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NP-33-02-007-00

Docket No. 50-346

License No. NPF-3

December 11, 2002

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

Ladies and Gentlemen:

LER 2002-007
Davis-Besse Nuclear Power Station, Unit No. 1
Date of Occurrence – April 24, 2002

Enclosed please find Licensee Event Report 2002-007, which is being submitted to provide written notification of potential leakage of the Incore Monitoring Instrumentation Nozzles at the bottom of the Reactor Vessel. This issue was identified as part of the Davis-Besse Return to Service Plan inspections. This LER is being submitted voluntarily in accordance with the guidelines of Section 2.7 of NUREG-1022, Event Reporting Guidelines. Commitments associated with this LER are listed in the Attachment.

Evaluations continue with respect to the determination of the potential leakage source. Any additional information as a result of the leakage test described herein will be provided in a supplement to this report within 30 days following completion of the leakage test.

Very truly yours,

Lew W Myers

GMW/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

Docket Number 50-346
License Number NPF-3
NP-33-02-007-00
Attachment
Page 1 of 1

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
1. Perform a test of the incore nozzles to confirm that no leakage exists. This will be accomplished by raising the Reactor Coolant System to normal operating temperature and pressure, and maintain for approximately 7 days. Following this test, temperature and pressure will be reduced in order to perform a visual inspection of the bare metal of the lower reactor vessel for symptoms of incore nozzle leakage.	1. Prior to Reactor Criticality
2. Submit supplemental information regarding the apparent cause and safety significance of this occurrence.	2. 30 days following completion of leakage test
3. Perform a bare metal reactor vessel visual inspection for symptoms of incore nozzle leakage.	3. During the next scheduled outage of sufficient duration.

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

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

LICENSEE EVENT REPORT (LER)

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

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

TITLE (4)

Potential Leakage of Incore Monitoring Instrumentation Nozzles at Bottom of Reactor Vessel

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
04	24	2002	2002	-- 007 --	00	12	11	2002		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
			Voluntary

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Gerald M. Wolf, Staff Engineer - Licensing	(419) 321-8114

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		02	11	2003

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

On April 24, 2002, with the reactor defueled, visual inspections of the underside of the reactor vessel revealed corrosion deposits. The heaviest concentration of corrosion deposits was noted around the center and lowest reactor incore monitoring instrumentation guide tube. Two sets of deposit samples have been taken and analyzed in an attempt to determine if the deposits were caused by one or more leaking incore nozzles, or as a result of runoff from cleaning of the reactor vessel closure head. However, no definitive conclusions could be reached with respect to the source of the deposits. An inspection will be conducted prior to reactor criticality to confirm that no leakage of the incore nozzles exists by raising the Reactor Coolant System to normal operating temperature and pressure, holding these conditions for approximately seven days, and then reducing conditions to perform a bare metal visual inspection for evidence of leakage. Since no incore nozzle leakage has been confirmed, this condition is being reported voluntarily.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Davis-Besse Unit Number 1	05000346	2002	-- 007 --	00	2 OF 4

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

DESCRIPTION OF OCCURRENCE:

Following the discovery of a large cavity in the Davis-Besse Nuclear Power Station (DBNPS) reactor vessel [AB-RPV] closure head, a Return to Service Plan was created to describe the course of action being taken for a safe and reliable return to service. Refer to DBNPS LER 2002-002 for further details of reactor vessel head leakage and resultant degradation. Included in this Return to Service Plan is the Containment Health Assurance Plan that focuses on the extent of the Reactor Coolant System leakage and any damage that may have resulted from the dispersion of boric acid leakage in the containment building. On April 24, 2002, with the reactor defueled, visual inspections of the underside of the reactor vessel revealed corrosion deposits. These deposits appeared to be the result of runoff from cleaning of the reactor vessel closure head. The heaviest concentration of corrosion deposits was noted around reactor incore monitoring instrumentation guide tube number 1, which is at the center of the reactor vessel and is the lowest point of the vessel. However, the possibility that these deposits could also have resulted from leakage of the incore monitoring instrumentation nozzles [AB-NZL] has not been discounted.

The DBNPS reactor vessel was manufactured by Babcock & Wilcox (B&W), and has 52 incore monitoring instrumentation nozzles that penetrate the lower portion of the vessel. Each of these incore nozzles is approximately three-quarters of an inch in diameter, fabricated from Alloy 600 material. These nozzles were welded to the reactor vessel using Alloy 182 material, which was stress relieved following welding. Subsequent modification of the nozzles, within the reactor vessel, was performed using Alloy 82 and Alloy 182 material which was not stress relieved. Guide tubes are welded to these nozzles that contain incore detector assemblies [IG] for measuring neutron flux and temperatures in the reactor core.

