

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Palo Verde Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 5 2 8 1	PAGE (3) OF 0 6
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TITLE (4)
Shutdown Cooling Isolation Valves Thermal Overload Protection not Bypassed

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 5	0 5	9 3	9 3	0 0 6	0 1	0 6	1 8	9 3	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) 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)			50.73(a)(2)(v)			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)(vi)			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)(vii)(A)			
	20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(vii)(B)			
20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)				

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME Thomas R. Bradish, Manager, Nuclear Regulatory Affairs	AREA CODE 6 0 2	NUMBER 3 9 3 - 5 4 2 1	

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO				

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

On May 5, 1993, at approximately 1600 MST, Palo Verde Units 1 and 3 were in MODE 1 (POWER OPERATION) operating at approximately 100 percent power and Palo Verde Unit 2 was in Mode 6 (REFUELING) and in the process of reloading the core when it was determined that Units 1, 2, and 3 were in a condition prohibited by Technical Specifications (TS). TS Limiting Condition for Operation (LCO) 3.8.4.2, requires that thermal overload protection bypass be provided on the Shutdown Cooling suction isolation valves so the valves will not be prevented from performing their function under accident conditions. Then at approximately 1640 MST, APS Engineering personnel identified that the original design of the valves' motor control circuits may not meet design requirements for thermal overload protection bypass. The NRC Operations Center was notified that PVNGS Units 1, 2 and 3 were in a condition outside their design basis at approximately 1725 MST on May 5, 1993.

Bypassing of the thermal overload protection on the Units 1 and 3 valves was completed at approximately 2245 MST on May 5, 1993. Unit 2 was refueling and had one loop of Shutdown Cooling in service when the conditions were discovered. Based on Technical Specification Interpretations, bypassing of the thermal overloads was not immediately required. Bypassing the thermal overload protection on the Unit 2 valves was completed on May 25, 1993.

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



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TEXT

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

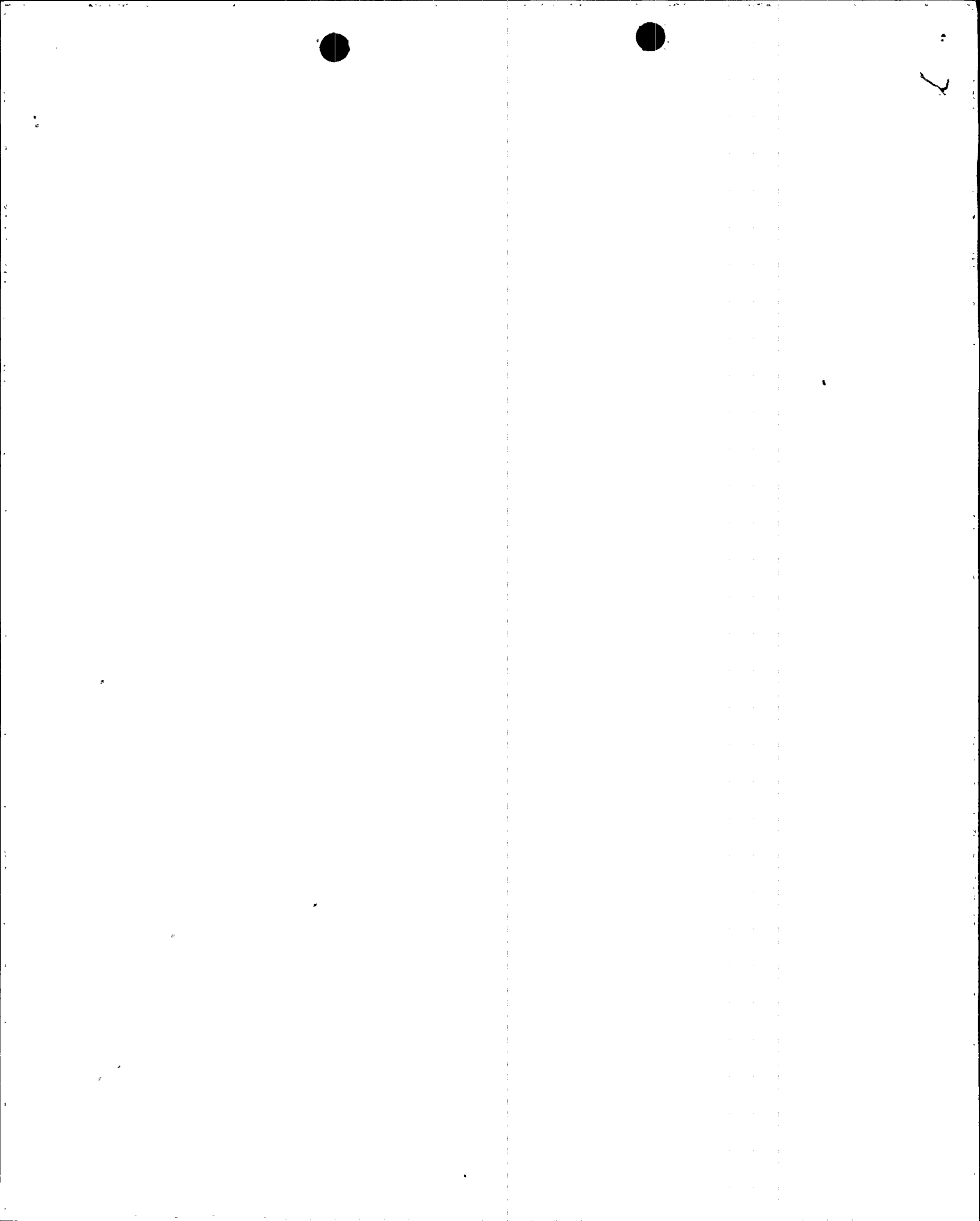
At approximately 1640 MST on May 5, 1993, Palo Verde Units 1 and 3 were in MODE 1 (POWER OPERATION) operating at approximately 100 percent power. Palo Verde Unit 2 was in MODE 6 (REFUELING) in the process of reloading the core.

