FENOC
FirstEnergy Nuclear Operating Company

5501 North State Route 2
Oak Harbor, Ohio 43449

Lew W. Myers
Chief Operating Officer

419-321-7599
Fax 419-321-7582

NP-33-02-008-00

Docket No. 50-346

License No. NPF-3

December 31, 2002

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

Ladies and Gentlemen:

LER 2002-008
Davis-Besse Nuclear Power Station, Unit No. 1
Date of Occurrence – March 8, 2002

Enclosed please find Licensee Event Report 2002-008, which is being submitted to provide written notification regarding degraded conditions identified on the Containment Air Coolers. Various degraded conditions have been identified during the current refueling outage since March 8, 2002. This LER is being submitted voluntarily in accordance with the guidelines of Section 2.7 of NUREG-1022, Event Reporting Guidelines.

Evaluation continues with respect to the operability/reportability of CAC thermal performance capability. The results of this evaluation will be provided in a supplement to this report by January 31, 2003.

Very truly yours,

Lew W. Myers

PSJ/s

Enclosures

cc: Mr. J. E. Dyer, Regional Administrator, USNRC Region III
Mr. C. S. Thomas, DB-1 NRC Senior Resident Inspector
Utility Radiological Safety Board

IE22

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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.

COMMITMENTS	DUE DATE
Provide LER Supplement reporting on the results of the CAC thermal performance capability evaluation	January 31, 2003

NRC FORM 366 (1-2001) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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 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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Davis-Besse Unit Number 1	05000346	1 OF 6

TITLE (4)
Containment Air Coolers Collective Significance of Degraded Conditions

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 NAME	DOCKET NUMBER
03	08	2002	2002	-- 008 --	00					05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	D
POWER LEVEL (10)	000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)

20 2201(b)	20.2203(a)(3)(i)	50.73(a)(2)(i)(C)	50.73(a)(2)(vii)
20 2201(d)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(A)
20.2203(a)(1)	20.2203(a)(4)	50.73(a)(2)(ii)(B)	50.73(a)(2)(viii)(B)
20 2203(a)(2)(i)	50.36(c)(1)(i)(A)	50 73(a)(2)(iii)	50 73(a)(2)(ix)(A)
20 2203(a)(2)(ii)	50 36(c)(1)(ii)(A)	50 73(a)(2)(iv)(A)	50.73(a)(2)(x)
20 2203(a)(2)(iii)	50 36(c)(2)	50 73(a)(2)(v)(A)	73 71(a)(4)
20.2203(a)(2)(iv)	50 46(a)(3)(ii)	50 73(a)(2)(v)(B)	73 71(a)(5)
20.2203(a)(2)(v)	50 73(a)(2)(i)(A)	50 73(a)(2)(v)(C)	x OTHER
20.2203(a)(2)(vi)	50 73(a)(2)(i)(B)	50 73(a)(2)(v)(D)	Specify in Abstract below or In NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Peter S. Jordan – Regulatory Affairs	(419) 321-8260

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)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		01	31	2003

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

Following unit shutdown for refueling on February 16, 2002, various degraded conditions were identified associated with the Containment Air Coolers (CACs). A review was performed of the collective significance of these degraded conditions adverse to quality. A preliminary engineering evaluation of structural integrity issues has been performed which concluded that corrosion and pitting that resulted from boric acid deposition was not sufficient to render the CACs structurally inoperable during or following a safe shutdown earthquake. A preliminary engineering evaluation has been performed of non-conservatisms utilized in piping stress analysis for the Service Water (SW) System that feeds the CACs. This evaluation concluded that the SW piping and CAC cooling coils would remain functional following postulated accidents. These engineering evaluations are being finalized. Notifications made to the licensee under Part 21 did not render the CACs inoperable. Fouling conditions have been identified for both air and water sides of the cooling coils. These conditions are being evaluated to assess thermal performance capability. The results of this evaluation and other pertinent information will be provided in an LER Supplement by January 31, 2003. This information is being provided to the NRC on a voluntary basis.

DESCRIPTION OF OCCURRENCE:

Davis Besse Nuclear Power Station (DBNPS) was designed with three Containment Air Cooling (CAC) units [BK]. During normal plant operation, two of three CAC units are operating to provide cooling of the containment atmosphere. The third unit is maintained in standby. Following a postulated accident (loss of coolant or main steam line break accident), the operating CAC units receive a safety features actuation signal (SFAS) [JE] shift operating CAC units from high to low speed fan operation. The CAC units were designed to provide a post-accident safety function to remove heat released into the containment atmosphere to promote long term cooling. Service Water (SW) [BI] is provided to the CAC cooling coils [BK-CCL] to provide the heat transport mechanism. The heat removal capability of two CAC units or one CAC unit in conjunction with one operating Containment Spray (CS) header [BE] have been analyzed to adequately mitigate post-accident conditions. The CAC units are currently being thoroughly refurbished because of their degraded condition.

