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ACCESSION NBR: 8710070026 DOC. DATE: 87/10/02 NOTARIZED: NO DOCKET #
FACIL: STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530
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RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-003-00: on 870929, condition identified that, if not corrected, could have resulted in improper operation of two shutdown cooling isolation valves in redundant trains. Caused by vendor error. Bolting replaced. W/871002 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 4
TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: Standardized plant. 05000530

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Palo Verde Unit 3	0 5 0 0 0 5 3 0	1 OF 0 6

TITLE (4) Valve Bolting Nonconformances Could Potentially Result In the Inability of Two Shutdown Cooling System Valves to Perform Their Functions

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 9	2 9	8 7	8 7	0 0 3	0 0	1 0	0 2	8 7	Palo Verde Unit 1	0 5 0 0 0 5 2 8
									Palo Verde Unit 2	0 5 0 0 0 5 2 9

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A) Part 21
		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
	AREA CODE
Thomas R. Bradish, Compliance Supervisor	6 0 2 — 3 9 3 - 3 5 3 1

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

On September 29, 1987, with Unit 3 in Mode 5 (COLD SHUTDOWN), a condition was identified that if left uncorrected, could have resulted in the improper operation of two Unit 3 shutdown cooling isolation valves in redundant trains. This determination resulted from an Engineering Evaluation Request which had been dispositioned to resolve identified valve yoke to motor operator bolting nonconformances.

The root cause of this event has been determined to be vendor error. Two valves supplied to the Arizona Nuclear Power Project (ANPP) did not have the required design changes implemented prior to shipment nor did the vendor provide notification of these changes to ANPP. The cause for the vendor error has not been determined at this time.

As corrective action, the "as-installed" bolting has been replaced with alternative bolting material. An inspection was conducted to ensure that the similar shutdown cooling isolation valves in Units 1 and 2 had adequate design margin and were acceptable for continued operation. The results of the inspection indicate that no modifications are required at this time.

In order to prevent recurrence, a Quality Assurance and an Engineering representative will conduct an evaluation at the vendor's facilities to determine the extent of these deficiencies and the potential for transportability to other valves supplied by that vendor.

IE22
1/1

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

On September 29, 1987, with Unit 3 in Mode 5 (COLD SHUTDOWN), a condition was identified that if left uncorrected, could have resulted in the improper operation of two Unit 3 shutdown cooling isolation valves in redundant trains. This determination resulted from an Engineering Evaluation Request which had been dispositioned to resolve identified valve yoke to motor operator bolting nonconformances.

In June, 1987, with Unit 3 in Mode 5, shutdown cooling isolation valve SI-651 was observed during preventative maintenance to have loose bolting between the motor operator and the valve yoke. An evaluation of the loose bolting determined that the cause may be attributed to system vibration. The bolts were retorqued. Units 1 and 2 were evaluated at this time, based on observation of the valves during previous maintenance activities, to not exhibit this problem.

Subsequent to the Unit 3 bolts being retorqued, the bolts were again found to be loose. Investigation into the cause of the problem revealed that the valve yoke to motor operator bolting for valves SI-651 & SI-652 did not match the vendor drawings or the design report for all three units.

The specified configuration as shown on the current valve outline drawing for valves SI-651 & SI-652 requires eight (8) - 7/8 inch, ASTM A193 Grade B7 (carbon steel), bolts between the adapter plate and the valve operator and sixteen (16) - 7/8 inch, ASTM A193 Grade B8M (stainless steel), bolts between the valve yoke and the adapter plate.

For valves SI-651 & SI-652, the "as-installed" bolting between the valve yoke and adapter plate, and between the adapter plate and the motor operator for each unit is described below:

Unit 1

Yoke to Adapter: Both valves contain sixteen (16) 7/8" stainless steel bolts.

Adapter to Operator: Both valves contain eight (8) 7/8" non-magnetic bolts.

Unit 2

Yoke to Adapter: Both valves contain one (1) circle of eight (8) 7/8" stainless steel bolts and one (1) circle of eight (8) unused 5/8" holes.

Adapter to Operator: Both valves contain eight (8) 7/8" non-magnetic bolts.

Unit 3

Yoke to Adapter: Both valves contain eight (8) 5/8" stainless steel studs with nuts and one (1) circle of eight (8) unused 5/8" holes.

Adapter to Operator: Both valves contain eight (8) 7/8" non-magnetic bolts.

The shutdown cooling isolation valves were manufactured by Borg-Warner Corp., (B-W) Nuclear Valve Division, (Valve Assembly - 16x12x16 inch, 1512 Lb., Gate, Cres, With Motor Oper.) and supplied by Combustion Engineering.

