TU ELECTRIC

Log # TXX-91180
File # 10200
910.4
Ref. Voluntary

May 21, 1991

William J. Cahill, Jr.
Executive Vice President

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NO. 50-445
REPORT OF EVENT WITH GENERIC INTEREST
LICENSEE EVENT REPORT 91-016-00

Gentlemen:

Enclosed is Licensee Event Report 91-016-00 for Comanche Peak Steam Electric Station Unit 1, "Manufacturing Error Leading to the Failure of a Check Valve to Prevent Backflow."

Review of this event has been conducted with due regard to the previous history and corrective actions associated with these check valves at CPSES. Based on this review, it was concluded that the current plans for continued use of these valves remains technically sound.

Sincerely,

William J. Cahill, Jr.

By: _____
A. B. Scott, Jr.
Vice President, Nuclear Operations

JAA/bm

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (2)

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Enclosure to TXX-91180

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION

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.

LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
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Title (4)

MANUFACTURING ERROR LEADING TO THE FAILURE OF A CHECK VALVE TO PREVENT BACKFLOW

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 Numbers
									N/A	0 5 0 0 0
0 3	2 5	9 1	9 1	- 0 1 1 6	- 0 0	0 5	2 1	9 1	N/A	0 5 0 0 0

This report is submitted pursuant to the requirements of 10 CFR §: (Check one or more of the following) (11)

5	20.402(b)	20.405(c)	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)	X	Other (Specify in Abstract below and in Text, NRC Form 366A)
0 0 0	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)		Voluntary Report
	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
T. A. HOPE COMPLIANCE SUPERVISOR	8 1 1 7 8 9 7 1 - 1 6 3 7 0

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	
B	B A	V	B 3 5 0	YES							

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 April 18, 1991, reverse flow testing was being performed on check valves in the Auxiliary Feedwater System. One of eight check valves in the system branch lines failed to meet the test acceptance criteria. The cause of the failure was determined to be a manufacturing deficiency in the finish machining of the rough casting of the valve body. The incomplete machining resulted in excess casting material inside the valve body which interfered with full stroke motion of the swing arm counterweight. Corrective action included finish machining of the affected check valve, inspection of similar valves in the system, and procedure review. A voluntary report is being submitted due to interest resulting from previous experience with check valves in the Auxiliary Feedwater System.

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

I. DESCRIPTION OF THE REPORTABLE EVENT

A. PLANT CONDITIONS PRIOR TO THE EVENT

On April 18, 1991, Comanche Peak Steam Electric Station (CPSES) Unit 1 was in Mode 5, Cold Shutdown, with the Reactor Coolant System at a temperature of 100 degrees F and pressure of approximately 15 psia.

B. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

There were no inoperable structures, systems, or components that contributed to the event.

C. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On April 18, 1991, backflow testing was being performed on check valves (EIIS:(V)) in the Auxiliary Feedwater (AFW) System (EIIS:(BA)). One of the check valves included in the test did not satisfy the test acceptance criteria, and action was initiated to identify the cause of the test failure. Radiography revealed that the valve disk was being held off of its seat by mechanical interference between the disk counterweight and the valve body. The valve was disassembled and it was discovered that the valve body casting had not been fully finish machined by the manufacturer. A lip of excess casting material at the back of the valve body had caused the disk counterweight to catch on the opening stroke and hang the valve disk in the open position.

E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL OR PERSONNEL ERROR

The condition was identified during work activity initiated following the failure of the check valve to meet the reverse flow test acceptance criteria.

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

II. COMPONENT OR SYSTEM FAILURES

A. FAILED COMPONENT INFORMATION

Component Description: Pressure seal check valve, 4 inch, 900 pound
Manufacturer: Borg-Warner/International Pump, Inc (BW/IP).
Manufacturer's Part Number: 75560

B. FAILURE MODE, MECHANISM, AND EFFECT OF EACH FAILED COMPONENT

The affected check valve stuck open due to interference between the disk counterweight and a lip of excess casting material on the valve body, allowing reverse flow in one branch of the AFW system.

C. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

A manufacturing error in the machining process of the valve body casting allowed excess casting material to remain on the inside surface of the valve body.

D. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

The Auxiliary Feedwater System is designed to provide flow to the steam generators for heat removal from the primary system after certain design basis accidents as described in the CPSES Final Safety Analysis Report and serves as the feedwater source during hot standby and cooldown from power operations. The system can also be used to adjust steam generator water levels prior to and during plant startup, to establish wet layup in the steam generators, or to maintain steam generator water levels following a loss of coolant accident. The check valve failure described in this report would not inhibit the ability of the system to deliver flow to the steam generators for performance of any of the functions for which the system is designed.

