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SUBJECT: LER 89-013-01:on 890630,FBP inoperability as result of failure to adequately assess original seal configuration.

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December 29, 1989

Report Required by:
10 CFR Part 50
Section 50.73

U S Nuclear Regulatory Commission
Attn: Document Control Desk
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MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50 License No. DPR-22

Supplemental Report
Fire Barrier Penetration Inoperability as a Result of
Failure to Adequately Assess Original Seal Configuration

A supplemental Licensee Event Report for this occurrence is attached.

Please contact us if you require additional information related to this event.

Jacqueline Gilchrist
For Thomas M Parker
Manager
Nuclear Support Services

c: Regional Administrator-III, NRC
NRR Project Manager, NRC
Resident Inspector, NRC
MPCA
Attn: J W Ferman

Attachment

9001100234 891230
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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
MONTICELLO NUCLEAR GENERATING PLANT	0 5 0 0 0 2 6 3	1 OF 0 7

TITLE (4) Fire Barrier Penetration Inoperability as a Result of Failure to Adequately Assess Original Seal Configuration

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 6	3 0	8 9	8 9	0 1 3	0 1	1 2	3 0	8 9		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 5 7	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	XX 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (AREA CODE)
Greg Olson, Engineer II	6 1 2 2 9 5 - 1 3 7 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	XX NO				

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

Several unsealed penetrations were discovered in barriers separating Division I and Division II fire areas. This is a condition which is contrary to the requirements of Technical Specification 3.13.G. Temporary seals were installed immediately.

Due to cognitive personnel error, inspection by contract personnel of Appendix R fire area boundary penetrations failed to identify several inadequate seals. Interference from pipe insulation jacketing and existing plant equipment prevented direct visual examination of the penetrations resulting in acceptance of an inadequate seal.

Corrective actions included initiating a walkdown of all fire area barriers to identify any deficient penetration seals. All fire area barriers have been inspected as of August 21, 1989.

DESCRIPTION

On the morning of June 30, 1989, with the plant operating at 57% of rated power, a member of the plant engineering staff, as a result of a training program designed to increase personnel awareness of fire protection concerns with barrier penetrations, identified an unsealed fire barrier penetration (PEN) to the Fire Protection Engineer. The unsealed opening provided a path between Fire Area II Zone 2H and Fire Area IV Zone 1F. This fire area boundary separates redundant divisions of safe-shutdown equipment. Technical Specification 3.13.G requires this penetration to be sealed whenever safe shutdown equipment in this fire area is required to be operable. A temporary seal was immediately installed.

Corrective actions taken to prevent a similar event included initiation of a plant-wide inspection of all fire area barriers by qualified plant personnel. As a result of this inspection, five unsealed penetrations were discovered on July 26, 1989 in a single fire area barrier wall separating Fire Area I Zone 2E and Fire Area III Zone 2A. These penetrations were reported to the Fire Protection Engineer and temporary seals were immediately installed. In addition, a roving fire watch was established to inspect all plant fire areas once per hour until the inspection of all accessible barriers was complete. The roving fire watch was discontinued on July 28, 1989. As of the date of this supplemental report, all fire area barriers in both accessible and inaccessible areas have been inspected. No additional deficient seals have been identified beyond those discovered on July 26, 1989.

CAUSE

The cause of both events was cognitive personnel error. Contract personnel performing the Appendix R Barrier Review failed to recognize the penetration between Fire Area II Zone 2H (West Shutdown Cooling Room) and Fire Area IV Zone 1F (Torus Area) was not sealed because the penetration seal was concealed by a pipe insulation jacket which prevented a direct visual examination of the seal. The insulation jacket covered the opening between an 18 inch diameter, grouted-in sleeve and the 16 inch diameter pipe running through the penetration. Subsequent wear to the jacket exposed the opening and plant personnel in the area then reported seeing an unsealed penetration to the

plant fire protection engineer. During the same review, contract personnel also failed to identify the penetrations in the wall between Fire Area III Zone 2A (Traversing InCore Probe (TIP) Drive Room) and Fire Area I Zone 2E (TIP Room) because the location of existing plant equipment limited access to portions of the barrier for inspection purposes. These errors were cognitive in nature and contrary to procedures used for Appendix R barrier inspections.

