

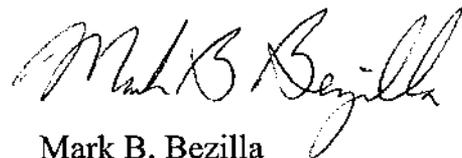
Mark B. Bezilla
Site Vice President724-682-5234
Fax: 724-643-8069January 8, 2003
L-03-003

Beaver Valley Power Station, Unit No. 1
Docket No. 50-334 License No. DPR-66
LER 2002-002-00

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

In accordance with Appendix A, Beaver Valley Technical Specifications, the following Licensee Event Report is submitted:

LER 2002-002-00, 10 CFR 50.73(a)(2)(iv)(A), "Manual Reactor Trip During Planned Shutdown Due to Turbine Motoring Alarm."



Mark B. Bezilla

Attachment

- c: Mr. D. S. Collins, NRR Project Manager
Mr. D. M. Kern, Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator
INPO Records Center (via electronic image)
Mr. L. E. Ryan (BRP/DEP)

NRC FORM 366 (7-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104	EXPIRES 7-31-2004
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)		Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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	

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4. TITLE
Manual Reactor Trip During Planned Shutdown Due To Turbine Motoring Alarm

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	11	2002	2002	002	00	01	08	2003	None	
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)								
10. POWER LEVEL	53	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)					
		<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)					
		<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 73.71(a)(4)					
		<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)					
		<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A					
		<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)						
		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)						
		<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)						
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)								
<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)								

12. LICENSEE CONTACT FOR THIS LER

NAME L. R. Freeland, Manager Regulatory Affairs/Performance Improvement	TELEPHONE NUMBER (Include Area Code) (724) 682-5284
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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
B	IT	PDI	M246	Y					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
YES (If yes, complete EXPECTED SUBMISSION DATE)			X	NO		MONTH
						DAY
						YEAR

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

On November 11, 2002, Beaver Valley Power Station (BVPS) Unit 1 was performing a planned power reduction from full power at a rate of approximately 12 percent per hour for a scheduled maintenance outage. At approximately 1946 hours, the plant was at 53 percent power and the Turbine Motoring Condition alarm was received. An automatic turbine trip will occur if this alarm is received for more than 30 seconds. An automatic reactor trip will also occur following a turbine trip signal, if the plant power level is above 49 percent power. After approximately 20 seconds from the time of the alarm, the Control Room Unit Supervisor directed a manual reactor trip. Control room personnel implemented Emergency Operating Procedure E-0 for a reactor trip. The Auxiliary Feed Water System actuated as expected and all other systems functioned as required.

An investigation into the event determined that the turbine motoring condition alarm was caused by a failure of the turbine differential pressure instrument that measures the differential pressure between the turbine impulse pressure and the turbine exhaust. The failure was due to a misapplication of the instrument to the service conditions. The failed instrument was replaced with a new instrument more suited for the application.

The manual initiation of a reactor trip via the Reactor Protection System by the BVPS Unit 1 control room operator on November 11, 2002, was a valid manual reactor trip signal and was not part of a pre-planned sequence during testing or reactor operation. Therefore this event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A). The safety significance of the manual reactor trip on November 11, 2002 was small.

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PLANT AND SYSTEM IDENTIFICATION

Westinghouse-Pressurized Water Reactor (PWR)
Main Turbine Instrumentation System (IT)

CONDITIONS PRIOR TO OCCURRENCE

Unit 1: Mode 1 at 53 % power

There were no systems, structures, or components that were inoperable that contributed to the event other than as described below.

DESCRIPTION OF EVENT

On November 11, 2002, Beaver Valley Power Station (BVPS) Unit 1 was performing a planned power reduction from full power at a rate of approximately 12 percent per hour for a scheduled maintenance outage. At approximately 1946 hours, the plant was at 53 percent power and the Turbine Motoring Condition alarm was received. An automatic turbine trip will occur if this alarm is received for more than 30 seconds. An automatic reactor trip will also occur following a turbine trip signal, if the plant power level is above 49 percent power. Prior to the alarm, control room personnel did not receive any unusual or unexpected alarms or indications associated with the turbine or any other system being monitored in the control room. After approximately 20 seconds from the time of the alarm, the Control Room Unit Supervisor directed a manual reactor trip. Control room personnel implemented Emergency Operating Procedure E-0 for a reactor trip. The Auxiliary Feed Water System actuated as expected and all other systems functioned as required. The Emergency Operating Procedures were exited at 2034 hours when the plant was stabilized in Mode 3.

An investigation into the event determined that the Turbine Motoring Condition alarm was caused by a failure of the instrument (PDIS-1TB-103) that measures the differential pressure between the turbine impulse pressure and the turbine exhaust. This instrument contains a set of electrical contacts which generates a Turbine Motoring Condition alarm when the sensed differential pressure drops to less than or equal to 5 psid.

REPORTABILITY

The manual initiation of a reactor trip via the Reactor Protection System by the BVPS Unit 1 control room operator on November 11, 2002, was a valid manual reactor trip signal and was not part of a pre-planned sequence during testing or reactor operation. Therefore this event is reportable pursuant to 10 CFR 50.72(b)(3)(iv)(A) and 50.73(a)(2)(iv)(A). The NRC was notified that a manual reactor trip occurred at BVPS Unit 1 pursuant to 10 CFR 50.72 (b)(3)(iv)(A) at 2208 hours on November 11, 2002 (ENS No. 39363).