Information on the "as-installed" valve to motor operator bolting configurations was provided to B-W and Combustion Engineering (C-E) for their evaluation. The evaluations demonstrated that the bolts securing the motor operator to the valve (motor operator to adapter plate bolting and valve yoke to adapter plate bolting) were adequate for Palo Verde Units 1 and 2 (i.e., system design criteria was met).

A similar evaluation indicated that the elastic stress limits were exceeded for the Unit 3 valves (SI-651 & SI-652) bolting when exposed to normal operating loads. These stresses, if repeatedly experienced by the valves, could potentially have resulted in fatigue failure of the bolts, rendering the valves inoperable.

For each Palo Verde unit there are four (4) valves (SI-653, -654, -655, & -656) similar in valve body design to SI-651 & SI-652. However, the original sizing of valve SI-651 & SI-652 motor operators required a larger motor operator (Limitorque Model SMB-3-100) than was required on valves SI-653, -654, -655, & -656 (Limitorque Model SMB-1-40). At approximately the same time the valves were being seismically analyzed (prior to valve shipment), B-W determined that the valve yoke to adapter plate bolting on valves SI-651 & SI-652 was overstressed. To correct this deficiency B-W issued an Engineering Change Notice (ECN) to upgrade the yoke to adapter plate bolting to sixteen (16) - 7/8 inch, ASTM A193 Grade B8M, bolts on valves SI-651 & SI-652. When this ECN was incorporated on Revision F of the B-W valve outline drawing, B-W indicated that the ECN was implemented on the Unit 1 valves previously shipped to the Palo Verde jobsite. A later revision, Rev. H, of the valve outline drawing changed the material of the eight (8) - 7/8 inch adapter plate to motor operator bolts from ASTM A193 Grade B8M to ASTM A193 Grade B7. At the time Rev. H of the valve outline drawing was issued, the Unit 1 and 2 valves had been shipped. The Rev. H drawing was to be used by B-W for the manufacture of the Unit 3 valves.

A comparison of the "as-installed" valve to motor operator bolting configuration and the revisions of the valve outline drawings follows:

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

Unit 1 - Valves SI-651 & SI-652 currently reflect the valve to motor operator bolting configuration on Revision F of the valve outline drawing. Since C-E has no records of authorizing field bolting changes for these valves and Bechtel has no records of receiving or implementing the bolting changes, it is concluded that B-W shipped the valves incorporating the bolting changes described on the ECN which was later incorporated in Revision F of the valve outline drawing.

Unit 2 - At the time of shipment, the unit 2 valve to motor operator bolting configuration should have conformed with the valve outline drawing Revision F. The "as-installed" bolting configuration does not reflect any revision of the valve outline drawing. Since C-E has no records authorizing field bolting changes for these valves and Bechtel has no records of receiving or implementing bolting changes, it is concluded that B-W shipped the valves partially incorporating the bolting changes described on the ECN which was later incorporated in Revision F of the valve outline drawing.

Unit 3 - By the shipping date of 9-12-80, the valves should have been modified to incorporate all of the bolting changes (i.e., Revision H of the valve outline drawing.) The bolting configuration however does not reflect the requirement of any revision of the drawing (i.e., studs and nuts were used between the valve yoke and adaptor plate in lieu of bolts).

The root cause of this event has been determined to be vendor error. The SI-651 and SI-652 valves supplied to the Arizona Nuclear Power Project (ANPP) did not have the required design changes implemented prior to shipment nor did the vendor provide notification of these changes to ANPP. The cause for the vendor error has not been determined at this time.

The other sixteen inch gate valves supplied by B-W were inspected to determine if a similar condition exists. This investigation revealed that valves SI-653, -654, -655, & -656 had similar valve bodies (16x12x16 gate) however, they were provided with a different (smaller) motor operator which has a different bolting configuration to the valve yoke. As a prudent measure the revisions to the valve outline drawings for these valves were reviewed for consistency and the "as-installed" configurations were verified as acceptable.

Based on the results of the evaluation, ANPP has determined that Palo Verde Units 1 and 2 can be operated with the "as-installed" valve bolting configuration. It has been determined that the bolting for the Palo Verde Units 1 and 2 valves is adequate and does not require modification.

