

## LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (INBB 7714) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001 AND TO THE PAPERWORK REDUCTION PROJECT (2150-0104) OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

FACILITY NAME (1)

Beaver Valley Power Station Unit 1

DOCKET NUMBER (2)

05000334

PAGE (3)

1 OF 6

Generic Letter 96-01 Incorrect Testing of Safety-Related Logic Circuits

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
06	18	96	96	004	02	08	06	96	Beaver Valley P.S. Unit 2	05000412
									FACILITY NAME	DOCKET NUMBER
									N/A	
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)							
			20.402(b)			20.405(c)			50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		100	20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)	73.71(c)
			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)(ii)			50.73(a)(2)(viii)(A)	(Specify in abstract below and in text)
			20.405(a)(1)(iv)			50.73(a)(2)(iii)			50.73(a)(2)(viii)(B)	
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)	NRC Form 366(A)

LICENSEE CONTACT FOR THIS LER (12)

NAME

T. P. Noonan, Vice-President Nuclear Operations/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 NPDs	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs

SUPPLEMENTAL REPORT EXPECTED (14)

X YES (if yes, complete EXPECTED SUBMISSION DATE)		NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
				08	06	96

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

As a result of reviews being performed in response to Generic Letter 96-01, "Testing of Safety Related Logic Circuits", the following condition(s) has (have) been discovered and determined to be reportable under 10 CFR 50.73 (a)(2)(i)(B):

1. On March 25, 1996, with Unit 1 in Mode 5, it was found that relays LRL-LS100C and 100D were being tested once per 18 months. The proper test frequency has been determined to be monthly as part of the Channel Functional Test required by FS Table 4.3.2 item 1.1.d. The function of these relays is described in Page 2 of this report.
2. On June 8, 1996, as a result of a Unit 2 review of Solid State Protection System (SSPS) interposing relays (LER 2-96-003), it was discovered that relays SDX7A1, SDX7A2, SDX7B1, and SDX7B2 were not adequately tested. Previous reviews performed did not reveal this condition. The deficient surveillance tests were revised and the affected circuits were satisfactorily tested on June 9, 1996. The details of this condition are found on Pages 3 & 4 of this report.
3. On June 18, 1996, as a result of an investigation of SSPS latching relay replacement contacts, it was discovered that slave relays K630A and K630B were not adequately tested. Previous reviews performed did not reveal this condition. The deficient surveillance test procedure was revised and the affected circuits will be tested prior to September 30, 1996. The details of this condition are found on Pages 5 and 6 of this report.

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 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.

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Beaver Valley Power Station Unit 1		05000334		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 6
				96	004	02	

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

**DESCRIPTION OF EVENT**

On March 25, 1996 with Unit 1 in Mode 5 cooling down for the eleventh refueling outage, it was determined that relays LRL-100C & 100D were not being tested at the appropriate frequency. This was discovered as a result of reviews being performed in response to Generic Letter 96-1. These relays de-energize and close the Quench Spray Pump Flow Cutback Control valves when the Refueling Water Storage Tank (RWST) reaches a level of 8'6" during a Loss of Coolant Accident (LOCA). These flow control valves are normally open and permit full flow following a LOCA until the Containment is sub atmospheric. When the RWST reaches a level of 8'6" the flow control valves will close and the Quench Spray flow will be throttled to approximately 1,000 gpm. These relays are currently being tested on an eighteen month frequency per an operations surveillance test. It has been determined that they should be tested as part of the monthly Channel Function Test per Technical Specification Table 4.3.2 Item 1.1.d, Engineered Safety Feature Actuation System Instrumentation.

**CAUSE OF EVENT**

These relays were not considered to be part of the instrument channel and therefore not required to be tested as part of the monthly Channel Functional Test.

**REPORTABILITY**

This condition is being reported as a condition prohibited by the Plant Technical Specifications in accordance with 10CFR50.73(a)(2)(i)(B) due to relays LRL-100C & 100D not being tested at the proper frequency.

**SAFETY IMPLICATIONS**

The Flow Cutback Control valves provide reduced flow for sub atmospheric peak pressure control. A failure of the relays would result in these valves remaining open and full flow going through the Quench Spray system. The Emergency Operating Procedures contain a continuous action step to verify these valves close when a low level alarm is received. If the valves do not automatically close the operator is instructed to manually close them. If they still do not close the operator is instructed to shut off all but one pump. A review of recent operational surveillance tests showed no problems or failures associated with these relays. Therefore, there are no safety implications as a result of not testing these relays at the proper frequency.

**CORRECTIVE ACTIONS**

1. Maintenance and Operations procedures will be changed to include the performance of relay testing for LRL-QS100C and D as part of the monthly Channel Functional Test.
2. These relays will be tested prior to entering Mode 4 during the heat-up of Unit 1.
3. A review of Unit 2 revealed that there is no similar relay arrangement for this application.
4. The review of safety related logic will continue in compliance with Generic Letter 96-01. Should additional reportable conditions be discovered, an LER revision will be submitted.