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CAUSE OF EVENT

The cause of this event was a mechanical failure of the differential pressure instrument PDIS-1TB-103 that resulted in increasing the instrument's setpoint such that it actuated at a much higher setpoint than expected (approximately 110 psid versus 5 psid). The failure was determined to be caused by a misapplication of the instrument.

The instrument is designed to measure differential pressure in the range of 0-60 psid in order to obtain an accurate reading when it is required to provide its function as an indicator of possible turbine motoring. At a differential pressure of less than 5 psid the instrument's internal pressure switch is closed which generates a signal resulting in a Turbine Motoring Condition alarm. As impulse and extraction pressure differential increases, the switch opens. During normal operation, the differential pressure across the instrument is approximately 300 psid and the instrument is off scale. However, following a turbine trip the differential pressure across the instrument reverses and briefly goes negative (below zero psid as indicated on the instrument). This transient can result in damage to the instrument when a negative differential pressure exceeds 10% of the indicated full scale or approximately 6 psid. When the instrument was disassembled and inspected following the trip, internal damage was discovered which would have resulted in a change to the instrument's setpoint. The damage to the instrument likely occurred due to the cumulative effect of previous negative differential pressure spikes of greater than 6 psid seen by the instrument from past reactor/turbine trips at Unit 1. The investigation also determined that the instrument's life expectancy was shortened in this type of service and that the instrument's calibration should be checked after being subjected to differential pressure transients resulting from reverse pressurization.

Contributing factors identified during the event investigation were earlier missed opportunities to identify the problem. The instrument misapplication could have been identified earlier as a result of previous failures. The instrument was replaced in 1993 and repaired in 1999 when a bent linkage was discovered. These failures were not thoroughly investigated at the time.

In addition, there was a lack of understanding of the instrument readings. Prior to this event on September 12, 2002, a pinhole steam leak had been identified on the piping for the low-pressure root isolation valve leading to PDIS-1TB-103. As a result of the discovery of this steam leak, the Unit 1 operating crew shift briefings had included discussions to manually trip the reactor in response to the Turbine Motoring Condition alarm. Differential pressure readings were also being taken each shift using the instrument's gauge as a result of the steam leak on the instrument line. However, the validity of the instrument reading less than full scale when the actual differential pressure across the instrument was greater than 300 psid was not questioned. This was another missed opportunity to identify the damage to the instrument.

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SAFETY IMPLICATIONS

This event was a manual reactor trip, which is less severe than the design basis event for Loss of External Electrical Load and/or Turbine Trip. The Loss of External Electrical Load and/or Turbine Trip is analyzed in BVPS Unit No. 1 UFSAR Section 14.1.7. The actual plant response on November 11, 2002, was bounded by the UFSAR analysis for a Loss of External Electrical Load and/or Turbine Trip.

The plant risk associated with the BVPS Unit 1 manual reactor trip on November 11, 2002, due to a mechanical failure of the high-low pressure turbine differential pressure detector is considered to be low. This is based on the conditional core damage probability for the event when considering the actual component unavailabilities that were present at the time of the trip.

Based on the above, the safety significance of the manual reactor trip on November 11, 2002, was small.

CORRECTIVE ACTIONS

1. The failed differential pressure instrument was replaced with an instrument more suited for the application. This new instrument is similar to the type currently being used at Unit 2.
2. A review of the applications for the same model of instrument as the failed instrument was performed and no other misapplications were identified.
3. The steam leak on the instrument line was repaired during the Unit 1 maintenance outage.
4. The turbine operator logs at both units were revised to check that the high-low pressure turbine differential pressure instruments are reading as expected during turbine operation.
5. Briefings will be conducted on the event and the lessons learned as a result of this event with Plant Engineering, Operations, and Instrument and Control personnel.
6. A preventive maintenance strategy for the periodic replacement of the high-low pressure turbine differential pressure instrument at both BVPS units will be developed.
7. A calibration check of the high-low pressure turbine differential pressure instrument (PDIS-1TB-103 or 2TMS-DS103) will be added to future post-trip actions for each BVPS unit.
8. As a preventive measure, the Unit 2 high-low pressure turbine differential pressure instrument will be replaced during the next Unit 2 refueling outage and inspected for internal degradation.

Corrective action completion is being tracked through the Corrective Action Program.

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PREVIOUS SIMILAR EVENTS

A review of past Beaver Valley Power Station Licensee Event Reports for the last three years identified the following event that involved a reactor trip due to a turbine trip; however, there were no events identified that were similar in cause to the November 11, 2002 manual reactor trip.

Unit 1 LER 2000-006 Reactor Trip/Turbine Trip due to Turbine EH Loss of Control Power.

ATTACHMENT

Commitment List

The following list identifies those actions committed to by FirstEnergy Nuclear Operating Company (FENOC) for Beaver Valley Power Station (BVPS) Unit Nos. 1 and 2 in this document. Any other actions discussed in the submittal represent intended or planned actions by Beaver Valley. These other actions are described only as information and are not regulatory commitments. Please notify Mr. Larry R. Freeland, Manager, Regulatory Affairs/Performance Improvement, at Beaver Valley on (724) 682-5284 of any questions regarding this document or associated regulatory commitments.

Commitment

None

Due Date

None