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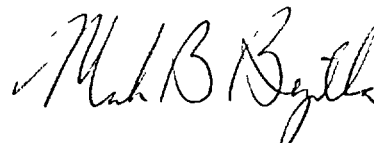
L-03-052

**Beaver Valley Power Station, Unit No. 1**  
**Docket No. 50-334 License No. DPR-66**  
**LER 2003-001-00**

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 2003-001-00, 10 CFR 50.73(a)(2)(iv)(A), "Safety Injection and Reactor Trip Due to Inadvertent Main Steam Isolation Valve Closure."



Mark B. Bezilla

Attachment

- c: Mr. T. G. Colburn, NRR Senior 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)

JE22

**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, NE0B-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 information collection.

<b>1. FACILITY NAME</b> Beaver Valley Power Station Unit No. 1	<b>2. DOCKET NUMBER</b> 05000334	<b>3. PAGE</b> 1 OF 5
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**4. TITLE**  
Safety Injection and Reactor Trip Due to Inadvertent Main Steam Isolation Valve Closure

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
02	24	2003	2003	001	00	03	26	2003	None	
									FACILITY NAME	DOCKET NUMBER

<b>9. OPERATING MODE</b>	1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check all that apply)</b>			
		20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
<b>10. POWER LEVEL</b>	100	20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
		20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
		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)(vii)	
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(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 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	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>		
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 2/24/03 at 1548 hours, Beaver Valley Power Station (BVPS) Unit 1 was operating at 100% power, end of core life at steady state conditions, with preliminary Refueling No. 15 work evolutions (scaffold erection) in progress, when the Control Room received Annunciator A1-56 "Steamline Stop Valve Not Fully Open". This alarm was followed by a safety injection and reactor trip due to low main steam pressure. All required safety related systems functioned as required. After the automatic actuation occurred, control room operators noted that all three steam generator pressures were stable at normal post reactor trip values. No indications of a steam leak were observed. The plant was stabilized in Mode 3.

The cause for the safety injection and reactor trip was the sudden inadvertent closure of the 'C' Main Steam Isolation Valve (MSIV), which caused a Low Steam Line Pressure safety injection and reactor trip. The west air cylinder rupture disk on the MSIV was damaged due to human error by craft workers installing scaffolding in the area below the MSIV. The rupture disk failed, thereby venting the instrument air pressure resulting in closure of the MSIV. Steam flows in the A and B loops subsequently increased and steam line pressures dropped such that the rate of the steam line pressure decrease in the B loop initiated a safety injection and reactor trip signal. An Unusual Event was declared for this event. This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in automatic actuation of an applicable system.

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**PLANT AND SYSTEM IDENTIFICATION**

Westinghouse-Pressurized Water Reactor (PWR)  
 Reactor Protection System (JC)  
 Engineered Safety Features Actuation System Instrumentation (JE)  
 Main Steam System (SB)  
 High Pressure Safety Injection System (BQ)  
 Auxiliary Feedwater System (BA)  
 Emergency Onsite Power Supply (EK)

**CONDITIONS PRIOR TO OCCURRENCE**

Unit 1: Mode 1 at 100 % 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 2/24/03 at 1548 hours, Beaver Valley Power Station (BVPS) Unit 1 was operating at 100% power, end of core life at steady state conditions, with preliminary Refueling No. 15 work evolutions (scaffold erection) in progress, when the Control Room received Annunciator A1-56 "Steamline Stop Valve Not Fully Open". This alarm was followed by a safety injection and reactor trip due to low main steam pressure.

The alarms were the result of the 'C' Main Steam Isolation Valve closing, which caused a Low Steam Line Pressure safety injection and reactor trip. The remaining two main steam isolation valves automatically closed due to the steam pressure decrease rate. As a result of the safety injection, the high head safety injection pumps were automatically realigned to inject into the Reactor Coolant System (RCS) and both emergency diesel generators started but did not load since offsite power remained available. As a result of the safety injection and reactor trip, the auxiliary feedwater pumps automatically started and commenced providing feedwater to the steam generators. Control room personnel implemented Emergency Operating Procedure E-0, "Reactor Trip / Safety Injection". All required safety related systems functioned as required. After the automatic actuation occurred, control room operators noted that all three steam generator pressures were stable at normal post reactor trip values. No indications of a steam leak were observed. The plant was stabilized in Mode 3.

Per the Emergency Plan, at 1600 hours, an Unusual Event was declared. At 1605 hours, the safety injection was terminated per procedure, E.S.1.1, Safety Injection Termination. At 1635 hours, procedure FR-I.1, Response To High Pressurizer Level was performed to re-establish a pressurizer steam bubble. At 1658 hours, operations exited from procedure FR-I.1, Response To High Pressurizer Level, and completed the remaining steps of E.S.1.1. At 1701 hours, procedure

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**DESCRIPTION OF EVENT (Continued)**

10M-11.4M, Recovery Procedure From Safety Injection procedure was performed. At 1735 hours, the Unusual Event was terminated.

