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419-321-7676
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Docket Number 50-346

NP-33-05-003-00

10CFR50.73

License Number NPF-3

July 12, 2005

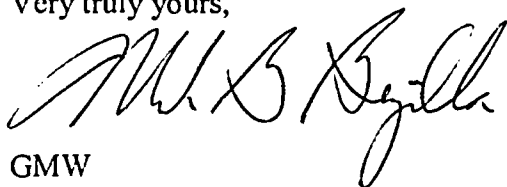
United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Ladies and Gentlemen:

LER 2005-003-00
Davis-Besse Nuclear Power Station, Unit No. 1
Date of Occurrence – May 13, 2005

Enclosed is Licensee Event Report (LER) 2005-003-00, which is being submitted to provide written notification of the discovery of an electrical containment building penetration feeding a containment building lighting panel not equipped with adequate backup electrical fault protection. This event is being reported pursuant to 10CFR50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degraded plant safety due to the circuit not meeting the single failure criterion as required by the plant's design basis. Immediate notification of this event was made to the Nuclear Regulatory Commission on May 13, 2005, in accordance with 10CFR50.72(b)(3)(ii)(B) (Event Number 41698). Commitments associated with this LER are listed in the Attachment.

Very truly yours,



GMW

Attachment
Enclosure

cc: Regional Administrator, USNRC Region III
DB-1 Project Manager, USNRC
DB-1 NRC Senior Resident Inspector
Utility Radiological Safety Board

IE22

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Attachment
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COMMITMENT LIST

The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station in this document. Any other actions discussed in the submittal represent intended or planned actions by Davis-Besse. They are described only as information and are not regulatory commitments. Please notify the Manager – Regulatory Compliance (419-321-8585) at Davis-Besse of any questions regarding this document or associated regulatory commitments.

<u>COMMITMENTS</u>	<u>DUE DATE</u>
1. Modifications will be made to install the required backup fault protection for the circuit supplying containment electrical penetration PBP5D, or the circuit will be procedurally de-energized during normal plant operations.	1. December 15, 2005
2. The database and associated design drawings will be revised to reflect the cables associated with the circuit powering lighting panel L49E1.	2. September 15, 2005
3. The database will also be changed to reflect that lighting circuits passing through containment electrical penetrations require unique numbering as appropriate.	3. September 15, 2005

NRC FORM 366 (6-2004)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104		EXPIRES 6/30/2007		
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2> <p style="margin: 5px 0 0 40px;">(See reverse for required number of digits/characters for each block)</p>				Estimated burden per response to comply with this mandatory collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to Infocollects@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 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.				
1. FACILITY NAME Davis-Besse Unit Number 1				2. DOCKET NUMBER 05000346		3. PAGE 1 OF 4		
4. TITLE Containment Electrical Penetration Not Equipped With Backup Electrical Fault Protection								
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR
05	13	2005	2005	- 003	- 00	07	12	2005
						8. OTHER FACILITIES INVOLVED		
						FACILITY NAME		
						DOCKET NUMBER 05000		
						FACILITY NAME		
						DOCKET NUMBER 05000		
9. OPERATING MODE		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)						
1		<input type="checkbox"/> 20.2201(b)		<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.73(a)(2)(i)(C)		
		<input type="checkbox"/> 20.2201(d)		<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(ii)(a)		
		<input type="checkbox"/> 20.2203(a)(1)		<input type="checkbox"/> 20.2203(a)(4)		<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)		
		<input type="checkbox"/> 20.2203(a)(2)(i)		<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(iii)		
		<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(iv)(A)		
100		<input type="checkbox"/> 20.2203(a)(2)(iii)		<input type="checkbox"/> 50.36(c)(2)		<input type="checkbox"/> 50.73(a)(2)(v)(A)		
		<input type="checkbox"/> 20.2203(a)(2)(iv)		<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(B)		
		<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.73(a)(2)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(v)(C)		
		<input type="checkbox"/> 20.2203(a)(2)(vi)		<input type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(v)(D)		
						<input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A		
12. LICENSEE CONTACT FOR THIS LER								
FACILITY NAME Gerald M. Wolf, Staff Engineer, Regulatory Compliance						TELEPHONE NUMBER (Include Area Code) (419) 321-8001		
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT								
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	
14. SUPPLEMENTAL REPORT EXPECTED					15. EXPECTED SUBMISSION DATE			
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE). <input checked="" type="checkbox"/> NO					MONTH DAY YEAR <div style="border: 1px solid black; height: 20px; width: 100%;"></div>			
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)								
<p>On March 23, 2005, with the plant in Mode 1 at 100 percent power, it was discovered that a circuit feeding a lighting panel inside containment had not been included in the calculation performed to evaluate primary and backup circuit protection for power circuits associated with containment electrical penetrations. Without reasonable assurance that the penetration could withstand the potentially available fault current assuming a single failure of the supply breaker, the circuit was isolated. Further evaluation determined there were no other elements besides the single 30-amp breaker that could protect the containment electrical penetration. Therefore, on May 13, 2005, it was determined that the penetration was not adequately protected in the event of a single failure of the 30-amp breaker, and is being reported in accordance with 10CFR50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degraded plant safety.</p> <p>This event is the result of an inadequate design in that a single drawing was used as the sole design input for the identification of applicable circuits for the calculation, and this drawing did not uniquely identify lighting circuits. The circuit will have the required backup fault protection installed or will be procedurally de-energized during plant operations.</p>								

