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November 2, 2015

L-15-316

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 2015-001

Enclosed is Revision 01 to Licensee Event Report (LER) 2015-001-00, "Borated Water Storage Tank (BWST) Rendered Inoperable due to Use of Non-Seismic Purification System." This event was previously reported pursuant to 10 CFR 50.73(a)(2)(i)(B). Revision 01 is being reported to also designate this event reportable pursuant to 10 CFR 50.73(a)(2)(v)(D).

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,

Brian D. Boles

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Enclosure: LER 2015-001, Revision 01

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

JE22  
NRF



**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

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 and Information Collections Branch (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.

<b>1. FACILITY NAME</b> Davis-Besse Nuclear Power Station	<b>2. DOCKET NUMBER</b> 05000 346	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Borated Water Storage Tank (BWST) Rendered Inoperable due to Use of Non-Seismic Purification System

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
02	11	2015	2015	- 001	- 01	10		2015	FACILITY NAME	DOCKET NUMBER
										05000
										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"/> 50.73(a)(2)(vii)
	<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"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(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"/> 50.73(a)(2)(ix)(A)
100	<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)	<input type="checkbox"/> 50.73(a)(2)(x)
	<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"/> 73.71(a)(4)
	<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"/> 73.71(a)(5)
	<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"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

**12. LICENSEE CONTACT FOR THIS LER**

LICENSEE CONTACT Vicki A. Wadsworth, Senior Nuclear Engineering Specialist, Regulatory Compliance	TELEPHONE NUMBER (Include Area Code) (419) 321-7690
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO			

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

On February 11, 2015, with the Davis-Besse Nuclear Power Station operating in Mode 1 at approximately 100 percent full power, during a Nuclear Regulatory Commission (NRC) Component Design Basis Inspection, it was identified the seismic Borated Water Storage Tank (BWST) had been aligned in the past to the non-seismic Spent Fuel Pool (SFP) system for purification. This rendered the BWST inoperable for periods of time longer than allowed per Technical Specification 3.5.4 while the plant was operating in Modes 1 through 4. Since initial plant design, the BWST had been aligned to the non-seismic SFP system at various times for purification of the BWST contents.

The cause of this event was that regulatory requirements for the separation of seismically qualified and non-qualified systems, structures, and components were not adequately incorporated into design basis documents and the Updated Safety Analysis Report. Administrative controls were established to restrict the alignments that could affect the operability of the BWST. All corrective actions have been completed. The condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition which was prohibited by the plant's Technical Specifications and 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented the fulfillment of the safety function systems needed to mitigate the consequences of an accident.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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Davis-Besse Unit Number 1	05000 346	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
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**NARRATIVE**

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

**System Description:**

The Davis-Besse Nuclear Power Station (DBNPS) Borated Water Storage Tank (BWST) [BP-T] is included in the Low Pressure Injection System/Decay Heat Removal System [BP] and the Spent Fuel Cooling and Cleanup System [DA]. The BWST is located outside the containment vessel and the auxiliary building, and contains a minimum volume of 500,100 gallons of borated water at a minimum concentration of 2600 ppm boron. The BWST supplies borated water for emergency core cooling via the Decay Heat Removal/Low Pressure Injection (LPI) System [BP] and High Pressure Injection (HPI) System [BJ], and as a source of borated water for the Containment Spray System [BE]. The BWST also supplies makeup water to the spent fuel pool cooling system, the refueling canal during refueling, and can serve as a source for the Makeup Pumps [CB-P]. The BWST is provided with a steam heater located in the auxiliary building which normally maintains the borated water at a temperature of greater than 50 degrees Fahrenheit. The minimum temperature of the BWST is 35 degrees Fahrenheit.

During accident conditions, the BWST provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown. The BWST ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Bases Accident (DBA); to cool and cover the core in the event of a Loss of Coolant Accident (LOCA), and to ensure an adequate level exists in the containment sump to support ECCS and containment spray pump operation in the recirculation mode.

The scope of this Licensee Event Report focuses on the Spent Fuel Cooling and Cleanup System which provides purification by removing fission and corrosion products and maintains the water clarity of the spent fuel pool water, the fuel transfer canal water, and the contents of the BWST. BWST purification is accomplished by aligning the spent fuel pool purification system in series with the BWST.

**Technical Specification(s):**

Technical Specification (TS) Limiting Condition for Operation (LCO) 3.5.4 requires the BWST to be Operable in Modes 1 through 4. With the BWST inoperable for reasons other than boron concentration or water temperature not within limits, TS 3.5.4 Action B requires the BWST be restored to Operable status in one hour.

