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NP-33-02-006-01

Docket No. 50-346

License No. NPF-3

March 26, 2004

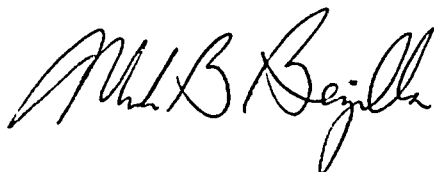
United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Ladies and Gentlemen:

LER 2002-006-01
Davis-Besse Nuclear Power Station, Unit No. 1
Date of Occurrence – August 11, 2002

Enclosed please find revision 1 to Licensee Event Report (LER) 2002-006, which was submitted to provide written notification of a potential tornado-generated missile issue. This issue was identified as part of the Davis-Besse Return to Service Plan system reviews. This revision finalizes the information related to the apparent cause and the safety significance of this occurrence that were not complete at the time of the original submittal. The original LER was submitted in accordance with 10CFR50.73(a)(2)(i)(B) as a condition or operation prohibited by the Technical Specifications. Commitments associated with this LER are listed in the Attachment.

Very truly yours,



GMW/s

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

JE22

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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 Affairs (419-321-8450) at Davis-Besse of any questions regarding this document or associated regulatory commitments.

<u>COMMITMENTS</u>	<u>DUE DATE</u>
1. Incorporate EPRI tornado missile risk evaluation methodology and associated computer program TORMIS into the DBNPS USAR.	1. Completed
2. Submit supplemental information regarding the apparent cause and safety significance of this occurrence.	2. Completed with submittal of Revision 1 of this LER
3. Continue implementation of Design Interface Evaluation Program.	3. Ongoing

(See reverse for required number of digits/characters for each block)

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 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.

1. FACILITY NAME Davis-Besse Unit Number 1	2. DOCKET NUMBER 05000346	3. PAGE 1 OF 4
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4. TITLE

Emergency Diesel Generator Exhaust Piping Not Adequately Protected From Potential Tornado-Generated Missiles

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	11	2002	2002	-- 006 --	01	03	26	2004	FACILITY NAME	DOCKET NUMBER 05000
9. OPERATING MODE		1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
10. POWER LEVEL		100	20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
			20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)	50.73(a)(2)(x)
			20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)	73.71(a)(4)
			20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)	73.71(a)(5)
			20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)	
			20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)	
			20.2203(a)(2)(v)		X	50.73(a)(2)(i)(B)			50.73(a)(2)(vii)	
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)	
			20.2203(a)(3)(i)			50.73(a)(2)(iii)(A)			50.73(a)(2)(viii)(B)	

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Gerald M. Wolf, Staff Engineer - Licensing	(419) 321-8001

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete EXPECTED SUBMISSION DATE).			X	No	15. EXPECTED SUBMISSION DATE			
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16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On August 11, 2002, with the plant defueled, a deficiency was identified where the last six feet of the Emergency Diesel Generators (EDG) exhaust piping is not protected from tornado-generated missiles. Additionally, an exterior door to a Main Steam Line Room was identified as not adequately protecting the Main Steam Safety Valves (MSSVs) from tornado-generated missiles. While the probability of a missile striking this equipment and damaging it to the point that it can no longer perform its designated safety function is remote, the licensing basis at the time of discovery was that systems vital to safe shutdown in the event of a tornado are enclosed in structures designed to withstand such missiles. The affected equipment was declared inoperable. Since these design deficiencies for the protection of the safety equipment existed since initial plant operation, the operation of the plant in this condition was prohibited by the Technical Specifications, and therefore these events were reported in accordance with 10CFR50.73(a)(2)(i)(B). A probabilistic methodology for tornado missile risk analysis of unprotected plant features was incorporated into the plant's licensing basis; no other facility modifications were determined to be necessary.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Davis-Besse Unit Number 1	05000346	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2002	-- 006 --	01	

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

DESCRIPTION OF OCCURRENCE:

As part of the Davis-Besse Nuclear Power Station (DBNPS) Return to Service Plan, detailed system health walkdowns have been conducted. On August 11, 2002, with the plant defueled, a deficiency was identified with the missile protection of the Emergency Diesel Generators (EDG) [EK-SC] exhaust piping in that the last six feet of the exhaust piping is not protected from tornado-generated missiles. The exhaust piping for each EDG extends above the roof of the EDG rooms and partially above the roof of the adjacent portion of the Auxiliary Building. The missile barriers protect the exhaust piping from tornado-generated missiles, which could render the respective EDG inoperable if a missile were to sufficiently collapse the exhaust piping.

At the DBNPS, on-site standby power is provided by two redundant EDGs each connected to its respective 4160 volt essential bus and one non-class 1E diesel generator which can be aligned to power either 4160 volt essential bus in the event of a station blackout. The two EDGs are contained in separate, adjacent rooms of the Auxiliary building, which have been analyzed for the following tornado-generated missiles per DBNPS Updated Safety Analysis Report (USAR) Section 3.3.2.1:

- The equivalent of a 12 foot long piece of wood 8 inches in diameter traveling end on at a speed of 250 miles per hour.
- The equivalent of a 4000 pound automobile traveling through the air at 50 miles per hour and at not more than 25 feet above the ground.
- The equivalent of a 10 foot long piece of pipe 3 inches inner diameter, Schedule 40, traveling end on at a speed of 100 miles per hour.

