

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9107020387      DOC.DATE: 91/06/28      NOTARIZED: NO      DOCKET #  
 FACIL: 50-263 Monticello Nuclear Generating Plant, Northern States      05000263  
 AUTH.NAME      AUTHOR AFFILIATION  
 SCOTT, D.      Northern States Power Co.  
 PARKER, T.M.      Northern States Power Co.  
 RECIP.NAME      RECIPIENT AFFILIATION

SUBJECT: LER 91-009-01: on 910427, secondary containment isolation  
 damper solenoids & SGTS cables did not meet requirements.  
 Caused by inadequate controls. Secondary containment  
 isolation dampers rerouted. W/910628 ltr.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 8  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: NRR/LONG, W. 05000263 A

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	PD3-1 LA	1 1	PD3-1 PD	1 1	
	LONG, B.	1 1			
INTERNAL:	ACNW	2 2	AEOD/DOA	1 1	
	AEOD/DSP/TPAB	1 1	AEOD/ROAB/DSP	2 2	
	NRR/DET/ECMB 9H	1 1	NRR/DET/EMEB 7E	1 1	
	NRR/DLPQ/LHFB10	1 1	NRR/DLPQ/LPEB10	1 1	
	NRR/DOEA/OEAB	1 1	NRR/DREP/PRPB11	2 2	
	NRR/DST/SELB 8D	1 1	NRR/DST/SICB8H3	1 1	
	NRR/DST/SPLB8D1	1 1	NRR/DST/SRXB 8E	1 1	
	<del>REG FILE 02</del>	1 1	RES/DSIR/EIB	1 1	
	RGN3 FILE 01	1 1			
EXTERNAL:	EG&G BRYCE, J.H	3 3	L ST LOBBY WARD	1 1	
	NRC PDR	1 1	NSIC MURPHY, G.A	1 1	R
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June 28, 1991

Report Required by  
10 CFR Part 50. Section 50.73

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

MONTICELLO NUCLEAR GENERATING PLANT  
Docket No. 50-263 License No. DPR-22

Inadequate Control of Construction Activities  
Causes Failure to Meet Cable Separation Requirements

The Supplemental Licensee Event Report for this occurrence is attached.

This event was originally reported via the Emergency Notification System in accordance with 10 CFR Part 50, Section 50.72 on April 27, 1991.

*TE Con for*

Thomas M Parker  
Manager  
Nuclear Support Services

c: Regional Administrator - III NRC  
Sr Resident Inspector, NRC  
NRR Project Manager, NRC  
MPCA

Attn: Dr J W Ferman

Attachment

9107020387 910628  
PDR ADDCK 05000263  
S PDR

*Handwritten initials/signature*

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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) **Monticello Nuclear Generating Plant** DOCKET NUMBER (2) **0 | 5 | 0 | 0 | 0 | 2 | 6 | 3 | 1** PAGE (3) **1** OF **0 | 7**

TITLE (4) **Inadequate Control of Construction Activities Causes Failure to Meet Cable Separation Requirements**

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	4	2	7	9	1	9	1	0	0	9	0	1	0	6	2	8	9	1	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) <b>0   0   0</b>	20.402(b)	20.405(e)	50.73(a)(2)(iv)	73.71(b)
	20.405(a)(1)(ii)	50.73(e)(1)	50.73(a)(2)(v)	73.71(d)
	20.405(a)(1)(iii)	50.73(e)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(A)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(vii)(B)	
	20.405(a)(1)(vi)	50.73(a)(2)(iv)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
<b>David Scott, Senior Production Engineer</b>	<b>6   1   2   2   9   5   -   1   3   4   1</b>

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (if yes, complete EXPECTED SUBMISSION DATE)  NO  NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On 4/27/91, with the plant in cold shutdown for refueling, it was determined that cables for Secondary Containment isolation damper solenoids and Standby Gas Treatment system components did not meet separation requirements in several locations. This violated separation requirements stated in the Updated Safety Analysis Report and on controlled drawings and was therefore reportable as a condition outside of the design basis of the plant. Several other cable separation discrepancies were subsequently found in other Safety Related systems. The root cause of this condition was that original construction installation and verification activities were inadequate.

Each circuit was evaluated for safety significance. Four circuits were modified to eliminate the system weaknesses and comply with plant design basis. Two circuits were evaluated as being acceptable "as built" with only drawing changes required. The remaining circuits were evaluated either as not having a failure mode which would affect their safety function or as having sufficient redundancies and verification to justify continued operation. These circuits will be modified during or prior to the next refueling outage.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

DESCRIPTION:

On 4/27/91, with the plant in cold shutdown, during cable (EIIS Component Code: CBL3) replacement for Environmental Qualification maintenance, engineering personnel determined that the cables for one pair of solenoids (EIIS Component Code: SOL) for Secondary Containment (EIIS System Code: NG) Isolation Dampers (EIIS Component Code: DMP), V-D-25 & V-D-26, were routed in a common cable tray (EIIS Component Code: TY) for approximately 10 feet. This violated the separation requirements stated on controlled drawings and is therefore reportable as a condition being outside design basis of the plant.

