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March 23, 2011
L-11-065

10 CFR 50.73

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

SUBJECT:
Davis-Besse Nuclear Power Station
Docket Number 50-346, License Number NPF-3
Licensee Event Report 2011-002

Enclosed is Licensee Event Report (LER) 2011-002, "Containment Air Cooler Isolation Valve Disabled due to Drawing Omission." This LER is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), operation in a condition prohibited by the Technical Specifications.

There are no regulatory commitments contained in this letter or its enclosure. The actions described represent intended or planned actions and are described for information only. If there are any questions or if additional information is required, please contact Mr. Patrick J. McCloskey, Manager, Site Regulatory Compliance, at (419) 321-7274.

Sincerely,

Barry S. Allen

GMW

Enclosure: LER 2011-002-00

cc: NRC Region III Administrator
NRC Resident Inspector
NRR Project Manager
Utility Radiological Safety Board

IE22
NRR

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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.

# LICENSEE EVENT REPORT (LER)

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

| 1. FACILITY NAME | 2. DOCKET NUMBER | 3. PAGE |
|---|---|---|
| Davis-Besse Nuclear Power Station | 05000346 | 1 OF 4 |

**4. TITLE**

Containment Air Cooler Isolation Valve Disabled due to Drawing Omission

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO. | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |
| 11 | 30 | 2010 | 2011 | - 002 - | 00 | 03 | 23 | 2011 | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |

**9. OPERATING MODE**

1

**10. POWER LEVEL**

100

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

| | | | |
|---|---|---|---|
| ☐ 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) | ☐ 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 |

**12. LICENSEE CONTACT FOR THIS LER**

| FACILITY NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| Gerald M. Wolf, Supervisor, Nuclear Compliance | (419) 321-8001 |

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

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

**14. SUPPLEMENTAL REPORT EXPECTED**

☐ YES (If yes, complete EXPECTED SUBMISSION DATE). ☒ NO

**15. EXPECTED SUBMISSION DATE**

| MONTH | DAY | YEAR |
|---|---|---|
| | | |


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

On January 22, 2011, with the Davis-Besse Nuclear Power Station in Mode 1 at approximately 100 percent power, routine testing discovered the outlet temperature control valve for Containment Air Cooler (CAC) 3 could not be closed from the control room. This containment isolation valve had been inadvertently rendered inoperable on November 30, 2010, while electrically isolating the CAC 3 fan motor that had tripped its supply breaker on overload when the motor was started on October 24, 2010.

The root cause of this event was determined to be a lack of information on the elementary wiring diagram used to prepare the clearance for isolating the fan motor. This drawing did not reference an additional drawing showing that the fan motor breaker contacts impact the power supply to the temperature control valve controls. When a clearance for the fan motor was revised, this lack of information led to the electrical isolation of the valve control circuitry, failing the valve in the open position. Corrective actions include revision of these drawings.

This issue is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation prohibited by the Technical Specifications for the inoperable containment isolation valve. Because an additional failure would be required for a potential containment bypass pathway to exist, this event had very low safety significance.

| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Davis-Besse Unit Number 1 | 05000346 | 2011 | -- 002 -- | 00 | 2 OF 4 |

NARRATIVE

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

The Davis-Besse Nuclear Power Station (DBNPS) was operating in Mode 1 at approximately 100 percent power during all events described below.

System Description:

The Containment Air Coolers (CACs) [BK-CLR] provide for containment atmosphere cooling during both normal operation and accident conditions. Each cooling train is equipped with cooling coils [CCL] and a fan [FAN] driven by a two speed electric motor [MO]. For both normal operation and accident conditions, two of three CACs are in operation in fast speed, and the third (spare) CAC is placed in standby. CAC 3 is designated as a swing component, as it can be manually aligned electrically and mechanically to either train 1 or train 2 of electrical power and the Service Water System (SW) [BI]. Key interlocks are used to ensure CAC 3 is not electrically aligned to both trains at the same time.

The CAC Outlet Temperature Control Valves [BK-TCV] are normally open on operating CACs to provide a flow path of SW from the operating CACs to the SW return header outside containment. During normal operation, these valves provide temperature control for their respective operating CAC. In the event of a design basis accident, a Safety Features Actuation System (SFAS) [JE] Level 2 signal will automatically place the two operating CAC fans in low speed to prevent motor overload from the higher density atmosphere. Fan operation in low speed initiates an electrical signal to fully open the Outlet Temperature Control Valves to allow maximum SW flow through the operating CACs. These temperature control valves are unusual in that they are fail-open air-operated Containment Isolation valves. Because the SW piping inside containment is a closed system, only one Containment Isolation valve is provided on the SW return header.

Technical Specification(s):

Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.3 requires each containment isolation valve be operable while the plant is operating in Modes 1, 2, 3, and 4. With a containment isolation valve inoperable in Modes 1 to 4 for a penetration flow path with only one containment isolation valve, TS LCO 3.6.3 Condition C requires the affected penetration flow path be isolated in 72 hours and verified isolated once per 31 days. If this action and associated completion time cannot be met, then TS LCO 3.6.3 Condition F requires the plant be placed in Mode 3 in 6 hours and in Mode 5 in 36 hours.

