Duquesne Light

Nuclear Group
P.O. Box 4
Shippingport, PA 15077-0004

Telephone (412) 393-6000

September 11, 1992
ND3MNO:3349

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

LER 91-010-01

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

Gentlemen:

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

LER 91-001-01, 10 CFR 50.73.a.2.iv, "Inadvertent ESF Actuation of Safety Injection Valve During Surveillance Testing".

Very truly yours,

T. P. Noonan
General Manager
Nuclear Operations

DAW/jd

w/Attachment

IE22

cc: Mr. T. T. Martin, Regional Administrator
United States Nuclear Regulatory Commission
Region 1
475 Allendale Road
King of Prussia, PA 19406

C. A. Roteck, Ohio Edison
76 S. Main Street
Akron, OH 44308

Mr. A. DeAgazio, BVPS Licensing Project Manager
United States Nuclear Regulatory Commission
Washington, DC 20555

Larry Rossbach, Nuclear Regulatory Commission,
BVPS Senior Resident Inspector

Larry Beck
Centerior Energy
6200 Oak Tree Blvd.
Independence, Ohio 44101-4661

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, GA 30339

G. E. Muckle,
Factory Mutual Engineering
680 Anderson Drive #BLD10
Pittsburgh, PA 15220-2773

Mr. Richard Janati
Department of Environmental Resources
P. O. Box 2063
16th Floor, Fulton Building
Harrisburg, PA 17120

Director, Safety Evaluation & Control
Virginia Electric & Power Co.
P.O. Box 26666
One James River Plaza
Richmond, VA 23261

W. Hartley
Virginia Power Company
5000 Dominion Blvd.
2SW Glenn Allen, VA 23060

J. M. Riddle
Halliburton NUS
Foster Plaza 7
661 Anderson Drive
Pittsburgh, PA 15220

Bill Wegner, Consultant
23 Woodlawn Terrace
Fredricksburg, VA 22404

NRC FORM 366 (5-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Beaver Valley Power Station Unit 1	0 5 0 0 0 3 3 4	1 OF 0 4

TITLE (4)
Inadvertent ESF Actuation of Safety Injection Valve During Surveillance Testing

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 NAMES	DOCKET NUMBER(S)
0 4	0 5	9 1	9 1	0 1 0	0 1	0 9	1 1	9 2	N/A	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		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 (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		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	TELEPHONE NUMBER
T.P. Noonan, General Manager Nuclear Operations	AREA CODE 4 1 2 6 4 3 - 1 2 5 8

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	
X	J G	6 8	W 1 2 0	N							

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

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

On 4/5/91, operators were performing OST 1.1.12 (Safeguards Protection System Train B Test). At 1923 hours an unanticipated closure of Train B Low Head Safety Injection Pump minimum flow line isolation valve, MOV-SI-885B, occurred. Operators terminated the test at 2019 hours and manually opened MOV-SI-885B from the control board. Instrumentation and Control Technicians investigated this event and determined that contact pair 3-4 of Solid State Protection System relay K641B had failed, allowing current to pass while the contacts were supposed to be open. Failure of this contact pair caused valve MOV-SI-885B to close. Technicians then replaced contact pair 3-4 in relay K641B. This failure only affected Train B Low Head Safety Injection Pump recirculation capability. The pump would have been fully capable of performing its design function in the event of a large break LOCA where recirculation flow is not required. The Train A System was operable throughout the event. The failure of one train of safety injection is bounded by analysis in Beaver Valley's UFSAR Section 6.3.1.2, "ECCS Single Failure Criterion Compliance".

DESCRIPTION OF EVENT

On 4/5/91 operators were performing monthly OST 1.1.12 (Safeguards Protection System Train B Test). This test verifies the operability of the Train B Solid State Protection System (SSPS) actuation circuitry by inputting test signals into the SSPS and observing relay actuations. Actual safeguard component actuations are inhibited during the test through the use of designed blocking features.

Continuous communication between the control room and the operators performing the test was established. The first relay tested in the procedure is the Main Feedwater Isolation and Safety Injection Automatic Transfer Relay (K642B). Per the procedure, the operators inputted a test signal to energize relay K642B. At 1923 hours, the Train B Low Head Safety Injection (LHSI) Pump minimum flow line isolation valve MOV-SI-885B closed. The operators immediately stopped the test to evaluate this unanticipated actuation. Aside from inputting this one test signal, no other manipulations had been performed on the SSPS circuitry.