LICENSEE EVENT REPORT (LER)

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Davis-Besse Unit Number 1	05000346	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2005	-- 003	-- 00	

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

DESCRIPTION OF OCCURRENCE:

The design of Containment electrical penetrations [NH-PEN] at the Davis-Besse Nuclear Power Station Unit 1 (DBNPS) provides both primary and backup fault protection for power circuits that are energized during plant operation. These electrical penetrations provide continuity of electrical circuits through the containment structure while maintaining the integrity of the containment pressure boundary. Should the primary fault protection fail to act, the backup fault protection will act in sufficient time to preclude thermal and mechanical damage to the containment penetration assembly under fault conditions.

Lighting Panel L49E1 [FF-PL] is located inside containment, and is supplied with power via containment electrical penetration PBP5D. The power supply to this lighting panel consists of an Alternating Current (AC) normal feed and a backup/alternate Direct Current (DC) feed [FH]. The normal feed is powered from 480 Volt AC (VAC) circuit breaker BF503 [EC-BKR] located on non-essential Bus F5 [EC-BU]. The backup feed is powered from the plant DC Distribution System [EJ]. Upon a loss of AC power, an automatic transfer switch will transfer the lighting panel power supply from the AC source to the DC Distribution System, which should be available throughout the time period that off-site power is assumed to be unavailable.

On March 23, 2005, with the plant in Mode 1 at 100 percent power, an investigation was underway to determine why plant drawings showed the circuit feeding lighting panel L49E1 as a spare circuit. These drawings were used as the source of an electrical design calculation (EC-118B) performed to document the evaluation of the primary and backup circuit protection for the power circuits associated with containment electrical penetrations. The investigation showed this circuit was not included in the calculation; therefore, the adequacy of the primary and backup protection for this circuit had not been verified as part of the calculation. Because reasonable assurance could not be provided that the penetration could withstand the potentially available fault current assuming a single failure of the AC breaker, the supply breaker for the AC feed to this lighting panel was opened on March 23, 2005. The DC supply breaker was also opened at this time because of concerns that a ground fault on the unqualified lighting panel during a design basis event could adversely affect the DC distribution system. This removed the power from the containment lighting panel.

Further investigation into the lighting panel circuit protection determined that there were no other elements in the AC feed besides the single 30-amp breaker BF503 that could reliably be expected to protect the containment electrical penetration. The next breaker electrically upstream of breaker BF503 was too large to provide adequate over-current protection of the electrical penetration if the 30-amp breaker failed to open. Therefore, on May 13, 2005, it was determined that the circuit was not adequately protected as required by the plant's design basis in the event of a single failure of the 30-amp breaker.

APPARENT CAUSE OF OCCURRENCE:

In 1985 Electrical Design Calculation EC-118B, "Evaluation of Protection Provided for Containment Electrical Power Penetrations," was performed to ascertain the degree of protection provided for electrical power penetrations. The calculation used a drawing derived from a database developed by the DBNPS architect/engineer containing electrical cables and equipment to identify the circuits requiring evaluation. In the period between 1985 and 1990, circuits were identified that did not meet the requirement to provide primary and backup fault protections as described in the plant's Safety Analysis Report. In order to resolve these issues, plant modifications were completed or the circuits

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APPARENT CAUSE OF OCCURRENCE: (Continued)

were de-energized during normal operation as required. This issue was reported to the NRC via DBNPS Licensee Event Report (LER) 90-005.