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

Event Classification: An operation prohibited by the plant's Technical Specifications (TS) and a condition that is outside the design basis of the plant.

At approximately 1600 MST, PVNGS Maintenance Standards personnel (utility, nonlicensed) identified that the Shutdown Cooling (SDC) suction isolation valves on Units 1, 2 and 3 may not meet the requirements of TS Limiting Condition for Operation (LCO) 3.8.4.2. The Units were informed and Units 1 and 3 entered the associated ACTION Statement. Unit 2 had one loop of SDC in service and based on TS Interpretations approved in June of 1989, took no actions. At approximately 1640 MST on May 5, 1993, the Unit 3 Shift Technical Advisor (STA) (utility, nonlicensed), the Unit 3 Shift Supervisor (SS) (utility, licensed), and the Nuclear Regulatory Affairs (NRA) Technical Supervisor (utility, nonlicensed) determined that, based on available information, Units 1, 2, and 3 were also in a condition outside the design basis of the plant. Then at approximately 1725 MST on May 5, 1993, the NRC Operations Center was notified that PVNGS Units 1, 2 and 3 were in a condition that was outside of their design basis.

TS LCO 3.8.4.2, requires that thermal overload protection bypass be provided on certain safety-related motor-operated valves so the valves will not be prevented from performing their function under accident conditions. The thermal overload protection shall be bypassed continuously or under accident conditions. The TS LCO is applicable whenever the motor-operated valve is required to be OPERABLE. APS Engineering personnel (utility, nonlicensed) have identified that the original design of the Shutdown Cooling (SDC) suction isolation valve motor control circuits provided this bypass capability only during automatic closure to prevent over-pressurization. No bypass capability of the thermal overload protection was provided under design basis accident conditions.



