

**Duquesne Light Company**

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April 21, 1997  
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*Beaver Valley Power Station, Unit No. 1  
Docket No. 50-334 License No. DPR-66  
LER 97-006-00*

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 97-006-00, 10 CFR 50.73(a)(2)(i), "Failure to Test Solid State Protection System Logic in Accordance with Technical Specifications."



R. L. LeGrand

Attachment

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PDR ADOCK 05000334  
S PDR

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IE221

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.8 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

**LICENSEE EVENT REPORT (LER)**

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

FACILITY NAME (1) Beaver Valley Power Station Unit 1										DOCKET NUMBER (2) 05000334		PAGE (3) 1 OF 4		
TITLE Failure to Test Solid State Protection System Logic in Accordance with Technical Specifications														
EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME		DOCKET NUMBER			
03	22	97	97	006	00	04	21	97	Beaver Valley Power Station Unit 2		05000412			
OPERATING MODE (9)		Units 1&2	20.402(b)			20.405(c)			50.73(a)(2)(iv)		73.71(b)			
POWER LEVEL (10)		Units 1&2	20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)		73.71(c)			
		0%	20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)		OTHER			
			20.405(a)(1)(iii)			X 50.73(a)(2)(i)			50.73(a)(2)(viii)(A)		(Specify in abstract below and in Text NRC Form 366A)			
			20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)					
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)					
LICENSEE CONTACT FOR THIS LER (12)														
NAME R. L. LeGrand, Vice President Nuclear Operations and Plant Manager										TELEPHONE NUMBER (include Area Code) (412) 393-7622				
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)														
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS				
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (if yes, complete EXPECTED SUBMISSION DATE)					X NO									
ABSTRACT (Limited to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)														
<p>On March 22, 1997, at 0700 hours, at Beaver Valley Power Station (BVPS), during a review of Unit 1 Solid State Protection System (SSPS) testing related to the Safety Injection (SI) function, it was determined that certain Engineered Safety Features Actuation System (ESFAS) Instrumentation and certain Reactor Trip System (RTS) Instrumentation were not being tested in accordance with the requirements of Technical Specifications (TS). Specifically, the following functions were not being adequately tested: (1) the reactor coolant system loop stop valve interlocks with (a) the low steam pressure safety injection function and with (b) the low-low steam generator (S/G) level reactor trip; (2) the SSPS logic circuitry for the ESFAS P-4 interlock (reactor trip status) logic for both the SI Reset/Auto Block and Feedwater Isolation (partial) functions. Furthermore, the review determined that the identical TS surveillance deficiencies existed at Unit 2. Both Units were in Mode 5 at the time the event was discovered, with no applicable Limiting Condition for Operation.</p> <p>This event is reportable pursuant to the requirements of 10 CFR 50.73(a)(2)(i) as an operation or condition prohibited by Technical Specifications. There were no automatically or manually initiated safety system responses as a result of this event.</p> <p>The apparent cause of this event at both Units was procedural deficiencies.</p> <p>Surveillance testing was performed on March 24, 1997, at Unit 1, and on March 27, 1997, at Unit 2, while both Units were still in Mode 5. This testing demonstrated that the ESFAS Instrumentation and the RTS Instrumentation channels involved had remained capable of performing their design function.</p> <p>Based upon the above information, there were no safety implications to the health and safety of the public.</p>														

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

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

**PLANT AND SYSTEM VERIFICATION**

Westinghouse Pressurized Water Reactor (PWR)

Solid State Protection System {JE}

Reactor Protection System {JC}

\* Energy Industry Identification System (EIIS), system and component function identifier codes appear in the text as (SS/CCC).

