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 FACIL:STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528
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SUBJECT: LER 89-013-00:on 890726,potentially unqualified containment
 purge isolation valves.

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Arizona Public Service Company

PALO VERDE NUCLEAR GENERATING STATION
P.O. BOX 52034 • PHOENIX, ARIZONA 85070-0034

192-00511-JGH/TDS/JJN
August 25, 1989

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket No. STN 50-528 (License No. NPF-41)
Licensee Event Report 89-013-00
File: 89-013-00

Attached please find Licensee Event Report (LER) No. 89-013-00 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.

This is a voluntary LER. However, further evaluation is in progress to determine the Safety Significance of this event. A supplement will be submitted if this event is determined to be reportable pursuant to 10CFR50.73(a)(2)(ii) or (iii) or 10CFR21.

If you have any questions, please contact T. D. Shriver, Compliance Manager at (602) 393-2521.

Very truly yours,

J. G. Haynes
J. G. Haynes
Vice President
Nuclear Production

JGH/TDS/JJN/kj

Attachment

cc: W. F. Conway (all w/a)
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E. E. Van Brunt, Jr.
J. B. Martin
T. J. Polich
M. J. Davis
A. C. Gehr
INPO Records Center

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Palo Verde Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 5 2 8				PAGE (3) 1 OF 0 7		
TITLE (4) Potentially Unqualified Containment Purge Isolation Valves																
EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)						
MONTH	DAY	YEAR	YEAR	SEQUENT AL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES				DOCKET NUMBER(S)			
0 7	2 6	8 9	8 9	0 1 3	0 0	0 8	2 5	8 9	Palo Verde Unit 2				0 5 0 0 0 5 2 9			
									Palo Verde Unit 3				0 5 0 0 0 5 3 0			
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)														
N		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)		
POWER LEVEL (10)		0 0 0				20.405(a)(1)(i)				50.73(a)(2)(v)				73.71(c)		
		20.405(a)(1)(ii)				50.73(a)(2)(vi)				<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
		20.405(a)(1)(iii)				50.73(a)(2)(vii)(A)										
		20.405(a)(1)(iv)				50.73(a)(2)(viii)(B)										
		20.405(a)(1)(v)				50.73(a)(2)(ix)								Voluntary		
LICENSEE CONTACT FOR THIS LER (12)																
NAME Timothy D. Shriver, Compliance Manager										TELEPHONE NUMBER						
										AREA CODE 6 0 2 3 9 3 - 2 5 2 1						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS						
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												NO		0 3	2 8	9 0

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

On July 26, 1989, at approximately 1803 MST, Palo Verde Unit 1 was in a refueling outage with the core (AC) off-loaded to the Spent Fuel Pool, Palo Verde Unit 2 was in Mode 1 (POWER OPERATIONS) at 100 percent power, and Palo Verde Unit 3 was in Mode 6 (REFUELING) when APS Engineering Department personnel determined that the containment purge power access valves were not installed in accordance with the configuration specified in the Environmental Qualification Report for those valves. The containment purge power access valves had a handwheel on the manual jacking screw which was not included in the seismic analysis for the valves. These handwheels were installed in all three Units.

As immediate corrective action, the containment purge power access valves were declared inoperable until the handwheels were removed. As corrective Action to Prevent Recurrence, the handwheel kit (i.e. handwheel, nut and washer) have been removed from power access purge valves in Unit 1, 2, and 3 in accordance with approved design change documents. An investigation of this event is in progress in accordance with the APS Incident Investigation Program. The investigation is expected to be completed by February 28, 1990. Following the completion of the investigation, a supplement to this report will be issued.

No previous similar events have been reported.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED GMB NO 3150-0104

EXPIRES: 8/31/88

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

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

On July 26, 1989, at approximately 1803 MST, the following plant conditions existed when APS Engineering Department personnel (utility, non-licensed) determined that the containment purge power access valves (JM)(V) were not installed in accordance with the configuration specified in the Environmental Qualification Report for those valves.

Palo Verde Unit 1 was in a refueling outage with the core (AC) off-loaded to the Spent Fuel Pool.

Palo Verde Unit 2 was in Mode 1 (POWER OPERATIONS) at 100 percent power.

Palo Verde Unit 3 was in Mode 6 (REFUELING).

B. Reportable Event Description (Including Dates and Approximate Times of Major Occurrences):

Event Classification: Voluntary

On July 26, 1989 at approximately 1803 MST, Engineering Department personnel determined that containment purge power access valves had a handwheel on the manual jacking screw which was not included in the seismic analysis for the valves. These handwheels were installed in all three Units.

