



September 27, 2007

L-MT-07-070
10 CFR Part 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

LER 2007-002 Supplement 1, "Unexpected De-energizing of Bus 16 during Refuel Outage 23"

Supplement 1 to the Licensee Event Report (LER) for this occurrence is attached. The station stated a supplement to this LER would be submitted following completion of the investigation of the event.

This letter contains no new commitments and no revisions to existing commitments.



For T. O'Connor

Timothy J. O'Connor
Site Vice President, Monticello Nuclear Generating Plant
Nuclear Management Company, LLC

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC

NRC FORM 366 (6-2004)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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>	EXPIRES 6-30-2007
LICENSEE EVENT REPORT (LER) <small>(See reverse for required number of digits/characters for each block)</small>			

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TITLE (4) Supplement 1 of LER 2007-02, Unexpected De-energizing of Bus 16 during Refuel Outage 23

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	17	2007	2007	- 002	- 01	09	27	2007	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)								
POWER LEVEL (10)	000	<input type="checkbox"/>	20.2201(b)	<input type="checkbox"/>	20.2203(a)(3)(ii)	<input type="checkbox"/>	50.73(a)(2)(ii)(B)	<input type="checkbox"/>	50.73(a)(2)(ix)(A)	
		<input type="checkbox"/>	20.2201(d)	<input type="checkbox"/>	20.2203(a)(4)	<input type="checkbox"/>	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(x)	
		<input type="checkbox"/>	20.2203(a)(1)	<input type="checkbox"/>	50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)(A)	<input type="checkbox"/>	73.71(a)(4)	
		<input type="checkbox"/>	20.2203(a)(2)(i)	<input type="checkbox"/>	50.36(c)(1)(ii)(A)	<input type="checkbox"/>	50.73(a)(2)(v)(A)	<input type="checkbox"/>	73.71(a)(5)	
		<input type="checkbox"/>	20.2203(a)(2)(ii)	<input type="checkbox"/>	50.36(c)(2)	<input type="checkbox"/>	50.73(a)(2)(v)(B)	<small>OTHER Specify in Abstract below or in NRC Form 366A</small>		
		<input type="checkbox"/>	20.2203(a)(2)(iii)	<input type="checkbox"/>	50.46(a)(3)(ii)	<input type="checkbox"/>	50.73(a)(2)(v)(C)			
		<input type="checkbox"/>	20.2203(a)(2)(iv)	<input type="checkbox"/>	50.73(a)(2)(i)(A)	<input type="checkbox"/>	50.73(a)(2)(v)(D)			
		<input type="checkbox"/>	20.2203(a)(2)(v)	<input type="checkbox"/>	50.73(a)(2)(i)(B)	<input type="checkbox"/>	50.73(a)(2)(vii)			
<input type="checkbox"/>	20.2203(a)(2)(vi)	<input type="checkbox"/>	50.73(a)(2)(i)(C)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)					
<input type="checkbox"/>	20.2203(a)(3)(i)	<input type="checkbox"/>	50.73(a)(2)(ii)(A)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)					

LICENSEE CONTACT FOR THIS LER (12)

NAME Ron Baumer	TELEPHONE NUMBER (Include Area Code) 763-295-1357
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

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

ABSTRACT

On March 17, 2007 at 2346, with the unit in MODE 5 (Refueling) and on Division I of shutdown cooling [BO], an unexpected loss of Bus [BU] 16 (the Division II safety related 4KV [EA] bus) occurred. The loss occurred while implementing a clearance order isolation in support of a modification to control room metering [MTR] for Bus 16. One step of the isolation withdrew the potential drawer for the bus. When this occurred, the protective relaying [27] sensed a bus under voltage, causing the aligned power supply to automatically isolate from the bus.

