



Monticello Nuclear Generating Plant  
2807 West County Road 75  
Monticello, MN 55362-9637

Operated by Nuclear Management  
Company LLC

November 22, 2000

US Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

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

**LER 2000-015**  
**Relay Failure Results in Inoperable Control Room**  
**Ventilation (CRV) / Emergency Filtration (EFT) System**

The Licensee Event Report for this occurrence is attached. This report contains no new NRC commitments.

Please contact Joel Beres at (763) 295-1479 if you require further information.

Byron Day  
Plant Manager  
Monticello Nuclear Generating Plant

c: Regional Administrator - III NRC  
NRR Project Manager, NRC

Sr Resident Inspector, NRC  
Minnesota Department of Commerce

Attachment

IE22

NRC FORM 366 (6-1998)		U.S. NUCLEAR REGULATORY COMMISSION		<b>APPROVED BY OMB NO. 3150-0104    EXPIRES 06/30/2001</b> <small>Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to the industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to the information collection.</small>								
<b>LICENSEE EVENT REPORT (LER)</b>  <small>(See reverse for required number of digits/characters for each block)</small>				DOCKET NUMBER (2) <b>05000263</b>		PAGE (3) <b>1 OF 4</b>						
FACILITY NAME (1) <b>MONTICELLO NUCLEAR GENERATING PLANT</b>												
<b>TITLE (4) Relay Failure Results in Inoperable Control Room Ventilation (CRV) / Emergency Filtration (EFT) System</b>												
<b>EVENT DATE (5)</b>			<b>LER NUMBER (6)</b>			<b>REPORT DATE (7)</b>			<b>OTHER FACILITIES INVOLVED (8)</b>			
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER		
10	25	00	00	-- 015 --	00	11	22	00		05000		
<b>OPERATING MODE (9)</b>		N	<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)</b>									
<b>POWER LEVEL (10)</b>		100	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)			
<b>POWER LEVEL (10)</b>		100	20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)			
<b>POWER LEVEL (10)</b>		100	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71			
<b>POWER LEVEL (10)</b>		100	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER			
<b>POWER LEVEL (10)</b>		100	20.2203(a)(2)(iii)		50.36(c)(1)		X	50.73(a)(2)(v)		<small>Specify in Abstract below or in NRC Form 366A</small>		
<b>POWER LEVEL (10)</b>		100	20.2203(a)(2)(iv)		50.36(c)(2)			50.73(a)(2)(vii)				
<b>LICENSEE CONTACT FOR THIS LER (12)</b>												
NAME <b>Joel Beres</b>						TELEPHONE NUMBER (Include Area Code) <b>763-295-1479</b>						
<b>COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)</b>												
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX								
B	VI	RLY	Struthers - Dunn	Y								
<b>SUPPLEMENTAL REPORT EXPECTED (14)</b>												
YES <small>(If yes, complete EXPECTED SUBMISSION DATE).</small>				X	NO			<b>EXPECTED SUBMISSION DATE (15)</b>		MONTH	DAY	YEAR

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On October 23, 2000 during a scheduled surveillance test, a control relay in the Control Room Ventilation System failed to change state in response to a valid logic signal. On October 25, 2000, the plant staff determined that the apparent cause of this failure was degradation of the vinyl plastic material used to encase the relay bearing pad. The remaining portions of the bearing pad had decomposed and mechanically prevented plunger movement.

All CRV/EFT system relays were subsequently inspected. On October 25, 2000, seven additional relays were found with decomposed pad material in the relay casing. All degraded relays were Struthers - Dunn type 219BBX222NE with 120V AC coils and date code stamp 8209. The relays had been in service since 1983 except one (1990). On October 27, 2000 two additional degraded relays in the CRV/EFT system were identified by an inspection. All of the degraded relays were replaced with spare relays with silicon rubber relay bearing pads and were successfully tested. No additional Struthers-Dunn relays with debris were found in other plant systems. This event is considered to have minimal impact on the health and safety of the public.

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

## Description

On October 23, 2000, while performing 14 Emergency Service Water Pump Surveillance Test 0255-11-III-4, the Control Room Ventilation<sup>1</sup> (CRV) air conditioning unit V-EAC-14A unexpectedly started while the operators were attempting to transfer from the A CRV train to the B CRV train. The A CRV train was declared inoperable. On October 25, 2000, the investigation revealed the problem was due to a failed Struthers - Dunn type 219BBX222NE relay.<sup>2</sup>

All CRV and Emergency Filtration Train (EFT) system relays were subsequently inspected. On October 25, 2000, seven additional degraded relays were found – five of which were in the B CRV/EFT train. B CRV/EFT trains were declared inoperable, and a 24-hour Limiting Condition for Operation (LCO) was entered in accordance with the technical specifications.

