

Ralph E. Beedle
Executive Vice President
Nuclear Generation

February 10, 1992
JPN-92-007

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

SUBJECT: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
**Use of a Closed Circuit Monitoring
System to Establish a Continuous Fire Watch**

Dear Sir:

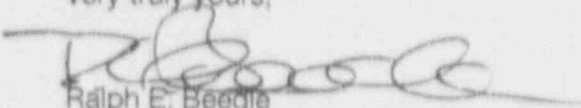
During a January 6, 1992 telephone conversation with the NRC staff, the staff asked the Authority to submit a description of how a closed circuit television (CCTV) system is being used to monitor a non-functional fire barrier penetration seal in the condensate demineralizer room. The staff also asked for a brief description of the equipment and the tests that are being used to assure equipment operability. The requested information is included in Attachment 1.

A CCTV system reduces personnel radiation exposure incurred during a continuous fire watch. This system is equivalent to a continuous fire watch because it provides for the early detection of fire and a prompt response by the fire brigade.

The Authority would like to use this system in other areas. Attachment 2 outlines criteria for the further use of this system.

Should you or your staff have any questions regarding this subject, please contact Mr. J. A. Gray, Jr.

Very truly yours,


Ralph E. Beedle
Executive Vice President
Nuclear Generation

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ADD 1/1

att: as stated

cc: Regional Administrator
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Office of the Resident Inspector
U. S. Nuclear Regulatory Commission
P. O. Box 136
Lycoming, NY 13093

Mr. Brian C. McCabe
Project Directorate I-1
Division of Reactor Projects - 1/II
U. S. Nuclear Regulatory Commission
Mail Stop 14 B2
Washington, DC 20555

USE OF A CLOSED CIRCUIT MONITORING SYSTEM TO ESTABLISH A CONTINUOUS FIRE WATCH

The use of a closed circuit television (CCTV) system reduces personnel radiation exposure incurred during a continuous fire watch. A closed circuit television camera, battery powered smoke detectors, and an audio intercom are used to monitor non-functional fire barrier penetration seals in radiation areas. This method is currently being used to meet the requirements for a continuous fire watch as required by Technical Specification 3.12.F.2 in the condensate demineralizer room.

Reference 1 describes how utilities are using video cameras to improve productivity and reduce radiation exposure during both routine and specialized tasks.

Technical Specification Requirement

FitzPatrick's Technical Specification 3.12.F.2 requires the posting of a continuous fire watch on one side of a fire barrier where a penetration seal has been declared non-functional and there is no functional fire detector on either side of the barrier.

Alternative Surveillance Technique - Condensate Demineralizer Room

The ongoing baseline fire barrier penetration seal surveillance program has identified a penetration seal in the condensate demineralizer room as non-functional. The condensate demineralizer room is a locked high radiation area with a general area dose rate up to 100 mR/hr. A continuous fire watch posted in a low dose area of this room would accumulate approximately 15 mrem/day. The total dose for all fire watches during the baseline surveillance is estimated at 20 mrem/day. This one fire watch would increase the total dose for all fire watches by 75%. An alternative to a person performing a continuous fire watch at this location would therefore be good ALARA practice.

A high resolution closed circuit television camera system in conjunction with two battery powered smoke detectors and two intercom units is used for the condensate demineralizer room penetration watch. The viewing monitor and one of the intercom units are located just outside the locked high radiation area where the general area dose rate would result in a daily dose of approximately 4 mrem.

Inside, the smoke detectors are positioned on the wall approximately 6 to 12 inches above the non-functional penetration and on the ceiling approximately 5 feet from the wall. These locations are based on the guidance provided by NFPA 80-1990, Figure B-51, and the Fire Protection Handbook, 17th Edition. The other intercom unit is locked in the continuous transmit mode and positioned near the smoke detectors. The camera unit is in the condensate demineralizer room positioned to allow continuous viewing of the non-functional penetration and general area. The camera can be remotely focused, panned, tilted, and zoomed.

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Equipment Specifications, Surveillance, and Testing

The equipment used for the remote continuous fire watch for the non-functional penetration seal in the condensate demineralizer room consists of a television camera, monitor, two smoke detectors, and two intercom units.