A review of station prints showed that the safety injection relay K642B initiated a close signal to MOV-SI-885B. This signal should have been blocked by the open contact pair 3-4 of the Refueling Water Storage Tank (RWST) Low Level relay K641B (Westinghouse Model AR440AR). This relay is de-energized as long as normal level is maintained in the RWST. Prior to the start of the test the operators verified that there was normal level in the RWST. This meant that relay K641B should have been de-energized, and its contact pair 3-4 open. After the actuation, I&C technicians verified the condition of relay K641B by measuring the voltage across all of the contact pairs. The technicians found only a 56 VAC potential across contact pair 3-4 while all of the other contact pairs had a full 120 VAC across them. This indicated that relay K641B was deenergized and contact pair 3-4 was not fully open.

At 2007 hours, the operators reset relay K642B and terminated OST 1.1.12. At 2019 hours, the operators manually opened MOV-SI-885B and at 2038 hours it was de-energized. The valve was declared inoperable due to the failed contact pair 3-4 of relay K641B. The components that receive actuation signals from the other contacts of relay K641B were not considered inoperable, based on the satisfactory voltage test results across those contacts.

MOV-SI-885B is normally open during operation and is designed to remain open during the early stages of an accident to provide minimum flow protection for the B LHSI pump. In later stages, the valve will automatically close. The automatic closure signal is generated from a safety injection signal coincident with a low Refueling Water Storage Tank level. The Refueling Water Storage Tank serves as the initial supply of water for safety injection.

CAUSE OF EVENT

This event was caused by the failed contact pair 3-4 of relay K641B. Even though the relay was later verified to be de-energized, its normally open 3-4 contacts were not fully open and allowed current to pass.

CORRECTIVE ACTIONS

1) I&C removed and inspected the 3-4 contact set. No cause for the failure was evident. No evidence of arcing (contact burning or pitting) was noted. The contacts were free-moving and did not bind or hang up during the inspection. In order to assure contact reliability, the contact set was replaced with a qualified spare set. The relay was then retested and MOV-SI-885B was returned to service at 0545 hours on 4/6/91.

2) An engineering evaluation of relay K641B and its "as-installed" application was initiated 10/31/90 due to a previous similar occurrence. The evaluation was completed and no abnormalities were noted. The relay was replaced during our eighth refueling outage at which time the suspect relay was thoroughly inspected by the I&C and relay departments. See Corrective Action #5 for the results of this inspection.

3) A temporary log was implemented to verify the voltage across contact pair 3-4 (once per shift). This was done to ensure a spurious closure of contact pair 3-4 would be detected within eight hours. The temporary log was discontinued when the unit entered its eighth refueling outage and SSPS was no longer required to be operational.

4) The OST was repeated several times (with a recorder across the coils of relay K641B) in an attempt to duplicate the failure. The failure did not repeat and the recorder did not pick up anything abnormal. The OST was performed successfully each month from 10/90 until this performance on 4/5/91.

5) During the eighth refueling outage a new relay was installed and the failed unit was turned over to the relay group. The failed relay passed satisfactorily through extensive testing and the failure mode could not be duplicated. Also, the newly installed relay was cycled several times via repeated performances of the OST prior to starting up after the refueling outage without incident.

6) Following an evaluation by the Independent Safety Evaluation Group (ISEG), a wiring check of MOV-SI-865B and MOV-SI-863B will be performed to verify their circuit integrity. Also, all MOV control circuits operated by relays K641B and K642B will be meggered at 100 volts with respect to ground and each other. A trouble shooting procedure (to be performed in either Mode 5 or 6) has been developed and is scheduled to be performed during the next refueling outage in April 1993.

PREVIOUS SIMILAR EVENTS

On 10/28/85 the 3-4 contacts of relay K641B apparently failed to fully open after testing. During this event, 54 VAC were measured across the contact pair instead of the full 120 VAC. Upon investigation the condition cleared and could not be reproduced. No further corrective actions were taken at that time.

A review of Licensee Event Reports (LER) shows that on 10/24/90, during the performance of OST 1.1.12, contact pair 3-4 of relay K641B failed causing the actuation of MOV-SI-885B. LER 1-90-016 was written to document the inadvertent ESF actuation. The 3-4 contact set was removed and throughly inspected with no cause of failure being evident. The failed set was replaced with a qualified spare set.

The NPRDS database was reviewed for failures of model AR440AR relays. No failures similar to the one described in this event were identified.

SAFETY EVALUATION

There were no safety implications due to this event. The failure of this relay affected only one train of the Safety Injection System. A failure in only one train is bounded by analysis in Beaver Valley's UFSAR Section 6.3.1.2, "ECCS Single Failure Criterion Compliance."