The circuit providing power to lighting panel L49E1 was not identified during the original review to determine applicable circuits fed through electrical power penetrations. The database used to create drawing E-200B identified the circuit for L49E1 only as an emergency lighting circuit and did not identify the circuit with a unique cable number. According to the database notes, it was permissible to not uniquely identify cables such as grounding, communications, cathodic protection, and lighting circuit cables. This resulted in the lighting panel cable not being listed in drawing E-200B, which was subsequently used to determine the circuits passing through electrical penetrations. The apparent cause for failing to provide appropriate backup fault protection for the L49E1 circuit is inadequate or incomplete design in that it was a misapplication to use drawing E-200B as a sole design input for the identification of applicable circuits for the evaluation.

ANALYSIS OF OCCURRENCE:

In accordance with 10CFR50 Appendix A Criterion 50, Containment Design Basis, containment electrical penetration PBP5D is required to maintain its integrity during design basis accidents to ensure containment integrity is maintained. Primary and backup fault protection is installed for power circuits routed through electrical penetrations that are energized during plant operation. However, since penetration PBP5D was not provided with adequate backup fault protection, if a fault had developed on the circuit during a design basis accident in conjunction with a single failure of the primary fault protection (30-amp breaker BF503) to act, the penetration may have failed as a result of thermal or mechanical damage.

In order to challenge the integrity of the electrical penetration, a bolted fault would need to occur inside containment. The circuit for lighting panel L49E1 enters containment through an inboard penetration box and is then routed approximately 70 feet inside conduit with no other circuits, to the lighting panel. This provides limited exposure to any physical or environmental damage that could cause a bolted fault.

Additionally, in order for the penetration to experience bolted fault electrical current, the 30-amp molded case circuit breaker (BF503) must fail to clear a bolted fault when it occurs. Previous testing of this and similar breakers provided confidence that the installed breaker would have provided the required overcurrent protection.

DBNPS LER 90-005 documented similar problems with circuit protection for containment electrical penetrations. Evaluations performed at that time concluded that there would have been no significant increase in the penetration's mechanical leakage as a result of the failure of the primary protective device to operate during a faulted condition. While there may have been cracking of the electrical penetration module's epoxy due to expansion of the penetration conductor, any such cracking was expected to be minor and not result in a significant increase in containment leakage. Therefore, the failure to provide backup fault protection for the circuit supplying power to lighting panel L49E1 via containment electrical penetration PBP5D was of minimal safety significance.

10CFR50.73(a)(2)(ii)(B) requires the reporting of the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety. The associated guidance presented in NUREG-1022,

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ANALYSIS OF OCCURRENCE: (Continued)

"Event Reporting Guidelines 10CFR50.72 and 50.73 (Revision 2)," includes an example of an event reportable under this criterion as the discovery that a system required to meet the single failure criterion does not do so. Because it could not be shown that the containment electrical penetration remained capable of fulfilling its intended safety function in the event of a single failure, this condition is being reported under this criterion. Initial notification of this condition was made to the NRC on May 13, 2005, in accordance with the eight-hour reporting requirement of 10CFR50.72(b)(3)(ii)(B) as an unanalyzed condition that significantly degrades plant safety (Event Number 41698).

CORRECTIVE ACTIONS:

The circuit for lighting panel L49E1 was de-energized on March 23, 2005, to remove the possibility of an electrical fault on this circuit that could damage containment electrical penetration PBP5D while further investigation into this issue was underway.

A review was conducted to ensure applicable containment electrical penetration circuits were evaluated for primary and backup fault protection. There were no additional electrical penetration circuits with fault protection deficiencies.

Modifications will be made to install the required backup fault protection for the circuit supplying containment electrical penetration PBP5D, or the circuit will be procedurally de-energized during normal plant operations.

The database and associated design drawings will be revised to reflect the cables associated with the circuit powering lighting panel L49E1. The database will also be changed to reflect that lighting circuits passing through containment electrical penetrations require unique numbering as appropriate.

The causal factors that led to the circuit to be omitted from the calculation occurred at least 20 years ago. Although similar isolated cases of misapplication of input data for engineering products may occur, no changes are warranted to the engineering programs currently in effect.

FAILURE DATA:

DBNPS LER 90-005 documents similar problems with circuit protection for containment electrical penetrations. This LER documented a total of 34 electrical circuits involving five penetrations that did not have backup fault protection, which represented a condition outside the design basis of the plant. The corrective actions taken in response to the 1990 event would not have prevented this current event because the database and drawing previously used to identify the potentially affected circuits did not uniquely list the circuit for lighting panel L49E1.

Energy Industry Identification System (EIS) codes are identified in the text as [XX].

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CRs 2005-01849, 2005-01872, 2005-02761