Three relays affecting the A CRV/EFT trains were replaced, which included the relay that failed on October 23, 2000. After successful post-maintenance testing, the A CRV/EFT trains were declared operable, and the 24-hour LCO was exited on October 25, 2000. Five relays were replaced on the B CRV/EFT trains. After successful post-maintenance testing, the 7-day LCO for one inoperable EFT train and 30-day LCO for one inoperable CRV train were exited on October 26, 2000. On October 27, 2000, two additional degraded relays were found on the A CRV and B EFT trains respectively. Both subsystems were declared inoperable, and the relays were immediately replaced and successfully tested.

## Event Analysis

### Analysis of Reportability

A four-hour notification was made to the NRC staff on October 25, 2000, pursuant to 10 CFR 50.72(b)(2)(iii).

This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(v). The event is considered to be a condition where the underlying relay failure that affected one CRV/EFT train could have caused a failure of the redundant train.

<sup>1</sup>EIIS System Code VI

<sup>2</sup>EIIS Component Code RLY

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## Safety Significance

The safety significance of this event was minimal. The health and safety of the public was not affected.

Although degraded relays were found in the redundant train, none of these relays had degraded to the point where relay operation had been affected. Only one relay in the A CRV train had actually failed. The relay failure mechanism is detectable by surveillance testing, which reduces the probability of simultaneous relay failures in redundant trains. Recent CRV/EFT system testing prior to this event had demonstrated full system operability. The decision to declare both trains of the CRV/EFT system inoperable was based on the fact that a simultaneous relay failure in redundant trains, although extremely unlikely, could not be excluded and a potential for a common mode failure existed.

A complete loss of CRV/EFT safety function would have required two failures to occur simultaneously in redundant trains. If redundant trains did fail simultaneously between surveillance testing, there are no safety consequences unless a very low probability plant accident also occurs. The safety function of the CRV/EFT System is to maintain control room habitability during certain design basis events that involve a radioactivity release. The CRV/EFT system does not directly prevent or control radioactive releases that may affect the health and safety of the public. The systems that do directly prevent and control radioactive releases to the public were not affected by this event. Consequently, the safety significance of this event is considered to be minimal.

## Cause

An assessment of this event is continuing under the corrective action program. The primary causal factors associated with this event have been identified.

The plant staff determined that the apparent cause of this failure was degradation of the vinyl plastic material used to encase the relay bearing pad. Once the vinyl material degrades, the relay pad decomposes, and the decomposed parts are free to move inside the relay casing. The damage ranged from small pieces broken off to the entire pad detached. For the failed relay, a portion of the decomposed pad mechanically prevented plunger movement. All degraded relays were Struthers - Dunn type 219BBX222NE with 120V AC coils and date code stamp 8209. The degraded relays had been in service since 1983 except one (1990).

The primary root cause of this event is a design deficiency. The vinyl material is not adequate to perform its design function. Struthers - Dunn had changed the relay pad material to silicon

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rubber for nuclear applications. Some relays with silicon rubber relay pads are installed at MNGP, and no degradation of these improved pads has been observed.

One secondary root cause of this event is the lack of a formal relay replacement program for non-EQ relays. Relay replacement for the CRV/EFT System has been a knowledge-based decision for the system engineer, and standardized methods for relay assessment, replacement, and documentation had not been formalized.

Another secondary root cause is that the scope of the operating experience program did not include reviews of non-vendor originated 10 CFR 21 reports in 1997. The NRC Part 21 database contains a 1997 10 CFR 21 report completed by the Hope Creek licensee as part of their LER 97-07. The Hope Creek event is very similar to the subject event and an effective screening and assessment may have prevented the relay failures. A check of plant records did not find any evidence that the Hope Creek 10 CFR 21 report had been received. Formal requirements to annually review 10 CFR 21 reports from the NRC database have since been instituted.

#### Corrective Actions

All Struthers - Dunn type 219BBX222NE relays were identified and inspected. A total of ten of these type relays were found to have degraded relay bearing pads and were replaced with spares. The remaining type 219BBX222NE relays with vinyl relay pads have been identified. All of these relays are installed in the CRV/EFT System. These relays do not show any signs of relay pad degradation, but will be replaced as spares become available from the manufacturer. Until all these relays have been replaced, a weekly visual inspection of these relays will be conducted to identify degradation of the relay pad before it affects relay operation.

A formal relay replacement program for non-EQ relays will be developed.

#### Failed Component Identification

Struthers - Dunn Relay Model Number 219BBX222NE

#### Similar Events

LER 88-03 Missed Surveillance of EDG Load Sequencing Due to Personnel Error

The corrective actions for this event included a review of the reliability of Struthers - Dunn relays in the EFT System. The scope and implementation of the corrective actions did not prevent the subject event from occurring. The lack of a formal relay replacement program for non-EQ relays was a contributing factor in the ineffectiveness of the corrective action.