

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

Telephone (412) 393-6000

April 27, 1992
ND3MNO:3291

Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
LER 91-026-01

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 91-026-01, 10 CFR 50.73.a.2.i.B, "Potentially Inoperable Charging Pump Due to Missing Nuts on High Speed Coupling."

Very truly yours,

T. P. Noonan
General Manager
Nuclear Operations

JGT/sl

Attachment

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PDR ADOCK 05000334
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JEH

April 27, 1992

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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

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Bill Wegner, Consultant
23 Woodlawn Terrace
Fredericksburg, VA 22404

LICENSEE EVENT REPORT (LER)

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 (3190-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

FACILITY NAME (1)
Beaver Valley Power Station Unit 1

DOCKET NUMBER (2)
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PAGE (3)

TITLE (4)
Potentially Inoperable Charging Pump Due to Missing Nuts on High Speed Coupling

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)
09	09	91	91	026	01	04	27	92	N/A	0 5 0 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5 (Check one or more of the following) (11)									
POWER LEVEL (10) 1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(vi)	73.71(b)							
	20.405(a)(1)(i)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)							
	20.405(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)							
	20.405(a)(1)(iii)	X 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)(ix)								

NAME
T.P. Noonan, General Manager Nuclear Operations
LICENSEE CONTACT FOR THIS LER (12)
TELEPHONE NUMBER
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	CB	XXX	XXX	N					

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

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

This revision is being submitted to reflect a second engineering evaluation of coupling performance during a seismic event and to revise the root cause of the event.

On 7/26/91, station mechanics were performing preventive maintenance on the "B" charging pump. When the coupling guard was removed, it was noticed that the nuts for the pump side spool piece coupling were not attached to the bolts but were lying in the bottom of the coupling guard. Maintenance had been performed on the pump on 6/28/90 and again on 7/05/90. A review of copies of the maintenance procedures used indicated that the coupling was most likely installed improperly following the first of these maintenance activities. The procedures will be revised to specifically address torquing bolts on both coupling halves. After completing the 7/26/91 maintenance, the nuts were installed on the bolts and torqued to specifications.

On 9/9/91, the initial engineering evaluation concluded, that if the charging pump were running during a seismic event, the coupling should remain intact during the event. If the pump were idle during the earthquake, afterward the coupling might not function if the pump were started. However, on 11/25/91 a subsequent analysis, taking the actual reassembly methods into account, concluded the coupling would remain intact during a seismic event in any operating condition.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-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) Beaver Valley Power Station Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 3 4	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 1	— 0 2 6	— 0 1	0 2	OF 0 5

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

DESCRIPTION OF EVENT

On 7/26/91 station mechanics were performing a lubrication preventive maintenance procedure (PMP-1/2-7CH-P-1A/21A-B-C-1M) on the "B" charging pump. When the coupling guard was removed, they noticed that all ten nuts for the pump side spool piece coupling were not attached to the bolts but were lying in the bottom of the coupling guard. The nuts and bolts on the speed increaser side of the spool piece coupling were in the correct configuration.

On 6/28/90, the speed increaser to pump coupling had been reassembled following maintenance. The procedure instructed that the bolts and nuts be installed hand tight and then the bolts were to be torqued. These actions were signed by maintenance and a Quality Assurance observer. A different maintenance action conducted on the pump 7/5/90, did not involve disassembly of the coupling. Because the nuts were not noted to be off the bolts, it is felt the coupling was improperly installed following the first maintenance activity.

Following discovery on 7/26/91, an engineering evaluation was performed to determine the response of the unbolted charging pump coupling during a seismic event. Both the pump manufacturer and coupling supplier offered the opinion that during operation of the pump the transmission of torque had bound the bolts in the coupling flange holes. On 9/9/91, the evaluation concluded that if the charging pump were running during a seismic event, the coupling should remain intact when an earthquake occurs. A second engineering analysis performed on 11/25/91, indicated that the actual method of coupling reassembly used by station mechanics would place the bolts under stress when the pump was shutdown. As specified in the vendor technical information, the station deliberately introduces a five mil off-set between the pump shaft and speed increaser to allow for thermal growth of the speed increaser during operation. This slight off-set places sufficient initial stress on the bolts to bind them in the coupling during a seismic event. Therefore, the pump coupling would also be expected to remain intact during a seismic event if it had been in standby.

The charging pump was demonstrated functional throughout the period (7/05/90 to 7/26/91) by monthly testing in accordance with technical specification surveillance requirements. Additionally, engineering analyses indicated the pump coupling would remain intact following a seismic event.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-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.

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			0 2 6	0 1	

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

Discussion with station mechanics indicated the coupling bolts are a tight fit and the presence of a bound fit was empirically observed by applying a torque wrench to bolts with their nuts removed on the "A" charging pump. The snug bolt fit on installation led to an initial concern that torque applied to the bolts might not be transmitted to the nuts and might not place the bolt under sufficient tension. Consequently, when proper torque was verified on the other charging pump couplings, torque was verified on the nut end of the fastener.

CAUSE OF THE EVENT

Improper installation of the coupling was due to inadequate work instructions. The procedure to reassemble the speed increaser to pump coupling directed the bolts and nuts be installed hand tight then the bolts were to be torqued. The coupling has a spacer and is bolted on both ends (Figure 1). However, the procedure does not specifically address torquing the bolts on each end of the coupling. This maintenance activity extended over several shifts and it is believed, but could not be verified, that only the bolts on the speed increaser half of the coupling were torqued. This would have resulted in the bolts on the pump half of the coupling being only hand tight and the coupling, as a whole, appearing to be properly assembled.