The remaining Secondary Containment isolation damper solenoid cable routings were reviewed. This revealed an additional problem of lack of divisional separation for the solenoid valves for Secondary Containment Isolation Dampers V-D-9 & V-D-10, which were routed through a common junction box (EIIS Component Code: JBX) near the solenoid valves.

As a result of these findings, all cable routings for the Secondary Containment System including the Standby Gas Treatment System (EIIS System Code: BH) were reviewed and inspected. Three more instances of lack of separation were found in the Standby Gas Treatment System.

The wiring for two sets of position indications for AO-2982, Primary Containment Exhaust to Main Exhaust Plenum Room Secondary Containment Isolation Valve (EIIS Component Code: ISV), were routed through a common flexible conduit (EIIS Component Code: CND) between divisional junction boxes.

Control power circuits for the Standby Gas Treatment System Room Heaters (EIIS Component Code: EHTR), E-34A-2 and E-34B-2, were routed through a common conduit between panels (EIIS Component Code: PL) C87A and C87B and routed between the panels and the wall mounted thermostat (EIIS Component Code: TH) for the Room Heater, E-34A-2.

Cables for the Off-Gas Dilution Fan (EIIS Component Code: FAN) Low Flow switches (EIIS Component Code: FS), PS-8000-J15 and PS-8000-J16, were found to be routed through a common conduit from the Off-Gas Stack to the Cable Spreading Room. A modification was prepared with the intent of correcting this condition but, due to communication errors, the modification was performed on cables leading to a second set of switches (FS-8000-J11 & FS-8000-J12) located in close proximity to PS-8000-J15 and PS-8000-J16. Modification of the FS-8000-J11 and FS-8000-J12 cables was unnecessary since separation requirements were already satisfied. This error was subsequently discovered by plant engineering personnel on 6/10/91.

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The review of cable separation was extended to include other Safety Related systems: Reactor Protection System (EIS System Code: JC), Emergency Core Cooling System (EIS System Code: JE), and Primary Containment Isolation System (EIS System Code: JM). It was determined that cables for the following components were not separated as required:

Primary Containment Isolation System:

- SV-4081 Post Accident Sampling Inboard Isolation Valve
- SV-4082 Post Accident Sampling Outboard Isolation Valve
- SV-3307 Drywell O2 Analyzer Outboard Isolation Valve
- SV-3308 Drywell O2 Analyzer Inboard Isolation Valve
- SV-3311 Torus O2 Analyzer Outboard Isolation Valve
- SV-3312 Torus O2 Analyzer Inboard Isolation Valve
- SV-3313 O2 Analyzer Return Outboard Isolation Valve
- SV-3314 O2 Analyzer Return Inboard Isolation Valve
- SV-3267 Torus N2 Purge Supply Valve
- SV-3268 Drywell N2 Purge Supply Valve
- SV-3269 Containment N2 Purge Supply Valve

Source Range Monitors

- MO-2029 Residual Heat Removal Shutdown Cooling Suction Isolation Valve

CAUSE:

The root cause of this condition was that original construction installation and verification activities were inadequate. Drawings and cable routing schedules indicated the proper routing. However, this was not always met during the cable installations.

A contributing cause to the Offgas Dilution Fan Low Flow switch lack of separation was personnel error in that the identification of the cables needing modification was imprecisely communicated between the engineering groups involved.

ANALYSIS:

1. Lack of Secondary Containment isolation cable separation:

The "as-built" configuration could not have resulted in the inoperability of both sets of Secondary Containment Isolation Dampers since the damper controls were "fail safe" in that configuration. Both schemes are deenergized by separated relays within Control Room panels.

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The only conceivable accident scenario that could cause both sets of dampers to be inoperable would be for a "hot short" to develop. Monticello's licensing basis does not require that "hot shorts" be considered. The probability of a "hot short" between cables in the cable tray is very low. To comply with design basis the cables were separated prior to handling fuel or restarting the Reactor.

2. Lack of Standby Gas Treatment System Room Heater cable separation:

This configuration was evaluated as not affecting the operability of either Standby Gas Treatment System Train, since the Room Heater circuits had fuses and breakers which were independent from the control power and Filter Heater power for each Standby Gas Treatment System Train. Also, each Room Heater is deenergized when its respective Standby Gas Treatment System is operating due to an automatic initiation signal. Failure of the deenergized heater control circuit in the common section of conduit and thermostat could not cause both Standby Gas Treatment System Trains to be inoperable when one Standby Gas Treatment System Train is operating.

However, a failure within the conduit or the thermostat junction box while both Standby Gas Treatment System Trains are in the Automatic/Standby mode, could cause both Room Heaters to be inoperable. A third Room Heater, E-34B-3 provides supplementary heating of Standby Gas Treatment System B Train only. Also, normal Reactor Building Heating and Ventilation provides heated forced draft air to the immediate area around each Standby Gas Treatment System Train. The Standby Gas Treatment System Train temperatures are monitored locally once per shift by the Operations staff to verify that each Standby Gas Treatment System Train is greater or equal to 72 degrees Fahrenheit. Therefore, the probability of an undetected failure of both Room Heaters is low.

3. Lack of AO-2982 wire separation:

The safety function of this valve is to close upon Standby Gas Treatment initiation. The valve is normally closed in a deenergized state and is only opened during operation for only short periods while Primary Containment is being inerted or purged. The likelihood of failure of this valve during this period is extremely small.

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When the lack of separation was discovered, the valve was blocked in its fail-safe position to assure Secondary Containment integrity during refueling. Later, when Secondary Containment integrity was not required, the cables were rerouted to comply with design basis.

4. Lack of Off-Gas Low Flow Alarm cable separation:

The cables for Off-Gas Dilution Fan Low Flow switches, PS-8000-J15 and PS-8000-J16, provide a low flow control signal to start the associated standby Offgas Dilution Fan, either V-EF-81A or V-EF-18B. The configuration created conditions which could have lead to simultaneous grounding of both normally energized cables. These faults could then result in the blowing of the control power fuses to both Offgas Dilution Fans, which are required for Standby Gas Treatment System operability. However, recent testing has shown that substantial vacuum could still be maintained by running the remaining fans. Also, the physical layout of the raceways in question was such that incidental damage to the conduits or junction boxes was unlikely and damage to the cables was very improbable.

The actions taken to modify cables to the second set of switches (FS-8000-J11 and FS-8000-J12) did not adversely affect that circuit.

5. Primary Containment Isolation System cable separation:

Two raceway locations were identified as having Primary Containment Isolation cables that did not meet the separation requirements. One location involved cables for SV-3267, SV-3268, and SV-3269. The other location involved cables for SV-3307, SV-3308, SV-3311, SV-3312, SV-3313, SV-3314, SV-4081, and SV-4082.

Each of these circuits were designed to fail-safe upon loss of power. Each combination of these cables was analyzed and found to meet licensing basis for single failure criteria.

6. Source Range Monitors

Cables from the Source Range Monitors were found not to meet the separation requirements through two junction boxes in the cable spreading room.

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The Source Range Monitors are not called out as an input to the Reactor Protection System in the Updated Safety Analysis Report and are not required by Technical Specifications. The Source Range Monitors only effect a scram if the shorting links are removed. This puts them into a noncoincident logic, and assuming single failure criteria with existing routing they could still effect a scram. Failure of cables would not defeat the Reactor Protection System or the Reactor Manual Control System.

7. MO-2029 Residual Heat Removal Shutdown Cooling Suction Isolation

Cables from MO-2029 position indicating switches providing input to automatic isolation logic for MO-2014 were not separated from cables providing input to automatic isolation logic for MO-2015. MO-2014 and MO-2015 are the A & B Residual Heat Removal Injection Valves. Application of single failure criteria to these cables determined that the lack of separation was not safety significant in that the containment isolation function could not be disabled by the failure.

CORRECTIVE ACTIONS:

Summary of Corrective Actions Taken:

1. Secondary Containment isolation damper solenoid cables were rerouted to establish required separation.
2. AO-2982 position indication wiring was modified to establish required separation.
3. Offgas Low Flow Alarm circuits were modified to provide electrical fault isolation of the Low Flow Switches from the Offgas Dilution Fan control circuits.
4. One Offgas Low Flow Control circuit was deenergized and disconnected to eliminate all possibility of a single active failure causing both Offgas Dilution Fans becoming inoperable. The Offgas Dilution Fan operating procedures were revised to assure system operability is maintained while the circuit is deenergized.



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5. Remaining Secondary Containment and Standby Gas Treatment System cable separation requirements were field verified. No additional separation problems were identified.
6. Investigations were performed to field verify cable separation of the Reactor Protection System, the Emergency Core Cooling System, and the Primary Containment Isolation System.
7. Corrective actions taken were reverified by engineering personnel to ensure they were conducted on the appropriate electrical circuits.

Summary of Corrective Actions to be Taken:

1. The drawing for the Source Range Monitor cables will be changed to delete the note indicating that mandatory separation is required.
2. The following circuits will be modified to provide cable separation prior to or during the 1993 Refueling Outage:
  - a. Standby Gas Treatment System Room Heater cables
  - b. Offgas Dilution Fan Low Flow Control cables
  - c. SV-3267, SV-3268, and SV-3269 cables
  - d. SV-3307, SV-3308, SV-3311, SV-3312, SV-3313, SV-3314, SV-4081, and SV-4082 cables
  - e. MO-2029 position indicating switch cables
3. Cables through the Cable Spreading Room will be verified for meeting separation requirement by tracing a sample of the cables during the 1993 Refueling Outage.

ADDITIONAL INFORMATION:

1. Failed Component Identification: NONE
2. Previous Similar Events: NONE