



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION REFERRED TO  
FIRE PROTECTION - INTERPRETATION OF TECHNICAL SPECIFICATION 3/4.7.10

FIRE BARRIERS AT

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

1.0 INTRODUCTION

By letter dated August 16, 1990, the Toledo Edison Company (TE) requested interpretation of Technical Specification (TS) 3/4.7.10, "Fire Barriers," for the Davis-Besse Nuclear Power Station, Unit 1. Specifically, the request by TE is as follows: "Does a one-sided inspection of barriers and penetration seals that are inaccessible due to physical constraints or ALARA considerations, regardless of plant operational status, meet Surveillance Requirements (SR) 4.7.10a and 4.7.10c requirements for exposed barrier surface and sealed penetration inspection?"

On August 1 and 2, 1990, TE discussed the issue with NRC staff in the Office of Nuclear Reactor Regulation and Region III. In these meetings, TE presented a technical justification for performing one-sided fire barrier inspections which supported their interpretation. In its August 16, 1990, request TE provided the following historical information:

On June 27, 1986, Surveillance Test Procedure ST 5016.11, Revision 5, "Fire Barrier Penetration Seal Surveillance Test," was issued. This procedure required barrier seal inspections to be performed per IP-M-008, "Fire and Associated Barrier Penetration As-Built Verification Data Collection." Step 6.8 of IP-M-008, Revision 2, dated July 7, 1985, states: "For those barriers where inspection of the opposite sides of the penetration seals is not possible due to ALARA considerations or unresolvable inaccessibility, the Engineering Team Leader shall indicate so in the comments column...".

On December 7, 1987, Toledo Edison submitted a License Amendment Request (LAR) (Letter Serial Number 1446) to "Revise Technical Specifications related to Fire Protection Barriers in order to reflect the current plant design, testing and compensatory measures considered to be adequate and practical." [emphasis added] This LAR also proposed new Surveillance Requirements that addressed the following fire barriers: fire-rated walls, floors and ceilings, electrical raceway fire enclosures, and structural steel fire-proofing.

This submittal requested replacement of the SR 4.7.10a wording from "At least once per 18 months by a visual inspection" for fire barrier penetration seals to "Performing a visual inspection of the exposed surfaces of each fire-rated wall, floor, and ceiling, electrical raceway fire enclosure and structural steel fire proofing at least once per 18 months." The LAR also requested addition of a footnote to SR 4.7.10a that exempted both sides of certain

barriers from the visual inspection requirements due to ALARA considerations and a separate surveillance requirement for penetration seals penetrations was retained.

On February 25, 1988, Amendment number 106 was issued by the NRC which approved the requested changes.

## 2.0 EVALUATION

On March 24, 1988, surveillance procedures DB-FP-03023, "18 Month Rated Barrier Visual Inspection," and DB-FP-03025, "18 Month Percent Penetration Seal Visual Inspection," were issued to implement the new SR 4.7.10a and SR 4.7.10c requirements, respectively. Both of these procedures allowed one-sided inspections like the previous procedure (ST 5016.11 as implemented by IP-M-008).

A review of the LAR which had been submitted in December 1987 was performed. Although the LAR does not explicitly state that one-sided inspections are considered as an acceptable method of meeting the surveillance requirements, it does state that the intent was to revise TS 3/4.7.10 to reflect current plant testing. As established by a review of the surveillance procedures for fire barrier penetration seals, the plant practice since at least 1986 was to allow one-sided inspections.

License Amendment No. 106 to the TS, section SR 4.7.10a states that fire barriers, including sealing devices, shall be verified OPERABLE by:  
"Performing a visual inspection of the exposed surfaces of each fire rated wall\*, floor and ceiling, electrical raceway fire enclosure and structural steel fire-proofing at least once per 18 months.

\*Barrier 102 WEST/210 EAST and a portion of barriers 206 EAST/210 WEST and 205 NORTH/206 SOUTH behind the filter bank are not subject to the requirements for visual inspection due to ALARA considerations."

In addition a visual inspection of at least 10 percent of each type of sealed penetration at least once per 18 months is specified in SR 4.7.10c. The visual inspection of fire seals was intended to ensure that the part of the seal that was subject to damaging exposure would be inspected to determine the suitability of the seal.

TE has recognized that the fire barrier penetration seal material is the weakest point in the overall boundary construction. The barriers for which inspection is performed on only one side contained either grout, silicone low density foam, or high density elastomer seals. TE has reviewed the radiation, temperature, and physical damage characteristics of these materials and has determined that the limiting seal materials are silicone foam and elastomer. However, the radiation resistance and temperature performance characteristics of silicone foam and elastomer are greater than the plant design conditions for these parameters. TE has reviewed a group of seals that had been inspected on one side only in high radiation areas which were most susceptible to damage. This is due to the fact that the non-inspected sides were physically protected from damage by some means such as concrete block walls constructed in front of the fire barrier, or equipment that is permanently placed over the seal. A one-sided inspection of the seals would reflect the condition for either side of the seal with respect to radiation damage.

The remaining factor to consider is the temperature of the penetrating pipe that is surrounded by the seal material. Any degradation to the seal material caused by a hot pipe is expected to be equally apparent on either side of the barrier. Here, too, a one-sided inspection would reflect the condition for either side of the seal with respect to temperature.

Another area of concern is the internal conduit seals due to their unique configuration.

Fire-rated internal conduit seals are inspected on one side due to the installation practice of having a junction box or access point on only one side with a continuous conduit extending out from the other side. This physical covering prevents exposure of the seal to degrading elements. The other classification of internal conduit seal is the smoke and hot gas seal that is not considered part of the fire rated barrier. These seals are inspected upon installation but are not periodically reinspected due to the protective covering provided by the conduit or junction box. The fire rating of the barrier is maintained even if the smoke and hot gas seal is degraded, but installation of these seals is provided to prevent the spread of smoke and hot gases that may affect sensitive electrical equipment.

For the barriers/seals that are inspected on both sides, a population exists that would bound all possible detrimental elements. These inspection results are evaluated by TE Engineering to ensure that, if degradation is found and there is a general concern that may apply to the seals inspected on only one side, appropriate actions can be taken to inspect or replace suspect seals.

Based on TE's review and further supported by their technical justification, TE has determined that SR 4.7.10a and SR 4.7.10c permit the one-sided inspection of barriers when physical constraints or ALARA considerations (defined as the barrier being inside a high radiation area ( $>100$  mrem/hour exposure to personnel)) regardless of plant operational status) render the opposite side inaccessible. For these barriers the inaccessible side is considered to be unexposed for inspection.

### 3.0 CONCLUSION

The staff has reviewed TE's submittal and concurs that one-sided inspection of fire barriers and fire seals is permissible when physical constraints or ALARA considerations prevent complete inspections. We note that less than 10 percent of TE's inspections are one-sided inspections. Although detailed fire protection requirements have been removed from the Davis-Besse TS and incorporated into the Updated Safety Analysis Reports, the basic requirements remain the same.

TE should make every effort to perform complete inspection on a case by case basis, and be advised that the determinations are subject to NRC inspection and review.

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Date: