control Room subfloor fire protection system. No other toxic gases are considered a threat based on hazard screening performed (per RG 1.78 Rev. 0 and RG 1.95 Rev. 1) on chemicals stored or transported onsite or near PNPP.
- Smoke: For fires external to the Control Complex building, the Control Room ventilation can be isolated from the smoke source by switching to emergency recirculation mode, which does not draw in outside air, and which can remove the smoke particulates already within the CRE. Inleakage of air (containing smoke) of up to 1375 cfm has been judged not to adversely affect the operators ability to perform their tasks, and smoke particulates from such inleakage would also be removed by the system filters. For fires within the CRE, the Control Room can be purged with outside air at a high flow rate if required to remove smoke, and if necessary, the operators can leave the Control Room and utilize the remote shutdown control areas. Although it is possible that a portion of the smoke from the Control Room fire might reach the remote shutdown control areas, it has been judged not to adversely affect the operators ability to perform their tasks. Capabilities exist to supplement the ventilation in the remote shutdown areas with fresh air from outside of the Control Complex if needed. Therefore, the reactor control capability remains available from either the Control Room or the remote shutdown areas in the event of smoke.

(c) That your technical specifications verify the integrity of the CRE, and the assumed inleakage rates of potentially contaminated air. If you currently have a DP surveillance requirement to demonstrate CRE integrity, provide the basis for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your DP surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable surveillance methodology (e.g., ASTM E741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.

If your facility does not currently have a technical specification surveillance requirement for your CRE integrity, explain how and at what frequency you confirm your CRE integrity and why this is adequate to demonstrate CRE integrity.

60-Day Response:

The PNPP Technical Specifications do not currently have a differential pressure (DP) surveillance requirement for CRE integrity as discussed in the first paragraph above, so this response addresses the second paragraph.

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As described above, although no Technical Specification requirement existed, the PNPP Control Room has been tested for integrity at least once per fuel cycle. The most recent of these tests was in April 2003. In the interim period until the final response to the Generic Letter is submitted, the current plan is to also perform a new ASTM E 741-2000 tracer gas test of the CRE. As also noted above, the current schedule for completion of this testing and acceptance of the results is the second half of 2004. Discussions of plans for any subsequent testing will be discussed in the final response to the Generic Letter.

Control of the Control Room boundary is currently addressed in plant procedures, very similar to the 'Control Room Integrity Program' being discussed between the industry and the NRC staff. During the interim period until the final response to the Generic Letter is submitted, these procedures will continue to provide controls over issues such as:

- maintaining configuration control,
- managing planned breaches of the CRE,
- correcting any unplanned breaches of the CRE that exceed the analyzed inleakage values, and
- performance of ongoing preventive maintenance for doors, walls, floor penetrations, dampers and drains that are part of the CRE.

Additional information on changes to the Control Room boundary integrity program will be discussed in the final response to the Generic Letter.

2. If you currently use compensatory measures to demonstrate control room habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures.

60-Day Response: This item is not applicable to the Perry Nuclear Power Plant.

3. If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principal Design Criteria" regarding control room habitability, in addition to responding to 1 and 2 above, provide documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence) of the basis for this conclusion and identify your actual requirements.

60-Day Response: This item is not applicable to the Perry Nuclear Power Plant.

Commitments

The actions discussed in this document represent intended or planned actions, are described for the NRC's information, and are not regulatory commitments. The PNPP Corrective Action Program is being used to track completion of the described actions. Please notify the Manager - Regulatory Affairs at the Perry Nuclear Power Plant of any questions regarding this document or any associated regulatory commitments.