On February 16, 2002, DBNPS commenced the Thirteenth Refueling Outage (13RFO). The plant entered Mode 6 on February 22, 2002, to perform refueling activities.

Following unit shutdown on February 16, 2002, various degraded conditions were identified associated with the CACs which were documented in condition reports (CRs). The issues were related to structural integrity (seismic adequacy, boric acid corrosion, and post accident thermal stress); maintenance, test, and configuration control; thermal performance; and 10 CFR 21 reports.

A decision was made to collectively review these degraded conditions to assess past operability of the CAC units. All CRs written since the beginning of 13RFO were reviewed to identify those CRs which documented conditions adverse to quality associated with the CAC units.

This information is being provided on a voluntary basis since no condition has yet been identified which would have rendered the CACs inoperable during periods of plant operation.

APPARENT CAUSE OF OCCURRENCE:

A number of the conditions adverse to quality related to corrosion, pitting, and rusting of the CAC unit components and SW piping resulted from boric acid deposition. These conditions could have challenged the seismic integrity of the CAC units. The boric acid deposition was the result of leaking reactor coolant, the causes of which have been documented in the Root Cause Analysis Reports on Failure to Identify Reactor Vessel Head Degradation provided to the NRC on April 18, 2002, and August 21, 2002.

Concerns identified relative to thermal stress and seismic design were the result of apparent non-conservative original design modeling assumptions . No basis or reference for these assumptions could be located.

APPARENT CAUSE OF OCCURRENCE (continued):

Several issues were identified which related to maintenance, test, and/or configuration control activities or conditions. These conditions were either administrative in nature or did not affect operability.

A limited number of conditions which could result in degraded thermal performance were identified. Water-side fouling of one cooling coil from CAC #3 was identified. It consisted of limited hard blockage of cooling coil tubes and accumulation of zebra mussel shells. In addition, microbiological induced corrosion (MIC) was identified on SW return flow manifold flanges. These degraded conditions are considered to be representative of the other cooling coils. The presence of the biological organisms was attributed to lack of effective biocide treatment of the SW System prior to and during 13RFO. Air-side (cooling fin) fouling was identified as the result of boric acid deposition. The cause of this condition is described above.

ANALYSIS OF OCCURRENCE:

Technical Specification 3.6.2.2 requires that at least two CAC units must be operable during Modes 1, 2, and 3. In order to mitigate postulated accident conditions, each CAC unit and each CS header is designed to remove 75E6 British Thermal Units (BTU) per hour. The total design heat removal capability is 150E6 BTU per hour. However, accident analyses incorporate degraded conditions for CAC operation to conservatively determine CAC performance. The design heat removal capability can be met by operation of two CAC units or one CAC unit in conjunction with one CS header. A seismic event concurrent with a loss of coolant accident (LOCA) is not assumed.

As previously noted, a number of CRs documented various deficiencies associated with the CAC units. These were broken down into four general categories, as follows:

Structural Integrity

Maintenance, Test, and Configuration Control

Thermal Performance

10 CFR 21

Structural Integrity:

Structural integrity issues encompassed corrosion, pitting, and rust resulting from boric acid deposition on CAC components and associated SW piping and their effect on seismic adequacy and post-accident thermal stresses.

A number of CRs were written to document degraded conditions on the CAC units and their associated SW piping resulting from boric acid deposition. These

ANALYSIS OF OCCURRENCE (continued):

conditions could result in diminished capability of the CAC units to perform their intended function following a LOCA or seismic event. A preliminary engineering assessment was conducted of the potential impact of the collective conditions to determine if the CAC units would have been structurally adequate. This evaluation is currently being finalized.

As part of the effort to determine the extent of condition related to leaks of boric acid, the CACs were inspected in May and June 2002. Moderate to severe corrosion was observed. The inspection was performed by a certified Seismic Capability Engineer. The assessment included the CAC structural frames, the cooling coils and their support frames, the fan motors, and motor supports. Based on the preliminary assessment of observed conditions, the CACs were determined to have been structurally adequate. While corrosion and pitting was observed, it has been preliminarily concluded that the "as-found" condition would not have been sufficiently degraded to prevent the CACs from performing as designed during and following an SSE in combination with other imposed design loads. Therefore, the CACs are considered to have been degraded but operable relative to the collective conditions of corrosion, rusting, and pitting that resulted from boric acid deposition.