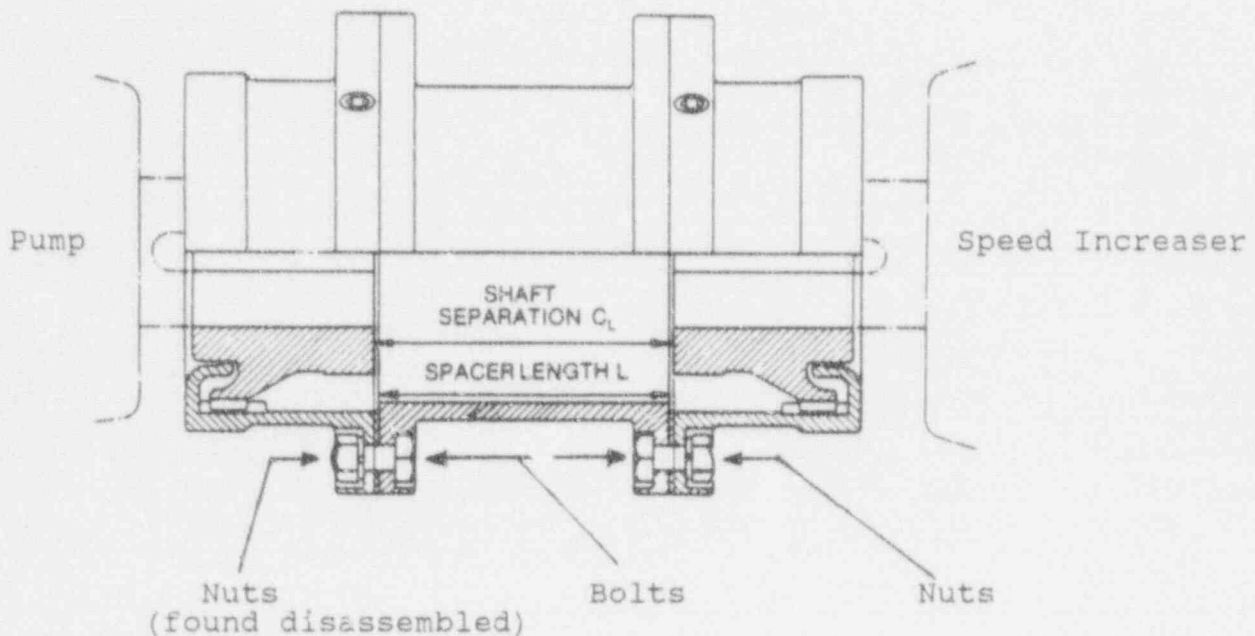


Figure 1

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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		YEAR 9 1	SEQUENTIAL NUMBER - 0 2 6	REVISION NUMBER - 0 1	

TEXT (if more space is required, use additional NRC Form 366A's) (17)

CORRECTIVE ACTIONS

The following corrective actions have been or will be taken as a result of this event:

- 1) Following discovery of this condition and completion of the maintenance action, the nuts were installed on the bolts and torqued to specifications, applying torque to the nuts.
- 2) The other charging pump couplings were inspected and found to be satisfactory. Specified torque was verified on the coupling nuts.
- 3) All maintenance supervisors will review this incident.
- 4) The preventive maintenance procedures will be revised to contain a specific signoff for torquing the bolts on each coupling half.
- 5) The post-maintenance test sheet for the charging pump will be revised to include a step that has the coupling assembly verified as correct by the mechanic.

SIMILAR PREVIOUS EVENTS

There have been no previous similar reportable events.

REPORTABILITY

The initial engineering evaluation questioned the structural integrity of the B charging pump coupling following a seismic event. A written report was submitted in accordance with 10CFR50.73(a)(2)(i)(B) because of the potential inoperability of the "B" charging pump from 7/6/90 through 7/26/91. A subsequent analysis indicated that the mechanical integrity of the charging pump coupling would not be threatened by a seismic event, regardless of whether the pump was operating or not. Therefore, this report was revised and is being submitted voluntarily.

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 RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), 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) Beaver Valley Power Station Unit 1	DOCKET NUMBER (2) 0500033491	LER NUMBER (8)			PAGE (3) 05 OF 05
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		91	026	01	

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

SAFETY IMPLICATIONS

The initial engineering evaluation indicated, if the charging pump was operating during a seismic event, the coupling would remain intact and continue to function. It also concluded that if the pump were not operating, then the coupling might not remain intact. However, a subsequent engineering evaluation considered actual assembly practices and this analysis indicated the coupling should remain intact, even if the pump were shutdown during the seismic event.

Throughout this period, the charging pump passed all its monthly surveillances.

However, should the pump fail, this would constitute failure of a single train of high head safety injection. It should also be noted that except during maintenance activities, a third charging pump is normally available, although operator action would be needed to rack its breaker onto the bus. A review of charging pumps taken out of service from July 1990 through July 1991 revealed a third charging pump was available approximately 76 percent of the time. Additionally, there have been no recorded seismic events at the station during this time period.

Therefore this event has no safety implications.