



CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT

RR#1 • BOX 127E • EAST HAMPTON, CT 06424-9341

January 9, 1991
Re: 10CFR50.73(a)(2)(i)(B)


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

Reference: Facility Operating License No. DPR-61
Docket No. 50-213
Reportable Occurrence LER 50-213/89-001-01

Gentlemen:

This letter forwards the Licensee Event Report 89-001-01, required to be submitted, pursuant to the requirements of Connecticut Yankee Technical Specifications.

Very truly yours,


John P. Stetz
Station Director

JPS/dl

Attachment: LER 50-213/89-001-01

cc: Mr. Thomas T. Martin
Regional Administrator, Region I
475 Allendale Road
King of Prussia, PA 19406

J. T. Shedlosky
Sr. Resident Inspector
Haddam Neck

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LICENSEE EVENT REPORT (LER)

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TITLE (4)
Inoperable Fire Barrier Seal Due to Procedural Deficiencies

EVENT DATE (6)			LER NUMBER (8)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMED		DOCKET NUMBER(S)
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THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)											

OPERATING MODE (9) 1	POWER LEVEL (10) 1 1 0 0	20.402(b)	20.406(a)(1)(i)	20.406(a)(1)(ii)	20.406(a)(1)(iii)	20.406(a)(1)(iv)	20.406(a)(1)(v)	20.406(a)(1)(vi)	20.406(a)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vi)	50.73(a)(2)(vii)(A)	50.73(a)(2)(vii)(B)	50.73(a)(2)(ix)	73.71(b)	73.71(c)	OTHER (Specify in Abstract below and in Text, NRC Form 308A)
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LICENSEE CONTACT FOR THIS LER (12)

NAME T. B. Kazukynas, Fire Protection Engineer	TELEPHONE NUMBER 2 1 0 3 2 1 6 1 7 1 - 1 2 1 5 5 1 6
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO			

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

ABSTRACT

On January 6, 1989, at 1400, with the plant in Mode 1 at 100% power, an engineering review of the results of a fire barrier walkdown determined that a temporarily sealed sleeve which penetrated the Hypochlorite Room wall in the Screenwell Building was inoperable. Upon determination of the inoperable seal, an hourly fire watch patrol was established in accordance with Technical Specification 3.22F.2 until the seal was replaced with a permanent rated fire seal on January 16, 1989. The inoperable seal was determined to be the result of past fire seal program procedural deficiencies. Procedure modifications have been made that will preclude recurrence. Additionally, a seal program upgrade project, was conducted in response to I&E Notice 88-04, and this will provide further assurance against recurrence. Since it could not be determined when the temporary material was installed or for what length of time the barrier penetration seal was not functional, it is assumed that the LCO Action Statement was not met. This supplemental report provides information describing five additional fire barrier deficiencies noted during the completion of the Penetration Seal Upgrade Project.

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TEXT (If more space is required, use additional NRC Form 306A's) (17)

BACKGROUND INFORMATION

In February of 1988, NRC I&E Notice 88-04, "Inadequate Qualification and Documentation of Fire Barrier Penetration Seals," was issued. The general concern of this I&E Notice was that utilities may not have complete test qualification documentation to substantiate the seal configurations being used or that installed seal design configurations or design parameters may be significantly different from the tested seals. To address the concern raised in this Notice, CYAPCO initiated a project to perform penetration seal program documentation and procedural upgrades, and to conduct field verifications of installed seal configurations. Where necessary, repairs to existing deficient seals were performed. The inoperable seals, which are the subject of this report, were found during walkdowns for this project.

EVENT DESCRIPTION

On January 6, 1989, at 1400, with the plant operating in Mode 1 at 100% power, a Technical Specification fire barrier in the Screenwell Building Hypochlorite Room was declared inoperable due to an unrated fire seal configuration in a 1 inch spare pipe sleeve. This fire barrier separates the hypochlorite system and diesel fire pump fuel tank from the Screenwell Building pump motor area. The pump motor area contains service water pumps and a diesel fire pump driver, which are Appendix R shutdown components.

