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NP-33-03-013-00

Docket No. 50-346

License No. NPF-3

December 1, 2003

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

Ladies and Gentlemen:

LER 2003-013-00  
Davis-Besse Nuclear Power Station, Unit No. 1  
Date of Occurrence – September 30, 2003

Enclosed please find Licensee Event Report 2003-013-00 which is being submitted to provide written notification of an unplanned reactor trip condition with the reactor shutdown. This trip occurred due to a Shutdown Bypass High Pressure signal. This signal inserted trippable reactivity Control Rod Group 1 while in the process of performing a plant cooldown activity. This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A), an event that resulted in actuation of the Reactor Protection System. An 8-hour immediate notification of this event was made to the NRC on September 30, 2003 (Event No. 40208). Commitments associated with this LER are listed in the Attachment.

Very truly yours,



PSJ/s

Enclosures

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

IE22

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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.

<b><u>COMMITMENTS</u></b>	<b><u>DUE DATE</u></b>
1. Revise procedure DB-OP-06903, "Plant Shutdown and Cooldown," to provide more prescriptive guidance for plant cooldown operation.	1. Complete.
2. Revise procedure DB-OP-06903, "Plant Shutdown and Cooldown," to incorporate a requirement to conduct a pre-job brief that includes specific operating experience gained from this event.	2. Complete.
3. Discuss this event with on-shift operating personnel and include guidance on management expectations when differences are encountered between training and actual plant conditions.	3. Complete.
4. Develop a Case Study of this event for initial and continuing training with a focus on constant cognizance of the proper operating envelope and the need to continually monitor multiple indications for each parameter.	4. January 31, 2004.
5. Develop an Operations Improvement Action Plan and implement items designated for restart.	5. Prior to restart

NRC FORM 366 (7-2001)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104		EXPIRES 7-31-2004	
<b>LICENSEE EVENT REPORT (LER)</b> (See reverse for required number of digits/characters for each block)							
1. FACILITY NAME <b>Davis-Besse Unit Number 1</b>				2. DOCKET NUMBER <b>05000346</b>		3. PAGE <b>1 OF 5</b>	
4. TITLE <b>Trip of Reactor Protection System During Plant Cooldown</b>							
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY
9	30	2003	2003	013	00	12	01
						8. OTHER FACILITIES INVOLVED	
						FACILITY NAME <b>05000</b>	
						DOCKET NUMBER <b>05000</b>	
9. OPERATING MODE <b>5</b>		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)					
10. POWER LEVEL <b>000</b>		20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)	
		20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)	
		20.2203(a)(1)		50.36(c)(1)(i)(A)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	
		20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)	
		20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)	
		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)		50.73(a)(2)(i)(B)		50.73(a)(2)(vi)	
		20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(vii)(A)	
		20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)	
12. LICENSEE CONTACT FOR THIS LER							
NAME <b>Peter S. Jordan - Regulatory Affairs</b>						TELEPHONE NUMBER (Include Area Code) <b>(419) 321-8260</b>	
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT							
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT
14. SUPPLEMENTAL REPORT EXPECTED					15. EXPECTED SUBMISSION DATE		
YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO					MONTH DAY YEAR		
16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)							
<p>On September 30, 2003, with the plant in Mode 3 following completion of a normal operating pressure test using non-nuclear heat, operators were performing a plant cooldown. The Reactor Coolant System (RCS) was at approximately 1750 psig and 532 degrees F with the Reactor Protection System (RPS) Shutdown Bypass High Pressure Trip of approximately 1812 psig enabled. Control Rod Group 1 (trippable reactivity) was withdrawn. At approximately 2125 hours, plant cooldown commenced by opening of the Turbine Bypass Valves (TBVs). The degree of opening of the TBVs exceeded that required for a properly controlled cooldown rate. A decrease in RCS pressure and Pressurizer level was experienced. Recovery efforts then resulted in an increase in RCS pressure which caused an unplanned RPS actuation and reactor trip on a Shutdown Bypass High Pressure signal. The RPS and all components responded as intended. There were no post-trip response equipment issues identified. The causes of this event were determined to be operator performance, procedural guidance, and a pre-job brief which were all less than adequate. Corrective actions include event-specific training and procedure enhancements. Notification of this event was made on September 30, 2003, pursuant to 10 CFR 50.72(b)(3)(iv)(A). This report is being provided pursuant to 10 CFR 50.73(a)(2)(iv)(A), an event that resulted in actuation of the RPS.</p>							

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Davis-Besse Unit Number 1	05000346	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		2003	- 013 -	00	

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

## DESCRIPTION OF OCCURRENCE:

At the time of this event, the Davis Besse Nuclear Power Station (DBNPS) procedure DB-OP-06903, "Plant Shutdown and Cooldown," permitted plant cooldown evolutions with Control Rod Group 1 (AA) either fully withdrawn or inserted. The operating crew desired to have Control Rod Group 1 withdrawn during cooldown because it provided instantaneous negative reactivity in the event a reactivity problem was identified. The design of the Reactor Protection System (RPS) (JC) is such that, in order to support this configuration at lower pressures, a Shutdown Bypass High Pressure Trip is inserted that will actuate the RPS and insert the rods at a Reactor Coolant System (RCS) (AB) pressure setpoint of approximately 1812 psig.