While tornadoes are rather common in Ohio, the probability of a tornado striking at a point within the one-degree square in which the site is located is $6.3 \text{ E-}4$ per year. The associated recurrence interval is one in approximately 1,590 years. The tornado that struck the DBNPS on June 24, 1998, was classified by the National Weather Service as an F2 (Fujita Scale) with winds ranging from 113 to 157 miles per hour. While the 1998 tornado resulted in a complete loss of offsite power, the EDGs were started prior to the loss of offsite power and supplied their respective essential loads until offsite power was restored (Refer to DBNPS LER 98-006 for further information on the 1998 tornado).

When the condition was first discovered for the unprotected portion of the exhaust piping, it was believed that an evaluation had been previously performed that documented this condition was acceptable. However, after further review, no such evaluation could be found. While the probability of a tornado-generated missile striking the unprotected exhaust piping and collapsing it to the point that the EDG is rendered inoperable is remote, the current licensing basis is that systems vital to safe shutdown, including the EDGs, are enclosed in Class I structures that have been designed to withstand tornado missiles. Therefore, on September 6, 2002, the Action Statement for Technical Specification 3.8.1.2 was entered due to both EDGs being inoperable (but functional) due to inadequate missile protection.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
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		2002	-- 006 --	01	

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

DESCRIPTION OF OCCURRENCE: (Continued)

Subsequent to this discovery, walkdowns of station equipment identified an exterior door to the Number 2 Main Steam Line Room was not adequately designed to protect the Main Steam Safety Valves (MSSVs) [SB-RV] from tornado-generated missiles. On September 6, 2002, the Action Statement for Technical Specification 3.7.1.1 was entered due the MSSVs being inoperable due to inadequate missile protection. The MSSVs are designed to provide sufficient relieving capacity to assure the Main Steam System pressure remains below its design pressure during the most severe anticipated system operational transients; nine MSSVs are installed on each of the two steam generator main steam headers.

The design deficiencies with the protection of the EDG Exhaust Piping and the MSSVs have existed since initial operation of the DBNPS. Therefore, since the plant operated when this equipment was required to be operable per DBNPS Technical Specifications, these conditions represent conditions prohibited by the Technical Specifications, and are therefore reportable in accordance with 10CFR50.73(a)(2)(i)(B).

APPARENT CAUSE OF OCCURRENCE:

The unprotected EDG Exhaust Piping and unprotected MSSVs have been in this condition since initial operation of the DBNPS. The conditions occurred during original construction. The apparent cause for these conditions is that the original Architect/Engineer design for the associated tornado missile barriers was inadequate, based on the DBNPS USAR description of tornado missile protection.

ANALYSIS OF OCCURRENCE:

The Electric Power Research Institute (EPRI) tornado missile methodology contained in EPRI Report NP-2005, "Tornado Missile Risk Evaluation Methodology," dated August 1981 was used to determine the probability of a tornado missile strike for the unprotected portions of the systems required in the event of a tornado. This EPRI methodology is implemented using the computer program TORMIS, which develops the probability of tornado missiles striking the modeled plant structures and other targets using Monte Carlo probability techniques. EPRI Report NP-2005 has been evaluated generically by the NRC in a Safety Evaluation Report dated October 26, 1983, which concluded that TORMIS is an acceptable approach for demonstrating compliance with the requirements of 10 CFR 50 Appendix A General Design Criteria 2 regarding protection of safety-related plant features from the effects of tornado and high wind generated missiles. In the development of this TORMIS analysis, the following conservative assumptions are included:

- It is assumed that a system or component being struck by a tornado missile will result in damage sufficient to preclude it from performing its intended safety function.

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FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Davis-Besse Unit Number 1	05000346	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		2002	-- 006 --	01	

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

ANALYSIS OF OCCURRENCE: (Continued)

- It is assumed that the damage to the system or component results in damage to fuel sufficient to result in conservatively calculated radiological release values in excess of 10 CFR 100 guidelines.
- There are no missiles that can directly impact irradiated fuel, including the spent fuel stored in the Spent Fuel Pool area of the Auxiliary Building. Any missiles postulated to enter this area miss the pool entirely, are stopped by internal walls, or strike the far side of the pool above the level of the fuel.

Based on the TORMIS analysis performed for the DBNPS, it has been determined that the cumulative DBNPS site tornado missile strike probability is approximately $5.7 \text{ E-}7$. This calculated probability includes all identified unprotected plant Structures, Systems and Components. The combined missile strike probability for the EDG exhaust stacks is approximately $4 \text{ E-}9$. This calculated probability is less than the DBNPS site acceptance criteria of $1 \text{ E-}6$. Therefore, this event has minimal safety significance.

CORRECTIVE ACTIONS:

The EPRI tornado missile risk evaluation methodology and associated computer program TORMIS was incorporated into the DBNPS Updated Safety Analysis Report (USAR). This methodology was then used to evaluate specific plant features where additional tornado missile protective barriers or alternative systems are a consideration. Plant walkdowns were performed to identify any other structures, systems, or components not adequately protected from tornado-generated missiles. The analysis determined that no facility modifications were necessary to ensure the site acceptance criteria was not exceeded, including the EDG exhaust piping and the door to Number 2 Main Steam Line Room.

Since the original design errors occurred, the plant modification process has been changed to include a Design Interface Review Checklist (DIRC), which specifically addresses the need to consider tornado missile protection when developing modifications to the facility.

FAILURE DATA:

There have been no LERs in the previous two years involving deficiencies with tornado-generated missile protection.

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

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CRs 2002-04147, 2002-04700,
2002-05590, 2003-08249