Further detailed inspections of the underside of the reactor vessel were conducted using a magnetic wheeled crawler in order to keep personnel dose as low as reasonable achievable (ALARA). These inspections, completed on June 8, 2002, revealed:

- Boron and rust deposit trails observed on the sides and bottom of the reactor vessel
- Similar deposits observed on several incore nozzles
- Tape remnants and residue observed on incore nozzles
- No build-up of boric acid or corrosion products on top of insulation
- No evidence of wastage on bottom of reactor vessel.

On June 18, 2002, samples were taken of the deposits on the underside of the reactor vessel and sent to a laboratory for analysis in an attempt to demonstrate that the flow trails and the incore nozzle deposits were from a common source. Fourteen distinct samples were taken; two from the "flow trails" observed on the side of the reactor vessel, and twelve from the deposits present

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Davis-Besse Unit Number 1	05000346	2002	-- 007 --	00	3 OF 4

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

DESCRIPTION OF OCCURRENCE: (Continued)

on various incore nozzles. The laboratory analysis provided conflicting evidence and therefore it is inconclusive whether the flow trails on the bottom of the reactor vessel and the incore nozzle deposits had a common source.

On October 4, 2002, additional samples were taken to provide further information for interpretation of reactor vessel lower head sample results. These samples included samples of adhesive tape and paint from the bottom of the reactor vessel, as well as four samples of the corrosion deposits on the reactor vessel hot and cold leg nozzles. The results of the analysis of these samples show that the tape and/or paint on the incore nozzles may have contributed to the differences between the flow trail and incore nozzle samples, and that significant differences existed between the compositions of the northwest flow trail and the hot and cold leg nozzle deposits. As before, no definitive conclusion could be reached from the available information to determine the source of the incore nozzle deposits.

At this time, there is no confirmed leakage of the DBNPS reactor vessel incore nozzles. All testing performed has been inconclusive regarding whether the deposits on the side and bottom of the reactor vessel had a common source. Therefore, this condition is being voluntarily reported as a Licensee Event Report in accordance with the guidelines of Section 2.7 of NUREG-1022, Event Reporting Guidelines.

APPARENT CAUSE OF OCCURRENCE:

The boric acid deposits and corrosion observed on the underside of the reactor pressure vessel appeared to be the result of runoff from cleaning of the reactor vessel closure head during previous outages, or leakage of the refueling cavity seal. Any additional information as a result of the leakage test described above will be provided in a supplement to this report within 30 days following completion of the leakage test.

ANALYSIS OF OCCURRENCE:

For the temperatures that the incore nozzles are exposed to, they are not expected to experience stress corrosion cracking associated with higher temperatures as has been observed on control rod drive nozzles. While visual inspections of these nozzles are not routinely conducted for plants in the United States, inspections and testing at 17 plants in France have not yet discovered any cracking or leaking of the incore nozzles.

At this point, there is no confirmed leakage of the DBNPS reactor vessel incore nozzles. Therefore, there is no known safety significance of this issue.

CORRECTIVE ACTIONS:

In September 2002, the bottom of the reactor vessel was thoroughly cleaned, removing the loose/peeling areas of coating on the lower reactor vessel along with all boric acid deposits. No corrective actions have been deemed necessary with respect to restoring the coating. The subject area cannot be properly prepared to meet design basis accident coating qualification requirements. Additionally, an engineering evaluation has been performed to verify the acceptability of not re-applying a coating to this area.

Prior to reactor criticality, a test of the Reactor Coolant System will be conducted to confirm that no incore nozzle leakage exists. This will be accomplished by raising the Reactor Coolant System to normal operating temperature and pressure. These conditions will be maintained for approximately seven days. If leakage is detected, a prompt and orderly return to ambient conditions will be initiated. At the end of the seven-day period, the Reactor Coolant System temperature and pressure will be reduced, and a visual inspection of the bare metal of the lower reactor vessel will be performed to look for symptoms of incore nozzle leakage.

Additionally, laboratory leak rate testing will be performed to determine resultant boric acid residue/deposits as a result of potential incore leak rates. This laboratory testing is being conducted to verify methods for detecting very small leaks, with a mockup being designed and built to measure leak rates at conditions very near to the normal operating pressure and temperature of the DBNPS Reactor Coolant System.

A bare metal reactor vessel visual inspection will also be performed during the next scheduled outage of sufficient duration for symptoms of incore nozzle leakage.

FAILURE DATA:

There have been no LERs in the previous two years involving deficiencies with the incore monitoring instrumentation nozzles at the DBNPS.

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

NP-33-02-007-00

CRs 2002-01430, 2002-01690, 2002-02498, 2002-02552, 2002-07059, 2002-09520