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Palo Verde Unit 3	0 5 0 0 0 5 3 0	8 7	— 0 0 3	— 0 0	0 5 OF 0 6

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

As described, the Unit 3 shutdown cooling isolation valves had inadequate bolting as analyzed. Therefore the potential for improper operation existed for both valves and this condition is being reported in accordance with 10CFR 50.73 (a)(2)(v) This condition could have affected the ability to cool the Unit down to Mode 5 without operator actions from outside the control room. Since the nonconforming bolting was identified and corrected prior to Unit 3 reaching initial criticality, the consequences described above were never encountered. Therefore, this event did not adversely affect the safe operation of the plant or the health and safety of the public.

This condition is evaluated as reportable under the requirements of 10CFR21 since it constitutes a known defect of a basic component and a substantial safety hazard. This LER satisfies the reporting requirements of 10CFR 21 with the exception of paragraph 21.21 (b)(3), subpart vi with regards to the names and locations of other facilities which may be affected.

The evaluation of the "as-installed" valve to motor operator bolting has determined that eight (8) - 7/8 inch ASTM-A193 Grade B-7 bolts are adequate for the bolting between the valve yoke and the adapter plate as well as between the motor operator and the adapter plate for valves SI-651 & SI-652. To assure consistency however, B-W has shipped the following bolting to Palo Verde:

Quantity/Valve	Description
8	7/8 inch - 9 x 3" LG. Hex Bolt, ASTM-A-193 GR. B-7 (replacement for Find No. 56 of B-W drawing 77850/77850-1).
8	7/8 inch - 9 x 2 ½" LG. Hex Bolt, ASTM-A-193 GR. B-7 (replacement for Find No. 55 of B-W Drawing 77850/77850-1).

This bolting will be used to replace the "as-installed" bolting as described below:

Unit	Schedule	Scope of Bolting Replacement
1	First Refueling Outage	1. Replace existing adapter plate to motor operator bolts with new bolts provided. 2. Replace existing valve yoke to adapter plate bolts with new bolts provided utilizing the outer bolt circle.

2	First Refueling Outage	1. Replace existing adapter plate to operator bolts with new bolts provided.
		2. Replace existing valve yoke to adapter plate bolts eight (8) with new bolts provided.
3	Completed	1. Remove existing valve yoke to adapter plate and adapter plate to motor operator bolts.
		2. Drill out valve yoke to accept the new 7/8 inch bolts utilizing the outer bolt circle dimensions.
		3. Replace the adapter plate to motor operator bolts with the new bolts provided.
		4. Replace the valve yoke to adapter plate bolts with the new bolts provided (utilizing the new holes drilled in the valve yoke and the existing adapter plate 7/8 inch threaded holes, previously unused.

The modifications described above will provide consistency between the three units. In addition B-W will update the required documentation (outline drawings and seismic qualification report) to reflect the modifications implemented.

Additionally, in order to prevent recurrence, a Quality Assurance and an Engineering representative will conduct an evaluation at the vendor's facilities to determine the extent of these deficiencies and the potential for transportability to other valves suplied by that vendor.

There were no structures, components, or systems that were inoperable at the start of the event, other than those previously described, that contributed to the event. There were no unusual characteristics of the work location which contributed to the event. There were no automatic or manually initiated safety system responses. No operator actions were required as a result of the event. Should other concerns or information pertinent to this event be discovered, a supplement to this report will be issued.

There have been no previous similar Licensee Event Reports submitted.

Arizona Nuclear Power Project
P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

192-00288-JGH/TRB/TJB
October 2, 1987

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: (A) Telephone conversation between W. J. Wagner and T. R. Bradish on September 29, 1987.

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 3
Docket No. 50-530
Licensee Event Report 3-87-003-00
File: 87-020-404, 87-006-216, 87-001-211

Attached please find Licensee Event Report (LER) No. 3-87-003-00 prepared and submitted pursuant to 10CFR 50.73. In accordance with 10CFR 50.73(d), we are herewith forwarding a copy of the LER to the Regional Administrator of the Region V Office.

Additionally, in accordance with Reference (A), the NRC was notified that this condition is reportable under 10CFR 21. This LER is our written report regarding this condition and satisfies the reporting requirements of 10CFR 21 with the exception of paragraph 21.21 (b)(3), subpart vi with regard to the names and locations of other facilities which may be affected. A copy of this report will be sent to Borg-Warner for their evaluation.

If you have any questions, please contact T. R. Bradish, Compliance Supervisor at (602) 393-3531.

Very truly yours,

VG Haynes 10/2

J. G. Haynes
Vice President
Nuclear Production

JGH/TJB/cld

Attachment

cc: O. M. DeMichele (all w/a)
E. E. Van Brunt, Jr.
J. B. Martin
J. R. Ball
R. C. Sorenson
E. A. Licitra
A. C. Gehr
INPO Records Center

ADD: NRR/DLPQ/QAB
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