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TEXT	<p>SDC provides residual heat removal capability during plant shutdown and is also used to bring the plant to MODE 5 (COLD SHUTDOWN) following an accident. Each unit has six SDC motor-operated suction isolation valves (three in each redundant train). These valves are used to isolate the high pressure Reactor Coolant System (RCS) from the low pressure SDC system to prevent over pressurization during normal plant operation. Before the discovery of the condition identified above, the automatic closure interlocks were being removed to implement an approved design change to the Units' operating licenses (Amendments 66, 55, and 39 to License Numbers NPF-41, NPF-51, and NPF-74, respectively). Open permissive and automatic closure interlocks associated with these SDC suction isolation valves (along with relief valves on the suction lines) had provided over pressurization protection of the SDC system.</p> <p>On May 5, 1993, work was partially complete in Unit 2 to implement a design change to remove the auto-closure interlock (IEC) on the SDC suction isolation valves. Part of this design change inadvertently included the removal of the thermal overload protection bypass for the motors associated with these valves. During a design change impact review, PVNGS Maintenance Standards personnel identified that removing these thermal overload protection bypasses from the valves' motor control circuits may violate TS LCO 3.8.4.2. At approximately 1600 MST on May 5, 1993, Units 1, 2, and 3 were notified of the condition and work in Unit 2 was stopped. Units 1 and 3 entered the ACTION Statement for TS LCO 3.8.4.2, which states in part "...with the thermal overload protection...not bypassed continuously or under accident conditions...take administrative action to continuously bypass the thermal overload within 8 hours or declare the affected valves(s) inoperable and apply the appropriate ACTION statement(s) for the affected valves(s)."</p> <p>At the time of discovery of the condition, Unit 2 had one loop of SDC in service. TS Interpretations 3.9.8.1-13-01-00 and 3.9.8.2-13-02-00, approved in June of 1989, state in part "...A SDC loop consists of:</p> <ul style="list-style-type: none"> • A Low Pressure Safety Injection Pump or Core Spray Pump... • Surveillance Test required by TS 4.0.5... • The associated flow path(s) capable of supporting the pump...
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	<p>Since one loop was in service with the suction valves open and the other loop was capable of being placed in service, even if manual operation of the suction valves was required, Unit 2 took no action. Material Nonconformance Reports (MNCR) were initiated to document and correct the problem.</p> <p>Electrical jumpers which bypassed the thermal overload protection were installed in Units 1 and 3 by approximately 2245 MST on May 5, 1993. The MNCRs were conditionally released according to approved PVNGS procedures and the TS LCO 3.8.4.2, was exited. Based on TS Interpretations, SDC was determined to be operable in Unit 2 and the thermal overload protection on these valves was bypassed on May 25, 1993.</p> <p>C. Status of structures, systems, or components that were inoperable at the start of the event that contributed to the event:</p> <p>Other than the SDC suction isolation valves identified in Section I.B, no other structures, systems, or components were inoperable at the start of the event which contributed to this event.</p> <p>D. Cause of each component or system failure, if known:</p> <p>Not applicable - no component or system failures were involved.</p> <p>E. Failure mode, mechanism, and effect of each failed component, if known:</p> <p>Not applicable - no component failures were involved.</p> <p>F. For failures of components with multiple functions, list of systems or secondary functions that were also affected:</p> <p>Not applicable - no failures of components with multiple functions were involved.</p> <p>G. For a failure 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:</p> <p>Not applicable - no failures that rendered a train of a safety system inoperable were involved.</p> <p>H. Method of discovery of each component or system failure or procedural error:</p> <p>Not applicable - there have been no component or system failures or procedural errors identified.</p>



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I. Cause of Event:

An investigation of this event is being conducted according to the APS Incident Investigation Program. Currently, APS Engineering personnel have determined that the original design of the SDC isolation valve motor control circuits included the bypass only during automatic closure to prevent over-pressurization. No bypass was ever included for the manual (control board handswitch) close or open modes of operation (SALP Cause Code B: Design Error).

This investigation is continuing and will determine the need for thermal overload protection bypass on the valves listed in TS Table 3.8-3. If additional information is developed which would affect the readers understanding or perception of this event, a supplement will be submitted.

J. Safety System Response:

Not applicable - there were no safety system responses and none were necessary.