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III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Not applicable - there were no safety system actuations associated with this event.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

There were no safety systems rendered inoperable as a result of the event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

For each of the design functions of the AFW system, the failure described in this report would not prevent the system from delivering flow to the associated steam generator, and additional check valves in the system would prevent or inhibit backflow. In the absence of a line break or manual valve misoperation, the check valve failure would lack significance in any plant mode because of the absence of a backflow path. It is concluded that the condition did not adversely affect the safe operation of CPSES Unit 1 or the health and safety of the public.

IV. CAUSE OF THE EVENT

Immediate cause : High flow rates through the branch line in conjunction with a manufacturing deficiency caused the check valve to stick in the open position. On April 12, 1991, dynamic testing was performed on the motor operated isolation valve down stream of the affected check valve. The test is conducted to meet the requirements of Generic Letter 89-10 to ensure that the motor-operated valve will close during a main feedwater line break accident. The test simulates, to the extent possible, expected AFW flow to a faulted steam generator during the accident. The test involves a flow rate of approximately 660 gallons per minute, and caused the swing arm and counterweight to impact the excess casting material with sufficient force to cause plastic deformation to the casting and wedge the disk in the open position. The test flow rate is well in excess of the flow rate required during normal surveillance testing of components in the AFW system.

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Root cause : The component was not manufactured in accordance with design. During the manufacture of the valve body, finish machining of the rough casting was not adequately performed. The incomplete machining resulted in excess casting material inside the valve body (Refer to Figure 1) which interfered with full stroke motion of the swing arm counterweight. Information related to valve port dimensions is BW/IP proprietory information and not an inspectable attribute during receipt inspection.

The counterweight was added in April, 1990, as a design modification to the eight check valves in the AFW branch lines. Post modification testing consisted of manual full stroke manipulation of each set of internals on an uninstalled test valve body. Since the test valve was the same model and vintage as the installed plant valves, it was assumed that no significant differences existed in the valve bodies. In an unmodified condition the valve would not have stuck open, and the condition described should not be considered a generic problem for this model check valve in other applications.

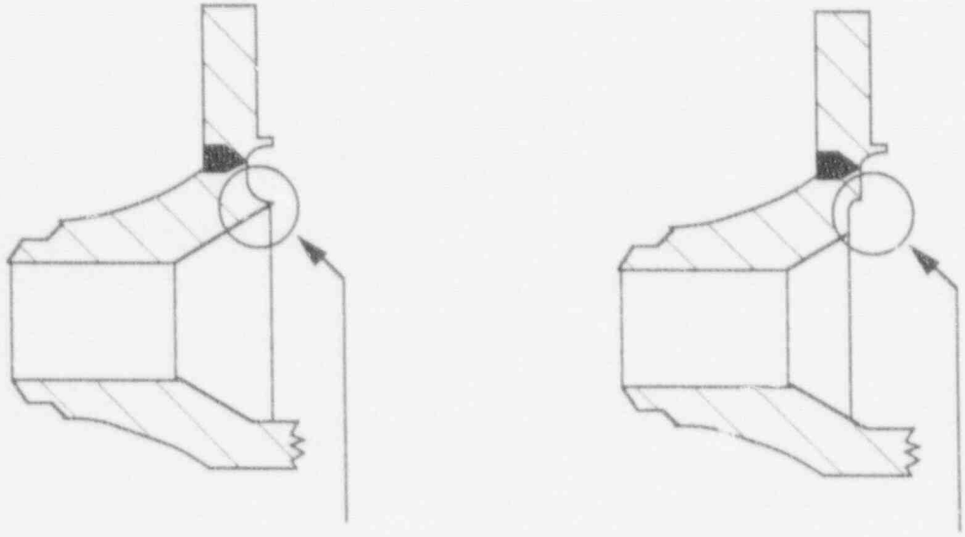

Figure 1

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION

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V. CORRECTIVE ACTIONS

IMMEDIATE

The affected valve was machined to remove excess casting material from the valve body and restore the design contour of the valve port. The remaining seven check valves in the AFW branch lines were disassembled, photographed, and inspected to ensure that finish machining had been adequately performed. Measurements inside the valve body were taken for each of the valves and revealed that finish machining had been performed correctly. The valves were reassembled and are scheduled to receive forward and reverse flow testing prior to plant restart.

ACTIONS TO PREVENT RECURRENCE

Procedures will be reviewed and revised as appropriate to ensure that in the event that replacement of one of the AFW branch line check valves is required, sufficient inspection and testing will be performed to prevent a similar condition.

VI. PREVIOUS SIMILAR EVENTS

There have been no previous similar events reported pursuant to 10CFR50.73.

VII. ADDITIONAL INFORMATION

Although the event does not meet the reporting criteria of 10CFR50.73, a voluntary report is being submitted because of the significance and generic interest of the event resulting from previous experience with BW/IP check valves in the AFW system.