A contributing cause to this event was an inadequate inspection scope for plant inspection procedures. The existing procedures required inspection of only identified penetration seals and fire barriers. As a result, previously unidentified barriers and penetrations were not identified during normal surveillance of fire barriers.

ANALYSIS

Both Zones 2H and 1F have local smoke detectors with remote alarm in the control room. Per the Updated Fire Hazards Analysis, the equivalent fire severity for these zones is less than one minute due to low combustible loading and lack of continuity of combustibles. Should a fire start in either of these zones, prompt response by the fire brigade together with the lack of combustible loading, assures the fire would not challenge any fire area barriers or any safe shutdown equipment located in adjacent fire areas.

However, for purpose of analysis, a fire propagating between the West Shutdown Cooling Room and the Torus area through the open penetration could result in the loss of safe shutdown equipment located in zone 2H and equipment located directly below in zone 1F. Propagation of the fire to other safe shutdown equipment in the Torus area that is not directly under zone 2H is considered unlikely based on the following justification:

1. The torus area is very clean and transient combustibles are not allowed;

2. Twelve ionization smoke detectors give overlapping coverage of the area to quickly detect a fire and initiate immediate action through an alarm in the control room;

3. The redundant trains for safe shutdown are horizontally separated by at least 100 feet with no intervening combustibles.

4. Manual hose stations and portable fire extinguishers in the area together with prompt fire brigade response, provides adequate suppression capability.

To determine the effect on safe shutdown, in the remote event that a fire should spread between Zones 2H and 1F, safe shutdown equipment in each zone is assumed to be lost as a result of a fire in that zone. The Monticello Safe Shutdown Analysis Report shows that a fire in zone 2H could result in the loss of Division II Low Pressure Coolant Injection (LPCI) system (BO) due to the loss of LPCI Valves (INV) (MO2013 and MO2015) located in this zone. Loss of cables for LPCI Loop Selection Logic Recirc Loop Riser dP Switches, dpis-2-129A and C, also located in this fire zone, could result in selecting Division II for LPCI injection. Coincident with a failure of MO2013 and MO2015, this would cause a complete loss of LPCI function. Safe Shutdown is assured during this event by the availability of the Core Spray System (BM), Suppression Pool Cooling and Alternate Shutdown Cooling functions of the Residual Heat Removal (RHR) system (BO), Reactor Core Injection Cooling (RCIC) (BM) and High Pressure Injection Cooling (HPCI) (BJ) systems.

Safe Shutdown equipment in zone 1F which is assumed to be lost includes RHR Discharge to Waste Surge Tank Isolation Valves (ISV) (MO 2032 and MO 2407). Spurious opening of MO 2032 and MO 2407 during a fire has been addressed as part of the Appendix R program. Administrative controls have been issued which prevent the spurious operation of this equipment and subsequent loss of safe shutdown capabilities in accordance with the Technical Specification requirements for Fire Protection.

Also located in zone 1F are the suppression pool temperature sensors (TIT). This is part of the plant monitoring system required for safe shutdown. One temperature sensor for each division of the Suppression Pool Temperature Monitoring System (SPOTMOS) is located in the area below Fire Zone 2H. The SPOTMOS system includes eight sensors for each division which are equally spaced around the torus. The eight sensors are averaged and their output displayed in the control room. Loss of one temperature sensor from each division as a result of a fire propagating from zone 2H will not impair safe shutdown since failure of a sensor will indicate an error if there is either an electrical short or open. This error is displayed in the control room where the operators can remove the sensor from the logic. The remaining seven sensors in each division will be averaged to obtain suppression pool temperature. Therefore, a postulated fire in the torus area could damage some sensors of both divisions but would have to propagate more than 145 feet to totally disable both divisions of temperature sensing.

Fire Area III Zone 2A (TIP Drive Room) is equipped with local smoke detectors with remote alarm in the control room. The equivalent fire severity for this zone is 46 minutes. The automatic smoke detection feature with alarm to control room will result in prompt fire brigade response and fire extinguishment thus preventing the spread of fire to other fire areas containing safe shutdown equipment. Fire Area I Zone 2E (TIP Room) does not have local detectors however, adjacent zones in Fire Area I do have local smoke detection.