The cause of the event was that the Plant Impact Assessment Process failed to properly identify the impact of opening BUS #16 Potential Transformer (POT) [FD] drawer during the development and sequencing of the isolation. Corrective actions currently in progress are: Develop training for licensed and non-licensed operators, revise the Operations Manuals to include system description information and precautions and limitations on Bus POT drawers and switchgear protective schemes, and identify other vulnerable electrical components that are infrequently operated. This supplemental LER identified a second root cause: The process for development, review and execution of critical outage activities was not aligned for strong ownership of the scope of work.

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

Description

On March 17, 2007 at 2346, with the unit in MODE 5 (Refueling) and on Division I of shutdown cooling, Operators were implementing a clearance order isolation in support of a modification to control room metering for Bus 16. The dayshift Senior Reactor Operator (SRO) in charge of hanging these isolations printed out the clearance orders and all of the tags that needed to be hung. He sequenced these in accordance with the schedule and performed a briefing with the crew that would be hanging these tags. Due to a delay, these activities were turned over to the night shift. The night shift SRO in charge of hanging these tags performed a briefing with two of the individuals that would be hanging the tags.

At approximately 22:00 on 03/17/07, authorization was given to begin isolating to prepare for the division II maintenance window. The SRO in charge of the evolution briefed four individuals to hang tags on multiple clearances. Two of the individuals had been previously briefed at the beginning of the shift. When the operators were ready to hang the POT drawer tag they noted that the bus potential transformer (POT) drawer was not actually installed behind the breaker as they had expected. In addition they also noted that this breaker was not racked out, but it was open. They also noted that there were two warnings on the POT drawer. One warning stated to contact Shift Supervisor prior to opening and the other warning stated not to open the drawer when energized.

The operators stopped and called the SRO in charge of the isolation. The operators believed that it was acceptable to open the POT drawer. They identified to the SRO that the POT drawer was actually aligned with a breaker other than briefed and that this breaker was racked in with the breaker in the open position. The operators did not relate to the SRO the warnings that are printed on the POT drawer. The SRO believed that it did not matter where the POT drawer was located because it was not specific to a breaker; rather it was specific to the Bus. Therefore, he instructed the operators to open the POT drawer.

The operators proceeded with opening the POT drawer and heard some relays actuate. They went around to the front of the breaker cubicle and noted that the Bus 16 loss of voltage and degraded voltage flags had actuated.

When the operators opened the POT drawer, the relays that they heard actuating were the voltage sensing relays [60] for 16 Bus. Opening of the POT drawer had actuated the loss of voltage relays which opened the feeder breaker [BKR] for Bus 16 from Bus 14. This de-energized the Bus and all of the associated loads. When this occurred the following automatic actuations also occurred:

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- Group II isolation occurred due to a loss of power to the refuel floor and plenum radiation monitors [MO] from the #12 Reactor Protection System (RPS) [JD] MG-Set [88].
- A full RPS trip occurred because the shorting links (which removed the RPS nuclear instrument redundancy) were removed so a loss of one division caused a full trip.

An 8 hour 10CFR50.72 non-emergency notification was made to the NRC at 0441 on 03/18/07 based on this event.

Event Analysis

Pursuant to 10CFR 50.72 paragraphs (b)(3)(iv)(A) for the ESF actuation, an eight-hour event notification was made to the USNRC. Per 10 CFR 50.73 (a)(2)(iv), a Licensee Event report is required for this event.

The event is not classified as a safety system functional failure.

Safety Significance

The direct effect of the unexpected isolation of Bus 16 was a loss of the loads off the bus and loss of Load Center 104. Based on these events the following also resulted:

- A Group II isolation occurred due to a loss of power to the refuel floor and plenum radiation monitors from the #12 RPS MG-Set.
- A full Reactor Protection System trip occurred because the SRM shorting links were removed so a loss of Division II caused a full trip.