**PREVIOUS SIMILAR EVENTS**

No recent previous similar events were found.

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

**PLANT AND SYSTEM IDENTIFICATION**

Westinghouse - Pressurized Water Reactor.

Solid State Protection System/Relay (JG/RLY CTR) \*

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

**IDENTIFICATION OF OCCURRENCE**

Event Date: June 6, 1996

Evaluation of this event extended from June 4, 1996 to June 9, 1996.

Date Determined to be Reportable: June 6, 1996

**CONDITION PRIOR TO OCCURRENCE**

Unit 1: Mode 1, 100% Reactor Power

Unit 2: Mode 1, 100% Reactor Power

**DESCRIPTION OF EVENT**

On June 4, 1996, a review of the Unit 1 reactor trip (LER 1-96-008) had initiated a physical and electrical review of the Unit 1 turbine trip circuits. As a result of the discovery of test lights installed in parallel with a turbine trip and two other solenoid coils, the review was expanded to include Unit 2 turbine trip circuitry. This review revealed several design differences between the two unit's turbine trip logic circuitry. Based on this, a review of the surveillance tests for each unit was initiated. The Unit 2 findings are covered in LER 2-96-003.

As a result of this discovery, a review of SSPS slave relay circuits was undertaken in order to determine if there was a generic testing deficiency of interposing relays actuated from SSPS slave relays. Several slave relay circuits were reviewed. Each review consisted of three steps. First, each circuit was reviewed to identify all relays, starting with the solid state protection system relay and ending with the final actuating device. Then, a licensing review was performed on each of these packages to identify relays which perform a safety related function required by Technical Specifications and the UFSAR. Third, station surveillance procedures were reviewed to determine if each of the safety related Technical Specifications or UFSAR required relays was tested per surveillance procedures.

On June 8, 1996, it was determined that Unit 1 interposing relays, SDX7A1, SDX7A2, SDX7B1, SDX7B2 were not adequately tested. These relays implement the P-12 interlock. Interposing relays are normally installed to provide a Q-Class break on safety-related logic. The Unit 1 surveillance tests were revised and these relays were satisfactorily tested on June 9, 1996. Subsequent evaluations revealed that this contact logic for the P-12 interlock has not been included in surveillance testing for either Unit 1 or Unit 2. The purpose of this interlock is to automatically reinstate a block of the non-safety related steam dump valves when Tavg is less than or equal to 541°F.

**CAUSE OF EVENT**

The cause of this event is attributed to inadequate reviews performed previously to assess the adequacy of safety related logic testing at Beaver Valley. These reviews failed to identify the inadequate testing of interposing relays.

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## TEXT CONTINUATION

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

**CORRECTIVE ACTIONS**

1. A review of applicability to both units was performed. The results of the Unit 2 review can be found in LER 2-96-003.
2. Procedure IOM-51.4.C was revised and the contact functions for the P-12 permissive and train B turbine trip, due to steam generator hi-hi level or safety injection initiation, were tested satisfactorily.
3. In accordance with the Duquesne Light Company response to Generic Letter 96-01 entitled "Testing of Safety-Related Logic Circuits", a comprehensive validation of surveillance procedures with regard to satisfying logic testing requirements of safety related logic circuits will be performed. These reviews will be completed as specified in our response to Generic Letter 96-01.

**REPORTABILITY**

This event is reportable in accordance with 10 CFR 50.73(a) (2) (i) (B), as a condition prohibited by Technical Specifications. As described in our letter NPD1VPO:0465, dated April 23, 1996, updates to this LER will be provided during the reviews of Generic Letter 96-01 upon discovery of reportable deficiencies.

**SAFETY IMPLICATIONS**

The trip function was found to have been operable. Additionally, should an expected automatic actuation not occur, operators are instructed by procedures to perform the actions manually.

A review of the UFSAR was performed and it was concluded that a failure to test the P-12 permissive does not prevent the fulfillment of actions of systems, structures or components necessary to shutdown and maintain a safe shutdown. The Unit 1 UFSAR Section 14.1.7, "Loss of External Electrical Load and/or Turbine Trip", bounds the failure of the non-safety related steam dump system to arm. As part of the post-trip reviews, the P-12 function has been verified following each reactor trip. The UFSAR Section 14.1.13, "Accidental Depressurization of the Main Steam System", bounds the case where the steam dump system armed prematurely and a steam dump valve inadvertently opened.

Based on the above, the health and safety of the public were not affected.

**SIMILAR EVENTS**

There is one similar event during the last two years regarding inadequate testing of safety related logic. This event is covered under the following report:

LER 1-96-006, "Inadequate Testing of Safety Injection Relays".

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Beaver Valley Power Station Unit 1	05000334	96	004	02	5 OF 6

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

**PLANT AND SYSTEM IDENTIFICATION**

Westinghouse - Pressurized Water Reactor.