An unmitigated fire in Fire Area III Zone 2A could result in loss of safe shutdown equipment located in this area, specifically, Division II RHR and Core Spray systems. Safe shutdown is assured since Division I RHR and Core Spray systems remain available. The open penetration between zones 2A and 2E could result in a fire passing into Zone 2E of Fire Area I. However, this is considered an unlikely event since the barrier between Zones 2A and 2E is 30 inches thick and the open penetrations in the barrier had very small clearances making fire spread difficult. No safe shutdown equipment exists in Zone 2E. In addition, the equivalent fire severity for zone 2E is less than one minute due to low combustible loading and lack of continuity of combustibles. Therefore, per the Monticello Updated Fire Hazards Analysis, should Fire Area I Zone 2E become involved in a fire, spread to other fire zones within Fire Area I is not considered likely and no threat to redundant Division I safe shutdown equipment in adjacent zones exists.

The above analysis shows the potential for a fire to start in any of these fire zones is low due to the lack of combustibles and strict control over combustion sources. Should a fire start in these zones, lack of combustible loading, local detection and prompt response from the fire brigade will prevent fire spread to other zones within each fire area. Thus, safe shutdown could be achieved.

The roving fire watch was discontinued on July 28, 1989 when all accessible barriers had been inspected. This was acceptable since the steam chase has temperature detection available which will alarm in the control room on high ambient temperature and the condenser hot side is equipped with a fire suppression system. Initiation of this suppression system will operate a local gong alarm and a control room alarm on start of an emergency fire pump. Therefore, adequate detection of fire initiation in these high radiation areas existed to assure prompt fire brigade response.

There were no consequences to the health and safety of the public since equipment required for safe shutdown was available at all times. The estimated length of time these barrier penetrations were inoperable is four years. These barriers were not required prior to 1985. The elapsed time between verification of the problems and temporary repair was less than one hour.

CORRECTIVE ACTIONS

The openings were immediately sealed with temporary seals. A permanent penetration seal has been installed in the first penetration discovered and the five additional penetrations were permanently grouted.

Procedure #0275-1, "Fire Barrier Penetration Seal Visual Inspection" and Procedure #0275-2, "Fire Barrier Wall, Damper and Floor Inspection" will be revised to include the fire barrier floor, wall and applicable penetrations discussed in this LER and to include adequate inspection instructions to ensure all existing barriers and penetrations are identified and inspected during the normal surveillance.

A walkdown, independent of procedure #0275-1,-2, of all fire area barriers was completed in order to identify any deficient penetration seals. Interferences such as insulation jackets which prevent the seal from being inspected were removed. The walkdown was conducted by qualified plant personnel. All questionable penetration seals were evaluated by the Fire Protection Engineer for adequacy. The five newly identified penetrations were permanently sealed with grout and no regular surveillance of the seals is required in the future.

ADDITIONAL INFORMATION

Failed Component Identification:

NONE

Previous Similar Events:

LER 88-004-00
LER 89-001-00

The corrective action for a similar LER, 88-004-00, stated that all fire area barriers would be inspected per procedure #0275 "Fire Barrier Penetration Seal Visual Inspection" to identify any deficient penetration seals. This was completed but failed to prevent the similar event described in LER 89-001-00 because an existing floor had not previously been recognized as separating redundant trains and therefore this barrier was not part of inspection procedure #0275. The follow-up actions of LER 88-004-00 also failed to prevent the event described in this LER since contract personnel failed to identify these penetrations on inspection procedure #0275.

The corrective action for LER 89-001-00 stated that the Appendix R Safe Shutdown Analysis would be reviewed to verify that all Appendix R barriers were identified in procedure #0275 and that an inspection by qualified personnel would be done to any new barriers identified during this review. No previously unidentified Appendix R barriers were identified during this review. The floor in zone 2H and the wall between zone 2A and 2E had been identified as Appendix R barriers in the original analysis, so these barriers were not inspected per LER 89-001 follow-up recommendation.