The camera is capable of being remotely focused, panned, tilted, and zoomed. The monitor is a high resolution 14 inch diagonal color display unit with a vertical resolution of 370 lines. Testing requirements and acceptance criteria for the camera and monitor are met if the designated fire barrier penetration is clearly visible and positively identified on the remote monitor. The camera provides the capability for a person performing the fire watch to visually monitor a designated area.

The smoke detectors are ionization type units with a UL 217 listing. Each unit's dual ionization chamber is screened by a stainless steel enclosure. The unit is powered by a 9 volt battery with the battery's functionality indicated by a flashing LED and supplemented by an audio low battery warning "beep." The testing methodology and acceptance criteria for the smoke detectors are based on the recommendations of the manufacturer and by guidance provided in NFPA 74-1989, Chapter 6, "Maintenance and Tests." The manufacturer states that the built-in test button accurately tests all detector functions. The pressing of this button will cause a loud continuous sound within 10 seconds if the unit is functioning properly. The manufacturer also specifically recommends against the use of any aerosol or open flame test as this could degrade the unit's sensitivity or impair the ability of the detector to function. The detectors, supplemented by the intercom units, provides the smoke detection capability for a person performing the fire watch at a remote location.

The intercom units are AC powered and use the common electrical wiring between the units as the transfer medium. The units can be locked in the continuous transmit position to allow continuous monitoring by the other unit. Testing requirements and acceptance criteria for the intercom units are based on the ability of the continuous fire watch being able to hear the audible alarm from the smoke detectors. This test can be run concurrently with the testing of the smoke detector units.

Testing of this equipment will be performed on a weekly basis to ensure functionality.

Radiation Effects

The affects of radiation on this equipment has not been tested. Any degradation in audio or video transmission would be readily detected.

Radiation may degrade the sensitivity of ionization type smoke detectors. Such detectors function based upon smoke particulates blocking the detection of ionizing radiation from a contained source (e.g., americium). A surrounding radiation field may therefore compensate for blockage of the internal source by smoke particulates. The manufacturer has no information on unit sensitivity or performance for operation in a radiation field. To offset this, the Authority has purchased battery powered photoelectric smoke detectors. The photoelectric units are also UL 217 listed and are functionally equivalent to the ionization units. They have the added advantage of being more resistant to radiation induced changes in sensitivity since they use an internal light source to detect smoke particulates. The

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replacement of the ionization type detectors with the photoelectric units will be made after conferring with the NRC staff and upon receiving the staff's approval. In the interim, the Authority feels that the lack of any significant quantities of combustible materials in the area provides a sufficient level of protection. In addition, the requirement for a weekly test of the CCTV system allows the performance of a visual survey of the affected penetration area.

Conclusions

The posting of a continuous fire watch to monitor the non-functional fire barrier penetration seal in the condensate demineralizer room by using a closed circuit television system along with an intercom system provides a level of protection equivalent to the posting of the continuous fire watch directly at the non-functional penetration seal location. The relocating of the continuous fire watch outside of the high radiation area does not reduce the level of protection required by the Technical Specifications and conforms with accepted ALARA practices.

Reference

1. EPRI report, dated August 1990, EPRI NP-6882, "Video Camera Use at Nuclear Power Plants."

**CRITERIA FOR USING
ALTERNATE FIRE WATCH METHODOLOGY**

This methodology allows Technical Specification requirements to be satisfied without exposing watch personnel to high radiation fields or other adverse conditions.

The Authority plans to use this watch method when the Technical Specifications require a continuous fire watch or a roving fire patrol for a non-functional penetration seal that cannot be repaired in less than 24 hours and where either of the following conditions exist:

1. a continuous fire watch would be required in an area with a general area dose rate ≥ 2 mR/hr

or

a roving fire patrol would be required in an area with a general area dose rate ≥ 100 mR/hr.

2. a continuous fire watch or a roving fire patrol would be required in an environment that poses a health risk to personnel fulfilling these duties (e.g., chemical or material hazards, high temperature or background sound levels).