The decision to declare the barrier inoperable was the result of an engineering review of the configuration of the seal installed in the spare penetration. As determined by field inspections, a ceramic fiber material was installed in the penetration. Although permitted by the seal installation procedure for temporary use, this configuration has been determined, by engineering review, to be a non-rated configuration. The field inspection which discovered the deficient configurations was part of the on-going seal verification program.

The following information describes five additional fire barrier deficiencies noted during the completion of the Penetration Seal Program Upgrade Project.

On April 13, 1989, with the plant operating in Mode 1 at 100% power, a Technical Specification fire barrier between the Chemistry laboratory and the Chemistry Office was found with an open penetration. This penetration consisted of an unsealed pipe sleeve within which was a fire sprinkler supply line. This barrier is part of the fire barrier which separates the Turbine Building from the Service Building. The open penetration was

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associated with a sprinkler pipe. This line was run through the concrete block wall from the Chemistry laboratory to provide wet pipe sprinkler protection in the new Chemistry office.

On June 27, 1989, with the plant operating in Mode 1 at 100% power, a Technical Specification fire barrier between the Turbine Hall and the Cable Spreading Area was found with two fire dampers which did not meet the design requirements of National Fire Protection Association Codes. These fire dampers were installed in a fire barrier which separates the Turbine Building from the Service Building. The fire dampers are installed in the barrier where ventilation system make-up air is taken into the cable spreading area. During the Penetration Seal Upgrade Project walkdown, field inspection of the installation noted the design inadequacies which were considered significant enough to cause the dampers to fail to operate properly under fire exposure.

On September 14, 1989, with the plant in Mode 5 (cold shutdown) a Technical Specification fire barrier between the Turbine Building and the Service Building was found with several open penetrations. These openings were associated with mechanical penetrations consisting of water supply and waste lines servicing two lavatories located in the 59' 6" elevation of the Service Building.

On January 8, 1990, with the plant in Mode 6 (Refueling), a Technical Specification fire barrier between the Cable Spreading Area and the Chemistry/Health Physics Office Building was found with seven open penetrations. This barrier is part of the fire barrier which separates the Chemistry/Health Physics Building from the Service Building. The open penetrations were comprised of six, 4 inch diameter electrical conduits and one 2 1/2 inch diameter mechanical pipe which supplies fire hose station supply to the Chemistry/H.P. Building. In each case, the exterior of the penetrating item was not sealed adequately to maintain the fire barrier integrity.

On March 20, 1990, with the plant in Mode 6 (Refueling), a Technical Specification fire barrier located in the floor of the Primary Auxiliary Building at Elevation 35' 6" was found with an open 8 inch sleeve through which was run a six inch mechanical penetration. The annular space between the pipe and the sleeve was not sealed. This fire barrier was added to the plant fire barrier list as part of the Appendix R program.

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CAUSE OF THE EVENT

The root cause of the event was attributed to past procedure deficiencies with the penetration fire seal program.

Formerly, plant procedures had permitted the installation of unrated temporary fire seals without the use of a fire watch which is required by Technical Specification 3.22.F.2. The procedures had stated that, as a temporary measure, ceramic blanket material could be used to temporarily seal the opening until a permanent seal was installed. As stated previously, engineering review has determined the ceramic blanket material to be an unrated configuration. Further, the procedure assigned a ninety (90) day time limit as the maximum duration for the temporary seal installation before a permanent seal was required. However, the procedure implemented no administrative controls to track the replacement of temporary seals. Therefore, these procedural deficiencies permitted an unrated temporary seal to be installed without initiating a fire patrol and without the administrative controls to ensure that a permanent rated seal would be installed. These procedural problem deficiencies lead to the unrated temporary seal being left in place for an unknown length of time.