On September 30, 2003, with the plant in Mode 3 and following completion of a normal operating pressure test using non-nuclear heat, operators were performing a plant cooldown. The RCS was at approximately 1750 psig and 532 degrees F. Control Rod Group 1 (trippable reactivity) was withdrawn at approximately 2113 hours. At approximately 2125 hours cooldown of the RCS commenced by opening the Turbine Bypass Valves (TBVs) (JI). Over the next several minutes, a decrease in RCS pressure and Pressurizer (PZR) (PZR) level was observed. The TBVs were throttled back but not closed, and PZR heater bank 3 was energized. The RCS responded by increasing in pressure. At approximately 2134 hours, this increasing pressure resulted in an unplanned Reactor Trip Signal on Shutdown Bypass High Pressure which inserted the withdrawn Control Rod Group 1.

The RPS performed as designed by opening all four reactor trip breakers and subsequently de-energizing the control rod drive mechanisms. RCS inventory and pressure/temperature limits were maintained within allowable values. There were no post-trip response equipment issues identified. There were no equipment safety concerns identified. There were no structures, systems, or components that were inoperable at the start of the event that contributed to the event.

The immediate operational actions in response to the event included:

- Stabilizing plant conditions and ceasing RCS cooldown,
- Returning to normal operating temperature and pressure, and
- Performing a crew stand down to address Operations plant control.

## APPARENT CAUSE OF OCCURRENCE:

The apparent causes of this event were less than adequate operator performance, and less than adequate procedure guidance.

Prior to commencing the plant cooldown, simulator training and a pre-job briefing were conducted. The simulator training was conducted with Control Rod Group 1 inserted, and reactor core decay heat levels were programmed higher

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NARRATIVE (If more space is required, use additional copies of NRC Form 365A) (17)

## APPARENT CAUSE OF OCCURRENCE (continued):

than those that actually existed because the extended outage had allowed more time for core heat to decay. The actual cooldown was performed with Control Rod Group 1 withdrawn. The pre-job briefing did not include a discussion of the RPS Shutdown Bypass High Pressure trip or limiting setpoints.

Prior to RPS actuation, plant cooldown was commenced by increasing the TBV demand by about five percent over the steady state demand. The demand increase was based on the experience from the simulator training that was performed to support the cooldown evolution. However, the decay heat load programmed into the simulator was higher than the actual decay heat load of the RCS. The repositioning of the TBVs resulted in a higher than expected cooldown rate. During the transient, the operator lowered the demand signal on the TBVs but did not completely shut the valves. The higher than expected cooldown rate lowered RCS pressure and PZR level. To compensate for this system response, PZR heaters were energized, the PZR level controller setpoint was increased, and demand on the TBVs was reduced. This resulted in increasing RCS pressure and ultimately an RPS actuation occurred on Shutdown Bypass High Pressure.

During the cooldown, control room operators were not specifically monitoring the highest indicated RCS pressure. The focus of operator attention was on the Safety Features Actuation System (SFAS) [JE] inputs for margin to the SFAS RCS Low Pressure trip, not the RPS. The Shift Engineer did not check the readings for the RPS pressure points to determine control margin.

Subsequent to the event, it was determined that procedure DB-OP-06903, "Plant Shutdown and Cooldown," did not contain adequate guidance to aid operator knowledge of the RPS Shutdown Bypass High Pressure trip.

## ANALYSIS OF OCCURRENCE:

Prior to the RPS actuation, a normal operating pressure test was being conducted using non-nuclear heat. The RPS performed as intended by opening all four reactor trip breakers and subsequently de-energizing the control rod drive mechanisms. Reactor coolant inventory and pressure/temperature limits were maintained within allowable values. There were no post-trip response equipment issues identified. There were no equipment safety concerns identified. Therefore, this event was of minimal safety significance.

An 8-hour notification of this event was made to the NRC on September 30, 2003, pursuant to 10 CFR 50.72(b)(3)(iv)(A) (Event No. 40208). This report is submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A), an event that resulted in actuation of the Reactor Protection System.



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

## CORRECTIVE ACTIONS:

The individual human performance issues associated with this event were addressed in accordance with company policy and procedures.

Procedure DB-OP-06903, "Plant Shutdown and Cooldown," was revised on October 2, 2003, to provide more prescriptive guidance for the plant cooldown operation. A further revision was issued on November 18, 2003, to incorporate a requirement for a pre-job briefing that includes specific operating experience gained from this event.

This event was discussed with on-shift operating personnel and included guidance on management expectations when differences between training and actual plant conditions are encountered. This discussion was conducted by the Operations Manager between October 23 and November 7, 2003.

A case study of this event is to be developed with a focus on constant cognizance of proper operating envelope and the need to continually monitor multiple indications for each parameter. This case study will be used as part of the initial and continuing training programs. The development of this case study will be completed by January 31, 2004.

With the occurrence of this event, senior management had several recent events evaluated for extent of condition. This evaluation identified that organizational weaknesses and Operations Department shortcomings existed. As a result of this recognition, an Operations Improvement Action Plan has been developed and restart designated items are being implemented prior to restart to improve individual, program and procedure, management, and independent oversight.

## FAILURE DATA:

The DBNPS has experienced no unintended actuation of the RPS resulting in a reactor trip in the last three years. However, on September 15, 2003, while heating up the RCS for the NOP test, Core Flood Valve CF1B unexpectedly opened and discharged to the Decay Heat System lifting one or more relief valves which discharged to the Reactor Coolant Drain Tank. While this event was not reportable, its root causes were similar. They were procedure deficiencies and less than adequate pre-job briefing. Corrective actions included discussing the event with Operations personnel and future inclusion of the event in training lesson plans. This event is documented in CR 03-07746. The corrective actions for the CF1B event were too specific to the event to have reasonably precluded the RPS actuation and plant trip event. However, as noted above, an Operations Improvement Action Plan has been developed and is being implemented to improve operational performance from a programmatic perspective.

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

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CR 03-08374