Solid State Protection System/Relay {JG/RLY CTR}\*

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

**IDENTIFICATION OF OCCURRENCE**

Event Date: June 18, 1996

Date Determined to be Reportable: July 10, 1996

**CONDITION PRIOR TO OCCURRENCE**

Unit 1: Mode 1, 100% Reactor Power

Unit 2: Mode 1, 100% Reactor Power

**DESCRIPTION OF EVENT**

While investigating a problem with Solid State Protection System (SSPS) latching-type slave relay replacement contacts on June 18, 1996, it was discovered that surveillance procedure number 1/2 OST-44A.15 did not adequately test SSPS slave relays K630A and B. These relays provide an initiating signal to the Control Room Emergency Bottled Air Pressurization System (CREBAPS) under the following logical condition: chlorine is detected in the Unit 1 control room supply ventilation system and the CREBAPS system is powered from Unit 2. Under these conditions, the system is designed to maintain a CREBAPS initiation signal upon detection of chlorine by means of the mechanical latch-in feature of the K630 relays. The CREBAPS is used to pressurize the Unit 1 and 2 main control area for one hour after a design basis accident to protect control room personnel from radioactive or hazardous inleakage. The test procedure directs the performer to depress the actuation push-button for two to three seconds, and verify that CREBAPS header air pressure decreases. The pressure decrease was considered sufficient to verify that the slave relays had latched. Subsequent review has shown that a pressure decrease will occur just due to the manual actuation, thus not verifying the functionality of the K630 mechanical latch.

The procedures for testing the other possible combinations of CREBAPS power supplies and chlorine initiating signals were reviewed to determine if similar testing deficiencies existed. None were found.

Upon discovery of this deficiency, the CREBAPS power switch was placed in the Unit 1 position and a caution tag was placed on the switch to prevent the operator from inadvertently switching to the Unit 2 position. The surveillance test was revised, and the CREBAPS power switch will remain in the Unit 1 position until the revised 1/2 OST-44A.15 is performed during the upcoming Unit 2 outage. This will be completed by September 30, 1996.

**CAUSE OF EVENT**

The cause of this event is attributed to inadequate reviews performed in the past to assess the adequacy of safety related logic testing. These reviews failed to identify the need to include mechanical latch integrity as part of the safety related logic test procedures.



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**CORRECTIVE ACTIONS**

1. Upon discovery of this deficiency, the CREBAPS power switch was placed in the Unit 1 position and a caution tag was placed on the switch to prevent the operator from inadvertently switching to the Unit 2 position.
2. Surveillance test 1/2 OST-44A.15 was revised to verify mechanical latching of the K630A and B relays. This is accomplished by providing a short duration latching signal early in the test, and later verifying that the trip valve will reopen. Previously, testing relied upon header pressure drop which does not prove mechanical latching of the K630 relays. The CREBAPS mode switch will remain in the Unit 1 position until the revised 1/2 OST-44A.15 is performed during the upcoming Unit 2 outage. This will be completed by September 30, 1996.
3. In accordance with the Duquesne Light Company response to Generic Letter 96-01 entitled "Testing of Safety-Related Logic Circuits", a comprehensive validation of surveillance procedures with regard to satisfying logic testing requirements of safety related logic circuits is being performed. These reviews will be completed as specified in our response to Generic Letter 96-01.

**REPORTABILITY**

This event is reportable in accordance with 10 CFR 50.73(a) (2) (i) (B), as a condition prohibited by Technical Specifications. Unit 1 Technical Specification 4.7.7.2 and Unit 2 Technical Specification 4.7.7.1 require that it be shown every 18 months that a chlorine test signal from either unit will initiate CREBAPS operation. As discussed in the Unit 1 UFSAR (Section 9.13.4) and the Unit 2 UFSAR (Section 9.4.1.2.1), CREBAPS operation includes pressurization of the Unit 1 and Unit 2 main control area for one hour.

As described in our letter NPDIVPO:0465, dated April 23, 1996, updates to this LER will be provided during the reviews of Generic Letter 96-01 upon discovery of reportable deficiencies.

**SAFETY IMPLICATIONS**

On a chlorine initiation signal from either Unit 1 or 2, all the series isolation ventilation dampers which isolate the combined control room from the outside atmosphere will go closed. They will remain in that position until a seal-in signal is manually reset. Under the assumption that the CREBAPS initiation signal is not sealed-in, the CREBAPS might initiate for a short period of time, and then shutdown. This would occur because the closure of the isolation ventilation dampers would reduce chlorine concentrations in the ventilation supply, where the chlorine detectors are located. The shutdown of the CREBAPS would, however, be noted by control room operators. They would then initiate the CREBAPS manually. The isolation of the control room from the outside atmosphere and the manual initiation of the CREBAPS would be in accordance with the Unit 1 and Unit 2 design bases, which are to maintain control room habitability to either allow continued safe operation, or to proceed through and maintain a safe shutdown. The CREBAPS is normally powered from Unit 1, which does not depend upon these latching relays for seal-in.

Based on the above, the health and safety of the public were not affected.

**SIMILAR EVENTS**

There is one similar event during the last two years regarding inadequate testing of safety related logic. This event is covered under the following report:

LER 1-96-006, "Inadequate Testing of Safety Injection Relays".