Prior to the event, a revision was made to the seal installation procedure to ensure that the replacement of a temporary seal with a permanent rated seal was performed. It appears that the temporary unrated seal noted in this report was installed prior to this procedural change. Since the event, the procedure has been further revised to ensure that no temporary unrated seals are installed without posting a fire patrol, as required Technical Specifications.

For the April 13, 1989 and January 8, 1990 events, there appears to be two causes for each event. The first cause appears to be inadequate original specification of penetration sealing requirements in the initiating project documents. The second cause appears to be the failure of Construction/Plant Engineering personnel to adequately identify and control breaches of Technical Specification Fire Barriers which had occurred as part of project implementation.

For the June 27, 1989 event, the cause appears to be the result of inadequate original design review. The design and installation of the two fire dampers involved did not meet mounting and spacing criteria as specified in the National Fire Protection Association Standard 90A which governs the installation of fire dampers in fire barriers. When the dampers were installed in the early 1980 timeframe, the design package which controlled the installation

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did not provide adequate detail to ensure the dampers would meet the fire code requirements. With the critical design details missing, the original installation was installed improperly.

For the September 14, 1989 event, the cause appears to be related to general inadequacy in the identification of required fire barriers during the original fire barrier penetration sealing effort. This effort was conducted in the 1979/1980 timeframe following the BTP 9.5-1, Fire Protection Program review of the Haddam Neck facility by the NRC. This particular portion of the service/turbine building fire barrier was missed as it was inaccessible from view from the top side behind solid chase walls and from the bottom side due to obstruction by plant equipment. It was only during the comprehensive walkdown effort and fire barrier drawing development effort which occurred with the upgrade project that this previously unidentified portion of the fire barrier was found and surveyed.

For the March 20, 1990 event, the cause appears to be the result of inadequate verification of the acceptability of a section of the Primary Auxiliary Building floor for serving as an Appendix R fire barrier. During the Appendix R evaluation effort conducted in the 1985/1986 timeframe, a portion of the floor in the PAB 35' 6" elevation was credited as a fire barrier. This was done to support an Appendix R exemption request. The open pipe sleeve found in this event was located on the edge of the boundary of the credited floor section. Due to its closeness to the boundary, it is assumed that it was not originally considered to be within the boundary and was therefore not upgraded with a rated seal. During the Penetration Seal Upgrade Project, the open penetration within the required boundary was noted and a rated fire seal installed.

SAFETY ASSESSMENT

This event is considered reportable per 10CFR50.73(a)(2)(i)(B) since the LCO Actions for Technical Specification 3.22F.2 were not met and is therefore a condition prohibited by the plant's Technical Specifications.

The safety significance of this event was negligible due to the low probability of a fire breaching the barrier through the small temporarily filled penetration and the fact that any fire breaching this barrier would have been controlled by installed fire protection features in the pump room area which houses Appendix R components. Further, this breach would not create a condition beyond that which has been previously evaluated for a fire originating within the pump room affecting the safe shutdown components.

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While the seal was not a fire rated configuration, there is a degree of fire resistance to the noncombustible ceramic material which would have served to retard the spread of fire across the barrier. In addition, a wet pipe sprinkler system is installed in the hypochlorite room which would control any fire involving the supply of diesel fire pump fuel. Also, the area is provided with smoke detection arranged to annunciate in the Control Room which would have ensured a quick response from the fire brigade to any fire in the area. Arrangements have been made within the pump room to protect specific safe shutdown components in that area (service water pumps and diesel fire pump installation) from a fire originating within the area. A breach of this fire wall through the penetration in question would have had no adverse impact on the protection of the safe shutdown components.

The five additional events noted during the completion of the Penetration Seal Upgrade Project are considered reportable per 10CFR50.73(a)(2)(i)(B) since the LCO Actions for Technical Specification 3.22F.2 were not met and this was a condition prohibited by the plant's Technical Specifications.

For the April 13, 1989 event, the safety significance was negligible. This is due to the fact that the as-found barrier breach would not have allowed a rapid spread of fire across the barrier. The opening was covered on both sides with a noncombustible wall covering material. This material would have served as a non-rated fire stop and prevented flame spread through the opening until the installed sprinklers in the area could have operated to control the fire.