A review of the qualification documentation for the containment purge power access containment isolation valves indicates that the valve actuators were qualified to seismic category I without the manual handwheel in place. These valves are:

Unit 1	Unit 2	Unit 3
1J-CPA-UV-4A	2J-CPA-UV-4A	3J-CPA-UV-4A
1J-CPA-UV-4B	2J-CPA-UV-4B	3J-CPA-UV-4B
1J-CPB-UV-5A	2J-CPB-UV-5A	3J-CPB-UV-5A
1J-CPB-UV-5B	2J-CPB-UV-5B	3J-CPB-UV-5B

The subject valves are used as intake and exhaust containment isolation valves for the containment purge system. These valves are normally used during power operation to reduce the radioactivity level inside containment when an entry into containment is required. These valves are also used to relieve and maintain the containment pressure at or below 2.5 psig as requirement by PVNGS Technical Specification Limiting Condition for

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Operation 3.6.1.4. The time limit for the closure of the subject valves is less than or equal to 8 seconds as identified in PVNGS Technical Specification Table 3.6-1 for Units 1, 2, and 3.

Prior to the event, the original actuators for the above valves were Limitorque actuators and were replaced with G. H. Bettis actuators per approved Design Change Packages (DCP) 10J-CP-023, 2SJ-CP-23 and 3CJ-CP-023 in Units 1, 2, and 3 respectively. The reason for replacing the actuator was to meet the required containment closure time of less than 8 seconds. The original Limitorque actuators would fail "as is" during a postulated loss of offsite power scenario and would have to be loaded on the emergency diesel generators for closure. The actuator replacement work per the DCPs listed above were completed in Units 1, 2, and 3 on April 17, 1985, April 23, 1985 and March 5, 1986 respectively.

The purchase order for procurement of the G. H. Bettis actuators (P. O. #10407-F-170825-HO) was awarded to Henry Pratt Company. Item number 1 of the purchase order requires that G. H. Bettis actuator model number "N521-SR80-M3 Handwheel Actuator" be provided. Purchase order items number 3 and 4 require that revised seismic report and operability and environmental analysis report be provided. Finally, the purchase order requires that a certification of the valve assembly meet the requirements of Specification 13-JM-605 with exception to paragraph 4.4.7.1.2.

In July, 1989 during manual operation of the Containment Purge Valves (3J-CPA-UV4A and 4B; 3J-CPB-UV-5A and 5B), Unit 3 Operations personnel had difficulty with the manual jacking screw assembly supplied with the valve. Engineering personnel contacted G. H. Bettis to investigate the problem. During the conversation with the manufacturer, a statement was made by the manufacturer that the valves were not tested (environmentally or seismically) with the manual jacking screw assembly installed.

Having identified that the valves may not have been analyzed with the handwheel, Nuclear Engineering reviewed the design documents and specifically all the pertinent qualification reports. Per the Seismic/Environmental Qualification Report Log #J605-171-2 performed by G. H. Bettis, four model actuators were tested. The models are: N732C-SR-80-12, NT420B-SR1-12, NT520B-SR1-12 and NCB-520-SR80-12. These four models were chosen to be the type tested units since they best represent all of the variables affecting environmental qualification, exhibit the lowest natural frequencies within their series based on their respective mass, centers-of-gravity and size, and exhibit the highest stress levels during operation. Appendix I of this report further explains that the actuator model N732C-SR-80-12 is the generic parent test actuator of all nuclear rated Heavy Duty (HD) model actuators.

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

This Appendix also details the design similarities that are shared by all HD model actuators. In addition, a letter in the above referenced log number states that Model N732C-SR80-12 actuator is the largest of the heavy duty actuators and would be the least rigid. The Engineering Data sheet published by the actuator manufacturer (Bettis) stated that the HD Series (Pneumatic) Actuators encompass the following model number series: 521, 721, 722, 731, and 732. Also in the above referenced log section number 1.4, the tests described in the test report were performed on the following models of Bettis Corporation valve actuators: NCB-520-SR80-12, N732C-SR80-M3-12, NT0420B0SR1-12 and NT-520B-SR1-12. For the model 732, the M3 description refers to the manual jacking screw assembly without the actuator handwheel. Based on the fact that the model number 521 series is in the HD family of actuators and the model 732 is the least rigid of the HD actuators, the qualification of the model 732 series actuator can encompass the model 521 series actuators manual jacking screw assembly minus the handwheel, nut and washer based on similarity. Similarly, as in the case of the model 732 series actuators, the model 521 series actuators require the manual jacking screw handwheel, handwheel nut and washer be removed during plant operation. Because the actuator models 732 and 521 were not qualified (Seismically or Environmentally) with the handwheel assembly (handwheel, handwheel nut and washer), the valves should be considered unqualified during that time frame that the handwheel assembly was installed.

Based on similarity to the model N732C-SR80-M3-12 actuator with the manual jacking screw assembly without the handwheel assembly, the model N521-SR80-M3 actuator with the manual jacking screw assembly without the handwheel assembly is considered qualified for use on the above referenced Containment Purge Valves.