**DESCRIPTION OF EVENT:**

On February 11, 2015, the DBNPS was operating in Mode 1 at approximately 100 percent full power. During an NRC Component Design Basis Inspection, it was identified that system operating procedures allowed the seismically qualified BWST to be aligned to the non-seismic Spent Fuel Pool (SFP) purification system during Modes 1-4. It was determined that this alignment to the SFP affected the Operability of the BWST per TS 3.5.4. Consequently, if the BWST was aligned to SFP purification during a seismic event, the BWST inventory could be lost through the non-seismic purification system. At the time of discovery the BWST was not aligned to the SFP purification system, and an LCO Tracking Item was created for Operations to enter TS LCO 3.5.4 if aligning the BWST to SFP purification while in Modes 1 through 4.

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**NARRATIVE**

**CAUSE OF EVENT:**

During initial plant licensing, the DBNPS Preliminary Safety Analysis Report stated the BWST could be aligned to the SFP System for purification. The initial system operating procedure for the SFP Cooling and Purification System included instructions to align the BWST for purification, and did not reference the BWST TS. Personnel did not recognize that aligning a seismic system to a non-seismic system could affect the operability of the BWST as specified by the TS. This alignment was used in the early 1980's while the plant was in Modes 5 and 6 in conformance with the TS. In 1988, the operating procedures for the BWST and SFP Cooling and Purification System were combined into one procedure, and during the consolidation references to the applicable TS were removed.

In 1991, the BWST was aligned to the SFP purification with the plant in Mode 1, and since that time the BWST has been consistently aligned to the SFP Purification System for a few weeks before and after refueling outages to purify the BWST water.

In 2010, an industry Operating Experience (OE) was issued describing a similar condition at another facility where the purification of a borated water source in Modes 1 through 4 via a non-seismic system rendered the water source inoperable. The evaluation of this industry OE concluded the BWST remained Operable when aligned to the SFP Cooling and Cleanup System because the BWST is not required to mitigate a seismic event per the DBNPS design basis. The Operability requirements of the BWST per TS 3.5.4 were not addressed in the OE evaluation. Review of additional OE related to this issue, including NRC Information Notice (IN) 2012-01, failed to recognize the established industry and NRC position that alignment of the seismic BWST to a non-seismic purification system rendered the BWST Inoperable during Modes 1 through 4.

The cause of the seismic BWST being aligned to the non-seismic SFP Purification system in Modes 1 through 4, therefore rendering the BWST inoperable, was due to misinterpretation of the operability requirements of the BWST during the original design phase of the DBNPS. Contributing to this event is that Operating Experience evaluations failed to recognize established NRC positions, and the expectations of Supervision/Management regarding Information Notices or NRC positions in other OEs were not defined.

**ANALYSIS OF EVENT:**

Per the DBNPS licensing bases, the BWST is required for a Loss of Coolant Accident (LOCA) and is not required for a design basis earthquake event. The DBNPS licensing bases requires the plant to be able to reach Hot Standby (Mode 3) following a design basis earthquake for all events other than a LOCA. Additionally, the Earthquake Emergency Plan Off Normal Occurrence Procedure has immediate steps for an operator to manually isolate SFP purification locally following a seismic event.

A qualitative analysis was performed and this condition was considered to have a very low risk significance. The delta Core Damage Frequency (CDF), when estimated using an approximate seismic model, was determined to be much less than Regulatory Guide 1.174 threshold value of 1.0E-06 events per year for determining very small increases in CDF; therefore, this issue was determined to be of very low safety significance.

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**NARRATIVE**

ANALYSIS OF EVENT: (continued)

Reportability Discussion:

The BWST has been periodically aligned to the non-seismic SFP purification system in the past, rendering the BWST inoperable when required to be operable per TS 3.5.4 while in Modes 1 through 4, for a period of time longer than allowed per the TS. The most recent times the BWST was in this alignment while in Modes 1 through 4 were from December 18, 2013 to January 8, 2014 (21 days) prior to the Eighteenth Refueling Outage, and from April 29 to May 13, 2014 (14 days) following the Eighteenth Refueling Outage. Therefore, the plant operated in a condition prohibited by the TS, which is reportable per 10 CFR 50.73(a)(2)(i)(B).

Because the single train BWST was inoperable due to its connection to the non-seismic purification system, this issue also represents a loss of safety function and is being reported in accordance with 10 CFR 50.73(a)(2)(v)(D) as any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

CORRECTIVE ACTIONS:

A TS LCO 3.5.4 tracking item was created for Operations to enter LCO 3.5.4 if aligning the BWST to SFP purification while in Modes 1 through 4.

The BWST Operating Procedure, DB-OP-06015, has been revised to restrict BWST alignment to the SFP Purification system while in Modes 1-4 and allow placing the BWST on SFP Purification during Modes 5, 6 or defueled.

This issue has been communicated to Site Engineering to increase sensitivity regarding how NRC positions and Operating Experience evaluations should be communicated to the plant.

An extent of condition review was performed to validate no other seismic required systems were rendered inoperable due to being aligned to non-seismic systems without appropriate isolation features.

PREVIOUS SIMILAR EVENTS:

There have been no Licensee Event Reports (LERs) at the DBNPS involving a seismic to non-seismic lineup in the past three years.