Apparent non-conservatisms were identified in the stress analysis methodology that was applied to the SW piping supply and return lines for the CACs. The conditions involved lack of inclusion of stress intensification factors, consideration of water hammer loads, application of post-accident thermal loads versus SW piping nozzle flexibility, and seismic loading. A preliminary engineering evaluation of these issues was performed, and it was concluded that although the issues result in a degraded condition, the CACs were not rendered inoperable based on these non-conservatisms. This evaluation is currently being finalized.

Thermal Performance:

Inspections of the CACs revealed cooling coil fouling conditions both on the air (cooling fin) side and the water side. Water side degradation apparently resulted from an accumulation of zebra mussel shells and silting. Four of 28 tubes on one coil from CAC #3 were discovered to be plugged with hard deposits and another three tubes were partially obstructed. The condition of this coil is considered to be representative of the other CAC cooling coils. Air side degradation consisted of boric acid residue and dirt which may impede the heat transfer characteristic of the cooling fins. An engineering evaluation is being performed to assess the effects of the degraded conditions on heat transfer capability from which past operability will be determined. The results of this evaluation will be provided in a supplement to this licensee event report by January 31, 2003.

10 CFR 21:

By letter dated April 1, 2002, Fischer Controls notified DBNPS of a deviation in their vendor manual regarding valve stem to plug torque requirements for certain specified valves with 1-1/4 inch diameter valve stems. This Part 21

ANALYSIS OF OCCURRENCE (continued):

notification was entered into the DBNPS Corrective Action Program as CR 02-02239. DBNPS concluded that it did not have a vendor manual for the referenced valve assemblies. A review of the DBNPS Asset Database indicated no safety-related assets fit the applicability criteria. However, since DBNPS did have similar Fischer valve assemblies, procedure DB-MM-09334, "Fischer Controls Type EWD and EWS Valve Maintenance," was reviewed and validated to identify torque values for the plug to stem connection for all stem sizes.

By letter dated May 20, 2002, Howden Buffalo notified DBNPS that the Reliance motors provided as part of the CAC fan assemblies had a deficiency with the stator winding which resulted from a vendor engineering error. The deficiency could result in winding failure during motor startup or speed changes. Operation of the CAC units at DBNPS is directly into high fan speed for normal operation. No winding failures or anomalies were experienced during fan startup. At the time of receipt of the Part 21 notification, the plant was in Mode 6 (shutdown) and the CAC motors were being refurbished as part of the overall CAC refurbishment. There was no past operability issue.

CORRECTIVE ACTIONS:

The overall corrective action to resolve the physical degradation of the CAC units is the refurbishment/replacement of the units prior to plant restart. This activity will be supported by appropriate engineering design documentation to ensure the design and installation of the new CAC units is consistent with their design basis.

FAILURE DATA:

There have been no LERs in the previous two years involving inoperability of the CAC units.

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

NP-33-02-008-00

Structural Integrity

CR 02-01139	CR 02-02194	CR 02-03273	CR 02-04364
CR 02-01363	CR 02-02269	CR 02-03670	CR 02-04414
CR 02-01378	CR 02-02294	CR 02-03703	CR 02-04587
CR 02-01642	CR 02-02318	CR 02-03765	CR 02-04906
CR 02-01730	CR 02-02330	CR 02-03848	CR 02-04969
CR 02-01748	CR 02-02394	CR 02-04036	CR 02-04980
CR 02-01841	CR 02-02409	CR 02-04350	CR 02-05235

Structural Integrity (continued):

CR 02-02108	CR 02-02414	CR 02-04351	CR 02-05373
CR 02-02165	CR 02-02864	CR 02-04358	CR 02-05563
CR 02-02172	CR 02-02943	CR 02-04361	CR 02-09595

Maintenance, Test, and Configuration

CR 02-01178	CR 02-04930	CR 02-05981	CR 02-07781
CR 02-02236	CR 02-04985	CR 02-06091	CR 02-08235
CR 02-02767	CR 02-05109	CR 02-06093	CR 02-08389
CR 02-03245	CR 02-05448	CR 02-06595	CR 02-08398
CR 02-03849	CR 02-05459	CR 02-07075	CR 02-08452
CR 02-04345	CR 02-05712	CR 02-07130	CR 02-08671
CR 02-04354	CR 02-05779	CR 02-07723	CR 02-08780
CR 02-04363	CR 02-05885	CR 02-07758	CR 02-08810
			CR 02-09404

Thermal Performance

CR 02-01191	CR 02-03963	CR 02-05516
CR 02-03960	CR 02-04419	CR 02-07516

10 CFR 21

CR 02-02191	CR 02-02239