**CONDITION PRIOR TO OCCURRENCE**

Unit 1: Mode 5, 0% Reactor Power

Unit 2: Mode 5, 0% Reactor Power

**DESCRIPTION OF EVENT**

On March 22, 1997, at 0700 hours, at Beaver Valley Power Station (BVPS), during a review of Unit 1 Solid State Protection System (SSPS) testing related to the Safety Injection (SI) function, it was determined that certain Engineered Safety Features Actuation System (ESFAS) Instrumentation {JE} and certain Reactor Trip System (RTS) Instrumentation {JC} were not being tested in accordance with the requirements of Technical Specifications (TS). Specifically, the following functions were not being adequately tested: (1) the reactor coolant system loop stop valve interlocks with (a) the low steam pressure safety injection function and with (b) the low-low steam generator (S/G) level reactor trip; (2) the SSPS logic circuitry for the ESFAS P-4 interlock (reactor trip status) logic for both the SI Reset/Auto Block and Feedwater Isolation (partial) functions. Furthermore, the review determined that the identical TS surveillance deficiencies existed at Unit 2. Since both Units were in Mode 5, no immediate Limiting Condition for Operation (LCO) action statements were applicable.

There were no automatically or manually initiated safety system responses as a result of this event.

**CAUSE OF EVENT**

The apparent cause of this event at both Units was procedural deficiencies. In the development of the surveillance test procedures for the Solid State Protection System (SSPS), Duquesne Light Company (DLC) incorrectly assumed that the identified logic circuitry was included in the semi-automatic test features of the original SSPS design as supplied by Westinghouse.

**ANALYSIS OF EVENT**

The Unit 1 review of the SSPS logic testing related to the SI function found the RCS loop stop valve position block signal, which is input to the SSPS logic, was not being tested as part of the appropriate Technical Specification Surveillance Requirements (TSSRs).

First, at Unit 1 the CHANNEL FUNCTIONAL TEST of the ESFAS Instrumentation functions "Safety Injection and Feedwater Isolation" on Automatic Actuation Logic (TSSR 4.3.2.1.1, Table 4.3-2, Item 1b) and "Steam Line Isolation" on Automatic Actuation Logic (TSSR 4.3.2.1.1, Table 4.3-2, Item 4b) did not include the testing of the RCS loop stop valve position block signal. The Automatic Actuation Logic for both the functions on steamline pressure low includes the same three logic inputs: 1) steamline pressure, 2) the P-11 interlock (pressurizer pressure) and 3) the RCS loop stop valve position block signal, from which the same logic output for both functions is developed. The bimonthly testing of these functions, in surveillance test procedure 1MSP-1.04-I for SSPS Train A and in 1MSP-1.05-I for SSPS Train B, therefore, was inadequate in that it failed to completely test the channel logic and thereby failed to adequately demonstrate the OPERABILITY of these ESFAS channel functions in accordance with the



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TSSRs. Second, the Unit 1 CHANNEL FUNCTIONAL TEST for the RTS Instrumentation function "Automatic Trip Logic" (TSSR 4.3.1.1.1, Table 4.3-1, Item 22) did not include the testing of the RCS loop stop valve position block signal. The automatic reactor trip function on steam generator (S/G) low-low water level includes two logic inputs: S/G water level and the RCS loop stop valve position block signal from which the logic output is developed. The bimonthly testing of this function, in 1MSP-1.04-I for SSPS Train A and in 1MSP-1.05-I for SSPS Train B, therefore, was inadequate in that it failed to completely test the channel logic and thereby failed to adequately demonstrate the OPERABILITY of the RTS channel function in accordance with the TSSR.

The review found the corresponding Unit 2 TSSR functions were inadequately tested by the corresponding Unit 2 surveillance procedures, in that the RCS loop stop valve position block signals were not tested during the bimonthly CHANNEL FUNCTIONAL TESTS. Therefore, OPERABILITY of the Unit 2 ESFAS Instrumentation Functions "Safety Injection and Feedwater Isolation" on Automatic Actuation Logic and Actuation Relays (TSSR 4.3.2.1.1, Table 4.3-2, Item 1b) and "Steam Line Isolation" on Automatic Actuation Logic and Actuation Relays (TSSR 4.3.2.1.1, Table 4.3-2, Item 4b) from steamline pressure low was not adequately demonstrated during the performance of 2MSP-1.04-I for SSPS Train A and 2MSP-1.05-I for SSPS Train B. Also, OPERABILITY of the Unit 2 RTS Instrumentation function "Automatic Trip Logic" (TSSR 4.3.1.1.1, Table 4.3-1, Item 22) on S/G water level low-low was not adequately demonstrated during the performance of 2MSP-1.04-I for SSPS Train A and 2MSP-1.05-I for SSPS Train B.