**REPORTABILITY**

An automatic safety injection and reactor trip occurred on February 24, 2003. This resulted in an automatic actuation of the Reactor Protection System (reactor trip), the main steam isolation system (multiple main steam isolation valves), the emergency core cooling system (ECCS) (high head safety injection pumps), the auxiliary feedwater system (motor driven and steam driven auxiliary feedwater pumps), and the emergency ac electrical power system (onsite emergency diesel generators). This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in automatic actuation of systems listed in paragraph (a)(2)(iv)(B)(1), (a)(2)(iv)(B)(2), (a)(2)(iv)(B)(3), and (a)(2)(iv)(B)(6), and (a)(2)(iv)(B)(8). The NRC was notified that an automatic safety injection and reactor trip occurred at BVPS Unit 1 which led to an Unusual Event declaration which was reported pursuant to 10 CFR 50.72(a)(1) at 1656 hours on February 24, 2003 (ENS No. 39616). In addition, this event was reported pursuant to 10 CFR 50.72 (b)(2)(iv)(A), (b)(2)(iv)(B) and (b)(3)(iv)(A). This LER also satisfies Technical Specification 3.5.2.b which requires a special report to be submitted to the NRC describing the circumstances of an ECCS actuation that injects water into the RCS and the total accumulated actuation cycles to date.

**CAUSE OF EVENT**

The cause for the safety injection and reactor trip was the sudden inadvertent closure of the 'C' Main Steam Isolation Valve (MSIV). The west air cylinder rupture disk on the MSIV was damaged due to human error by craft workers installing scaffolding in the area below the MSIV. While maneuvering a scaffold pole into position, a craft worker positioned it through a gap in the overhead grating. The top of the pole then punctured a rupture disk on one of the two air operating cylinders that hold the MSIV in the open position. The rupture disk failed, thereby venting the instrument air pressure resulting in closure of the MSIV.

**ANALYSIS OF EVENT**

The MSIVs are configured like check valves installed in the reverse direction in the main steam lines. The valves are held open by two pneumatic cylinders, one on each side of the valve. Puncturing the rupture disk and the subsequent venting of its instrument air caused the 'C' MSIV to close, isolating steam flow in the C loop. Steam flows in the A and B loops subsequently increased to meet the steam demand of the turbine, which consequently resulted in a steam pressure drop in the B loop such that reactor trip, safety injection and steam line isolation signals were generated. Although the actual B loop steam line pressure never decreased to the low steam line pressure safety injection setpoint of 500 psig, the lead/lag sensitivity in the ESF actuation instrumentation caused an automatic safety injection signal to be generated as a result of the rate of the pressure decrease.

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**ANALYSIS OF EVENT (Continued)**

The post-trip review did identify a MSIV configuration control error since no debris-catcher basket was attached to outside of the rupture disc as shown on design drawings. However, the debris basket is not necessary for valve performance.

The total accumulated actuation cycles to date at BVPS Unit No. 1 which involved injecting water into the Reactor Coolant System following a Safety Injection signal in Modes 1-4 is 23. This includes two events during pre-operational testing. There are an additional 22 inadvertent safety injection actuation cycles where no water was injected into the Reactor Coolant System or the safety injection occurred in Mode 5-6.

**SAFETY IMPLICATIONS**

The plant risk associated with the BVPS Unit 1 safety injection and reactor trip when the main steam isolation valve 'C' MSIV closed on 02/24/2003, 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. Therefore, the safety significance of this event was small.

**CORRECTIVE ACTIONS**

1. The rupture disks on each of the MSIVs were replaced.
2. Short term administrative controls were established to obtain Shift Manager permission prior to any work in the Main Steam Valve Room during plant operation.
3. A design change has been initiated to install cover plates on the grating at the MSIVs to provide physical protection of the rupture disks for the MSIV actuators.
4. The standard for the scaffold erection process was revised to have SRO-qualified Operations personnel perform walkdowns prior to erecting scaffolding to identify potential concerns and precautions associated with on-line equipment.
5. Self checking techniques and expectations were reinforced with site craft personnel. Specific emphasis was placed on craft responsibility to prevent inadvertent contact with plant operating equipment.

Completion of the above and other corrective actions are 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 five years found two similar events involving an inadvertent/unintentional Engineered Safety Feature (ESF) actuation at BVPS Unit 1 or Unit 2. There have been no other safety injection actuations in the last five years.

BVPS Unit 1 LER 00-004, "Inadvertent ESF Actuation Due to Loss of Power to 4kv Emergency Bus."

BVPS Unit 2 LER 00-001, "ESF Actuation of Feedwater Isolation While Shutting the Plant Down for Refueling."

# ATTACHMENT

## Beaver Valley Power Station, Unit No. 2 License Event Report 2003-001-00

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### 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/Corrective Actions, at Beaver Valley on (724) 682-5284 of any questions regarding this document or associated regulatory commitments.

#### **Commitment**

#### **Due Date**

A design change has been initiated to install cover plates on the grating at the MSIVs to provide physical protection of the rupture disks for the MSIV actuators.

As tracked through the Corrective Action Program.