For the June 27, 1989 event, the safety significance was negligible. This is due to the fact that there was no continuity of combustible material in the vicinity of the fire dampers. As such, any fire would not be rapidly spread through the failed damper openings. If a fire of any significance developed near the barrier, the installed sprinkler or waterspray systems would have been capable of controlling the exposure fire or protecting the important equipment in the area of the damper openings.

For the September 14, 1989 event, the safety significance of the event was negligible. Again, there was a lack of combustibles in the area of the breach which would have prevented the spread of fire across the barrier. In addition, any fire on the Turbine Building side of the barrier would have been controlled by the installed sprinkler system.

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For the January 8, 1990 event, the safety significance was negligible. This is due to the fact that the as-found barrier breach would not have allowed a rapid spread of fire across the barrier. The opening was covered on the Cable Spreading Area (CSA) side with a noncombustible wall material. This material would have served as a non-rated fire stop and prevented flame spread through the opening for a period of time. Should fire have eventually extended through the barrier, the installed sprinkler and waterspray systems provided in the CSA would have controlled the exposure fire and prevented damage to safety related equipment in the area.

For the March 20, 1990 event, the safety significance was negligible. In this area of the PAB, there is a lack of combustibles in the vicinity of the open pipe sleeve. On the bottom side of the penetration, installed sprinkler systems would have controlled any fire in cable trays or fires from transient combustible materials. As a result, there was no potential for fire spread across the barrier.

In all cases, in spite of the low probability of fire spreading across the degraded fire barrier as described for each event above, any fire which might have extended would not have created a situation beyond that which is assumed for a fire originating within that area. As such, these events would not have adversely affected the safe shutdown capability of the plant.

CORRECTIVE ACTION

The immediate corrective action was to establish a fire watch patrol to cover the affected areas and initiate work activities to install a permanent fire seal. The permanent seal was installed on January 16, 1989 and the fire watch patrol cancelled.

For the five additional events noted during the remainder of the Penetration Seal Upgrade Project completion, the following corrective action applies.

In each of the cases described, upon discovery of the fire barrier discrepancies, the barrier was declared inoperable and an appropriate fire watch established in accordance with the requirements of the plant's Technical Specifications. This fire watch was maintained until permanent sealing or repair of each barrier was performed. Permanent fire seals and new fire dampers have been installed and the barriers declared operable again.

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Several actions have occurred which will serve to prevent recurrence of events like this in the future. These actions are:

1. The completion of the Penetration Seal Upgrade Project has provided a clear, concise set of barrier and seal survey drawings. These drawings will help with the early identification of Technical Specification barriers for new projects. Also, the new program requires that a penetration seal log be issued for penetrations made in the implementation of project/design change work. This provides "up-front" information for personnel involved with barrier modifications.
2. The addition of a section on Fire Barrier Requirements into the General Employee Training program. This will provide generic information to all personnel on the requirements for maintaining and controlling fire barriers
3. Establishment of a section on "Control of Technical Specification Fire Barriers" in the station procedure on Fire Protection Program Implementation (ACP 1.2-2.32). This procedure provides the specifics needed for programmatic control of fire barriers.
4. Development of a supervisor level training program on "Control of Fire Barriers". This program is scheduled for presentation twice per year and is given to supervisors/foreman of plant departments or outside vendor organizations who could be involved with coordinating or performing work on fire barriers.
5. The hiring of a full time Station Fire Protection Engineer who is available for consultation and providing guidance on Technical Specification Fire Barrier requirements.

With the various programmatic improvements made in the fire barrier/fire seal program and overall fire protection program, breaches of fire barriers should be effectively controlled in the future. All of the corrective actions described above have been completed. No further corrective action is required.

ADDITIONAL INFORMATION

None

PREVIOUS SIMILAR EVENTS

- LER 87-014-00
- LER 87-004-01
- LER 86-017-00