The Unit 1 review of the SSPS logic testing related to the SI function also identified a diode in the SSPS logic circuitry for the ESFAS P-4 interlock logic for both the SI Reset/Auto Block and the Feedwater Isolation (partial) functions was not tested. The Feedwater Isolation (partial) function involves closing the main feedwater valves on low Tavg with P-4 indicating the reactor tripped. A failure mode of this diode (i.e., open circuit) would result in an INOPERABLE P-4 signal to the SSPS logic for these functions. The bimonthly testing performed to satisfy TSSR 4.3.2.1.2, which requires the logic for the ESFAS interlocks to be demonstrated operable during the at power CHANNEL FUNCTIONAL TEST of channels affected by interlock operation would not detect this failure mode and would incorrectly conclude the interlock logic was OPERABLE. Therefore, the bimonthly surveillances for this TSSR performed in 1MSP-1.04-I for SSPS Train A, and in 1MSP-1.05-I for SSPS Train B, were inadequate to demonstrate the operability of the ESFAS interlock logic related to the SI Reset/Auto Block and Feedwater Isolation (partial) functions.

The Unit 2 bimonthly testing performed to satisfy TSSR 4.3.2.1.2 for the ESFAS P-4 interlock logic affecting the CHANNEL FUNCTIONAL TEST for both the SI Reset/Auto Block and the Feedwater Isolation (partial) functions were inadequate for the same reasons as noted above for Unit 1. The applicable Unit 2 procedures are 2MSP-1.04-I for SSPS Train A and 2MSP-1.05-I for SSPS Train B.

**CORRECTIVE ACTIONS****Immediate Corrective Actions:**

Surveillance testing was performed on March 24, 1997, at Unit 1, and on March 27, 1997 at Unit 2, while both Units were still in Mode 5. This testing demonstrated that the ESFAS Instrumentation and the RTS Instrumentation channels involved had remained capable of performing their design function.

**Follow-Up Corrective Actions:**

1. The Maintenance Surveillance Procedures for Unit 1 (1MSP-1.04-I and 1MSP-1.05-I) were revised on April 14, 1997, and April 15, 1997, respectively, to correct the procedure deficiencies.
2. The Maintenance Surveillance Procedures for Unit 2 (2MSP-1.04-I and 2MSP-1.05-I) were revised on April 10, 1997, to correct the procedure deficiencies.

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3. In order to assess the potential generic implications and the extent of condition stemming from the identified test deficiencies, a further evaluation of the semi-automatic test features of the solid state protection system will be performed as a part of the ongoing Generic Letter 96-01 review. This additional review will be performed to ensure that testing of logic circuitry credited to the SSPS semi-automatic test features is adequately addressed. The schedule for this corrective action will be coincident with the Generic Letter responses for the respective Units.

**REPORTABILITY**

This event is reportable pursuant to the requirements of 10CFR50.73(a)(2)(i). as "any operation or condition prohibited by the plant's Technical Specifications."

**SAFETY IMPLICATIONS**

Surveillance testing was performed on March 24, 1997, at Unit 1, and on March 27, 1997 at Unit 2, while both Units were still in Mode 5. This testing demonstrated that the ESFAS Instrumentation and the RTS Instrumentation channels involved had remained capable of performing their design function. Based upon this information, there were no safety implications to the health and safety of the public.

**SIMILAR EVENTS**

A review of Licensee Event Reports for the past two years identified the following similar events:

1. LER 1-95-009-00, "ASME Valves Not Tested within Technical Specification Surveillance Interval," December 6, 1995.
2. LER 1-95-011-00, "Condition Prohibited by Technical Specifications - Missed Source Range Surveillance," January 18, 1996.
3. LER 2-95-005-00, "Missed Surveillance - Quadrant Power Tilt Ratio Calculation Not Performed," September 1, 1995.
4. LER 2-96-009-00, "Missed Technical Specification Surveillance Test - Quadrant Power Tilt Ratio Manual Calculation," January 20, 1997.