The Probabilistic Risk Assessment (PRA) group performed an evaluation of the Bus trip looking at the pre-tripped condition of the plant and the resultant configuration after the trip. In the pre-trip condition for 3/17/07 the risk was assessed with the reactor cavity flooded, the fuel pool gates installed, and the division II window commencing. In addition, Shutdown Cooling was not lost so decay heat removal was not affected. The increased risk of core damage and boiling frequency were determined to be negligible and were bounded by the following conditions:

- Reactor head is removed
- Minimum reactor level corresponds to flooded cavity conditions
- Fuel pool gates are installed
- Maximum reactor temperature is 100 °F
- Division I shutdown cooling is in service

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- Equipment considered to be unavailable includes Reactor Core Isolation Cooling (RCIC) [BW], High Pressure Coolant Injection (HPCI) [BJ], both Control Rod Drive Hydraulic (CRDH) [AA] pumps [PMP], 12 Emergency Diesel Generator (EDG) [EK] and Emergency Diesel Generator Service Water (EDGESW) [LB], Bus 16 (LC-104 x-tied to LC-103), Bus 14, Bus 12, Div. II 125 VDC (with temporary battery installed), 12 Core Spray (CS) [BM], Div. II Residual Heat Removal (RHR) [BO], Div. II Residual Heat Removal Service Water (RHRSW) [BI], 12 Service Water (SW) [CC] pump, 12 CW pump, Both divisions of condensate [SD] and feedwater [SJ], electric fire pump [KP], screen wash fire pump and the 1AR transformer [XFMR].
- Torus drained with appropriate ECCS system suction lines lined up to the CST's [KA].

Cause

The original LER identified the cause of the event as a failure of the Plant Impact Assessment Process to properly identify the impact of opening BUS #16 Potential Transformer (POT) [FD] drawer during the development and sequencing of the isolation. The follow-up investigation of the event has also identified a second root cause for the event. The second root cause of the event was that the process for development, review and execution of critical outage activities was not aligned for strong ownership of the scope of work.

Corrective Action

The following corrective actions are planned or have been completed:

- Division II load center 104, which was lost when the #16 bus was lost, was cross-tied to Division I load center 103, reenergizing the load center and allowing restoration of plant loads normally powered from Division II. (Complete)
- Operating crews and Work Execution Center personnel have been briefed on the direct cause of this event, the impact of withdrawing a potential transformer drawer, and the importance of stopping when unsure/challenging information. (Complete)
- An Operations Memorandum was issued which required all outage related electrical system isolations to be placed on hold. Individual isolations were not released for implementation until a documented independent re-examination was completed of the impact of the isolation on the plant. The re-examination was performed by Senior Reactor Operators or Technical Staff members designated by the Operations Manager. (Complete)
- Develop and deliver training for licensed and non-licensed operators on the interrelation between Bus POT drawers and Bus Protection schemes. This training needs to be developed and delivered in such a manner as to include all operations

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personnel who would be responsible for Isolation, Clearance Order and Impact Statement preparation, review and approval. (In progress)

- Revise the Monticello Operations Manuals (B-Manuals) to include system description information and precautions and limitations on Bus POT drawers and switchgear protective schemes. (In progress)
- Identify other vulnerable electrical components that are infrequently operated and enter precautionary notes in the Equipment Clearance database (Passport/SOMS). (In Progress)

The follow-up investigation identified the following additional corrective actions:

- Modify the outage schedule development process to include independent knowledgeable review of the outage sequence and coordination of divisional electrical windows.
- Benchmark industry and implement Outage Bus work coordinator concept (e.g. a HIT TEAM lead for bus outages).

Failed Component Identification

None

Previous Similar Events

The following station event was found to be related to this event:

1. LER 2005-03 - Loss of Shutdown Cooling, event occurred on March 8, 2005. During an isolation shutdown cooling was lost while the plant was in an outage. The cause of the event was determined to be failure of Operations Management and Station Management to effectively oversee implementation of the Outage isolation process. Corrective actions included revising station procedures, qualification of personnel to perform isolation reviews and the requirement of impact statements for isolations. The review of this event against the event in the LER found a similar issue with a lack of knowledge in the preparation, plant impact assessment, and approval of isolations and inadequate verification during the isolation process. An action has been initiated in the Corrective Action Program to review the effectiveness of the actions from this event and to determine if additional actions are necessary to prevent recurrence of this type of event