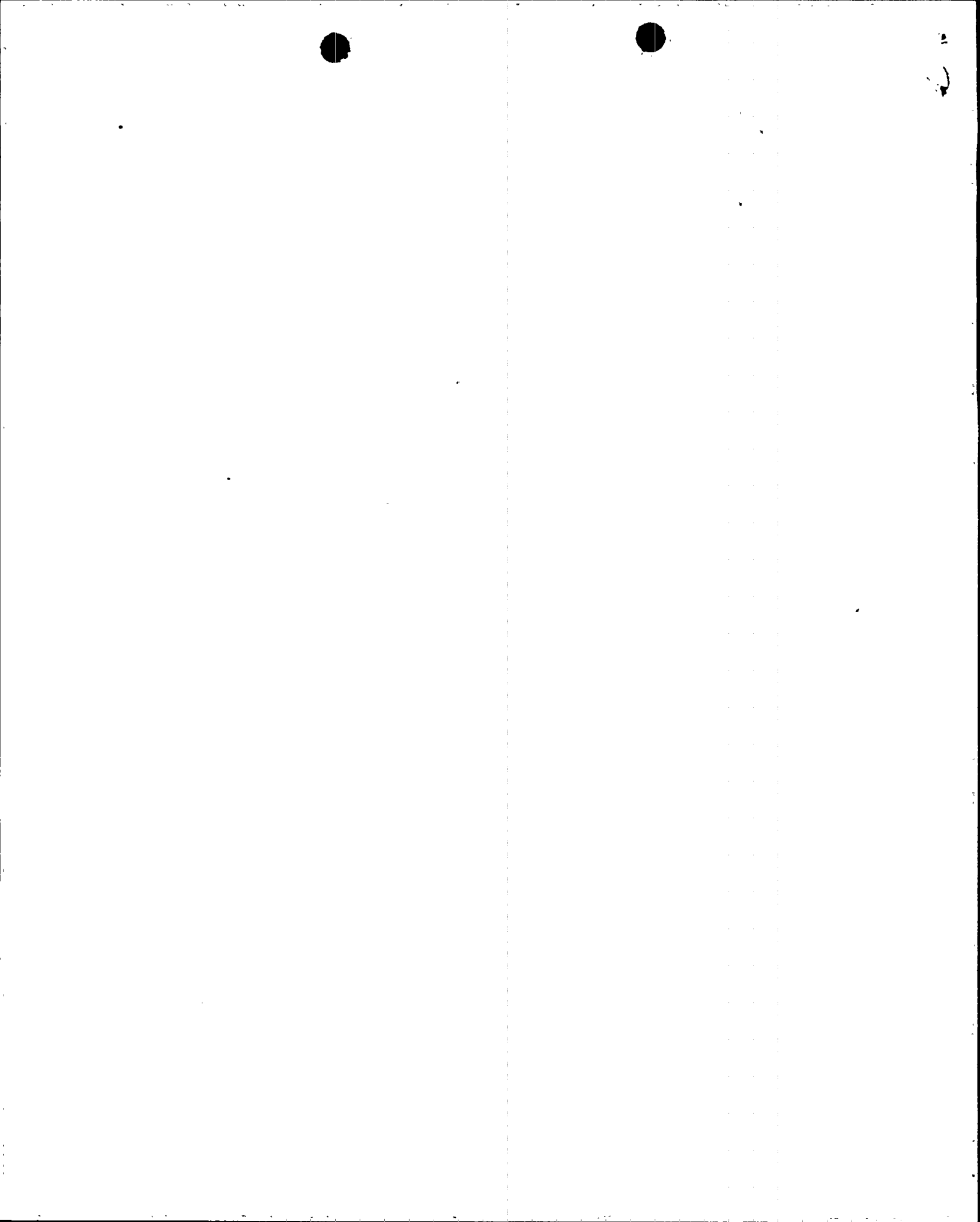
K. Failed Component Information:

Not applicable - no component failures were involved.

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

Each Unit has two independent trains of SDC. Accident analysis (Updated Final Safety Analysis Report Chapter 15) only require one SDC loop be available for entry into long term cooling after the applicable accidents. Accident analysis places no time requirement for entry into SDC. System redundancy and the ability to perform recovery actions minimize the safety significance and implications of not providing the SDC isolation valves with the required thermal overload protection bypass.

The event did not result in any challenges to the fission product barriers or result in any releases of radioactive materials. Therefore, there were no other adverse safety consequences or implications as a result of this event. This event did not adversely affect the safe operation of the plant or health and safety of the public.



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III. CORRECTIVE ACTION:

A. Immediate:

Upon discovery, Units 1 and 3 entered the ACTION statement for TS LCO 3.8.4.2. Material Nonconformance Reports (MNCR) were issued and the thermal overload protection for the SDG isolation valves was continuously bypassed in Units 1 and 3. After installation of the bypasses, the MNCRs were conditionally released according to approved PVNGS procedures and the motor-operators returned to an operable status.

Modifications to defeat the thermal overload protection on the Unit 2 valves were completed on May 25, 1993.

B. Action to Prevent Recurrence:

An Engineering Evaluation of TS LCO 3.8.4.2, is being conducted to review the functions of the motor-operated valves listed on Table 3.8-3. This evaluation will determine:

- the need for thermal overload protection bypass on these valves,
- the type of bypass needed (continuous or accident conditions only), and
- if additional valves should be included, or
- currently listed valves should be deleted.

This evaluation is expected to be completed by December 1, 1993. If during the evaluation of this condition, additional information is developed which would affect the readers understanding or perception of this event, a supplement will be submitted.

IV. PREVIOUS SIMILAR EVENTS:

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

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