TS LCO 3.6.6 requires two containment spray trains [BE] and two containment air cooling trains be operable while the plant is operating in Modes 1 to 4. With one containment air cooling train inoperable in Modes 1 to 4, TS LCO 3.6.6 Condition C requires the affected train be restored to operable status in 7 days. If this action and associated completion time cannot be met, then TS LCO 3.6.6 Condition F requires the plant be placed in Mode 3 in 6 hours and in Mode 5 in 36 hours.

DESCRIPTION OF EVENT:

On October 24, 2010, CAC 3 was placed in service aligned as train 1 as part of a routine equipment rotation. Approximately 34 seconds after being started in fast speed, the supply breaker tripped open on overcurrent. CAC 1 was placed back in service to meet TS requirements.

| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Davis-Besse Unit Number 1 | 05000346 | 2011 | -- 002 -- | 00 | 3 OF 4 |

NARRATIVE

DESCRIPTION OF EVENT: (continued)

Clearances were installed on October 24 and 25, 2010 to allow troubleshooting and other associated maintenance on the isolated CAC 3 fan motor. These clearances maintained power to the CAC 3 Outlet Temperature Control Valve (SW 1358), and this valve remained operable as demonstrated by testing on November 23, 2010. However, with the CAC 3 fan motor supply breakers open from both electrical train 1 (BE105) [EC-BKR] and from electrical train 2 (BF105), Control Room annunciators for both Bus E1 and F1 were brought into alarm.

On November 30, 2010 ("event date"), a revised clearance was installed for CAC 3 fan motor. This action supported the Control Room Annunciator black board philosophy to reduce distractions to the Control Room Operators. This clearance moved the clearance boundaries nearer to CAC 3 fan motor, tagging only the four individual breakers for the high and low speed motor windings for each electrical train (Breakers BEF151, BEF152, BEF153, and BEF154). This allowed supply breakers BE105 and BF105 to be reopened and clear the trouble annunciators for Bus E1 and F1. This clearance inadvertently removed control power to the CAC 3 Outlet Temperature Control Valve (SW 1358) solenoid valve, preventing the valve from being closed to perform its containment isolation function.

On January 22, 2011, at 2145 hours ("discovery date"), during performance of procedure DB-PF-03020, Service Water Train 1 Valve Test, it was identified that the CAC 3 Outlet Temperature Control Valve could not be closed using the Control Room handswitch [HIS]. Follow-up investigation identified the problem with the clearance installed in November, so the clearance was removed and control power was restored to the Outlet Temperature Control Valve, allowing the valve to be properly stroked on January 23, 2011, at 0454 hours.

CAUSE OF EVENT:

The CAC outlet temperature control valves are unusual in that they are fail-open air-operated Containment Isolation valves. In addition, the temperature control valves are interlocked with the CAC fan motors that operate in multiple speeds with complicated logic schemes (including multiple inputs from the SFAS). The control logic for the CAC 3 outlet temperature control valve is further complicated by the fact that it can be powered from either train of electrical power.

The root cause of this event was that the elementary wiring diagram used to prepare the clearance did not reference an additional drawing to inform the reviewer of breaker contacts that impact the power supply to the CAC 3 Outlet Temperature Control Valve controls. The clearance preparer and reviewer failed to identify this breaker interlock, resulting in the CAC 3 Outlet Temperature Control Valve being rendered inoperable when the clearance was revised on November 30, 2010. The valve remained inoperable until discovered on January 22, 2011, during routine testing.

| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Davis-Besse Unit Number 1 | 05000346 | 2011 | -- 002 -- | 00 | 4 OF 4 |

NARRATIVE

ANALYSIS OF EVENT:

CAC 3 was the designated spare train during the period of time that the outlet temperature control valve was inoperable. CAC 1 and 2 remained operable during this time period, and the DBNPS Probabilistic Risk Assessment (PRA) does not credit recovery of the spare CAC in the event of an accident. Therefore, there was no impact on the calculated Core Damage Frequency (CDF) during this time period (November 30, 2010, to January 22, 2011). Because an additional failure of the closed SW piping inside containment would be required for a potential containment bypass pathway to exist, there was no impact on the Large Early Release Fraction (LERF) due to the containment isolation valve being de-energized in the open position. Therefore, this event was of very low safety significance.

Reportability Discussion:

With the CAC 3 outlet temperature control valve not capable of being closed, the valve was not capable of performing its design function of isolating containment as required by TS LCO 3.6.3. This valve was inoperable for approximately 53 days, which exceeded the Completion Time specified in TS LCO 3.6.3 to restore the valve to Operable status or shutdown the plant. Therefore, this issue is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as it resulted in operation of the plant in a condition prohibited by the TS. Because an additional failure would be required for a potential containment bypass pathway to exist, and no other CAC was affected by the clearance that isolated electrical power to CAC 3, this issue did not result in a loss of safety function.

CORRECTIVE ACTIONS:

The clearance installed November 30, 2010, was removed and control power was restored to the CAC 3 Outlet Temperature Control Valve, allowing the valve to be properly stroked on January 23, 2011, at 0454 hours.

The elementary wiring diagrams (E-48B Sheets 33A and 33B, and E-58B Sheets 2A and 2C) associated with the CAC 3 fan motor and CAC 3 Outlet Temperature Control Valve will be revised to add a note/reference to refer to the opposite drawing to inform the reader of the associated interlocks between the equipment.

PREVIOUS SIMILAR EVENTS

There have been no Licensee Event Reports submitted for the DBNPS in the past three years where equipment was inadvertently rendered inoperable for longer than permitted by the TS as a result of a clearance issue.