The handwheel material is fabricated of aluminum and the weight is 7.3 lbs. (handwheel = 3007.9 grams; nut = 249.6 grams; washer = 55.4 grams; Total = 3312.9 grams or 7.3 lbs). The calculation 13-NC-ZC-202 Revision 2 "Post Loca Hydrogen Generation", evaluates the hydrogen generation inside of containment based upon an assumed weight of 2000 lbs of aluminum present inside of containment. The actual identified aluminum weight in the calculation is 1144 lbs. Hence, the calculation has a margin of 851 lbs. for any unidentified aluminum inside the containment. The weight of the two handwheel assemblies (2 X 7.3 lbs. = 14.6 lbs) is very small compared to the available margin.

- C. Status of structures, systems, or components that were inoperable at the start of the event that contributed to the event:

Not applicable - there were no structures, systems, or components inoperable at the start of the event that contributed to the event.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

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TEXT (If more space is required, use additional NRC Form 364A's) (17)

- D. Cause of each component or system failure, if known:
Not applicable - there were no component or system failures.
- E. Failure mode, mechanism, and effect of each failed component, if known:
Not applicable - there were no failed components.
- F. For failures of components with multiple functions, list of systems or secondary functions that were also affected:
Not applicable - there were no failed components.
- G. For failures that rendered a train of a safety system inoperable, estimated time elapsed from the discovery of the failure until the train was returned to service:
Not applicable - there were no failures.
- H. Method of discovery of each component or system failure or procedural error:
Not applicable - there were no component or system failures.
Further investigation of this event is in progress as described below.
- I. Cause of Event:
The cause of the event is under investigation in accordance with the APS Incident Investigation Program. The investigation is expected to be completed by February 28, 1990.
- J. Safety System Response:
Not applicable - there were no safety system responses and none were necessary.
- K. Failed Component Information:
Not applicable - there were no failed components.

II. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THIS EVENT:

In order to determine the safety implications of installing the unqualified valves stated above the following two scenarios are evaluated:

1. Evaluation of the valve operation during Loss of Coolant accident while performing power access purge operation.

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Palo Verde Unit 1

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

The twelve 8 inch diameter power access purge valves have been successfully surveillance tested in PVNGS Units 1, 2, and 3 with the manual handwheel in place for a total of 217 stroke tests (total for the 12 valves) as documented in surveillance tests 73ST-9ZZ07, 73ST-9ZZ05, 73ST-1ZZ11, 73ST-1ZZ03, 73ST-2ZZ11, 73ST-2ZZ03, 73ST-3ZZ11 and 73ST-3ZZ03. The subject testing has shown that the ability of the valve to function within the required technical specification time frame is not compromised with the manual handwheel in place.

Engineering Evaluation Request (EER 89-CP-004) has evaluated the increase in the containment aluminum content versus the calculation 13-NC-ZC-202 Revision 2. The result of the review indicates that additional 14.6 lbs aluminum added by the two handwheels (two valves inside containment) is insignificant with respect to the 851 lb margin available in the calculation. It is therefore concluded that the power access purge valves would perform their intended safety function in conjunction with a Loss of Coolant Accident.

2. Evaluation of the valve operation during a seismic event.

The 8 inch diameter power access purge valves must perform their intended safety function which is to close and maintain pressure integrity both during and after a seismic event. The ability of the valve to perform its safety function during a seismic event with the unqualified handwheel is currently under evaluation. Engineering has contacted the actuators manufacturer's representative (Entertech Corporation) and is currently evaluating the ability of the valve to function during a postulated seismic event.

Further evaluation of the safety significance of this event is in progress. The results of this evaluation will be reported in a supplement to this report if it would significantly alter the reader's perception of the event.

III. CORRECTIVE ACTIONS:

A. Immediate:

The containment purge power access valves were declared inoperable in Units 1 and 3. The handwheels were previously removed in Unit 2.

B. Action to Prevent Recurrence:

The handwheel kit (i.e. handwheel, nut and washer) have been removed from power access purge valves in Units 2 and 3 and will be removed in Unit 1 during the current refueling outage in accordance with the following Temporary Modifications.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Palo Verde Unit 1

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Unit 1

Unit 2

Unit 3

1-89-CP-076

2-89-CP-035

3-89-CP-0XX(LATER)

As mentioned before, the valves are seismically/environmentally qualified for use at PVNGS per the vendor report (ANPP log number J605-171) without the manual handwheel in place. Therefore the valves were considered operable after the temporary modifications were implemented.

An investigation of this event is in progress in accordance with the APS Incident Program. The investigation is expected to be completed by February 28, 1990. Following the completion of the investigation, a supplement to this report will be issued.

The actuator manufacturer's representative (Entertech Corporation) has been contacted to assist APS in development of an analysis to determine if the valve could perform its intended safety function with the handwheel in place.

IV. PREVIOUS SIMILAR EVENTS:

No previous similar events have been reported

