CENTERIOR ENERGY

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January 3, 1991
PY-CEI/NRR-1285 L

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

Perry Nuclear Power Plant
Docket No. 50-440
LER 90-035

Dear Sir:

Enclosed is Licensee Event Report 90-035 for the Perry Nuclear Power Plant.

Sincerely,

Michael D. Lyster

MDL:NJL:njc

Enclosure: LER 90-035

cc: NRR Project Manager
Sr. Resident Inspector

U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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-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.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Perry Nuclear Power Plant, Unit 1	0 5 0 0 0 4 4 0	1 OF 0 3

TITLE (4) Design Error Results in the Potential for a Loss of the Control Complex Chilled Water System

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 0 0
1 2	0 4	9 0	9 0	–	0 3 5	–	0 0	0 1	0 4	9 1		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
4		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
0 0 0		20.405(a)(1)(ii)	50.36(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)	X 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
Henry L. Hegrat, Compliance Engineer, Extension 6855	2 1 6 2 5 9 – 3 1 7 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	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 3	3 0	9 1

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

On December 4, 1990 at 1600, the Perry Nuclear Power Plant (PNPP) Architect Engineer, Gilbert/Commonwealth Inc. informed PNPP that a design deficiency may exist within the Control Complex Chilled Water (CCCW) System (P47). This deficiency could result in the loss of the CCCW system following a seismic event with the resultant loss of chilled water to the Control Room Emergency Recirculation (CRER) System. Technical Specification 3.7.2 requires that the CRER system be Operable in all Operational Conditions.

The root cause of this event is design error. The time it takes the CCCW expansion tank low level isolation of the piping associated with the non-safety related systems to occur following guillotine breaks is too great for the combination of pump flow, valve closure times and system capacity. As a result, the safety related systems serviced by CCCW may receive less than design CCCW flow.

The interim corrective actions taken for this event include the lowering of the normal operating level in the CCCW expansion tanks such that a low level isolation will occur in a shorter period of time following a break. The CCCW isolation valves have been throttled to 60 degrees open rather than 90 degrees (full) open and flow has been rebalanced to restrict the loss of inventory and to allow the isolation valves to close faster. The rebalancing is such that CCCW flow to the three safety-related HVAC systems and to the Computer Rooms HVAC system has not been reduced. This interim solution is sufficient for winter conditions. An evaluation of the seismic qualification of the non-safety piping and cooling coils is being made. If necessary, permanent design changes will be made before March 22, 1991.

On December 4, 1990 at 1600, the Perry Nuclear Power Plant (PNPP) Architect Engineer, Gilbert/Commonwealth Inc. informed PNPP that a design deficiency may exist within the Control Complex Chilled Water (CCCW) System. This deficiency could result in the loss of the CCCW system following a seismic event with the resultant loss of cooling water to the Control Room Emergency Recirculation (CRER) System. Technical Specification 3.7.2 requires that the CRER system be Operable in all Operational Conditions. At the time of discovery, the Plant was in Operational Condition 4 (Cold Shutdown). Reactor pressure vessel (RPV) temperature was 145 degrees F and reactor pressure was atmospheric.

Gilbert/Commonwealth Inc. identified a design deficiency at the V.C. Summer Nuclear Station in October, 1990 which was reportable under 10CFR21. This deficiency involved the potential failure of non-seismic piping resulting in a complete loss of the Chilled Water System following a seismic event. The V.C. Summer Chilled Water System supplies cooling water to both safety and non-safety related HVAC systems. In the event of a seismic occurrence, the piping to the non-safety related systems is assumed to fail. The non-safety related systems are automatically isolated upon a loss of water in the Chilled Water System, in order to maintain flow and water inventory to the safety related systems supplied by the Chilled Water System. The V.C. Summer design did not allow the isolation of the non-safety systems to occur in time to prevent loss of chilled water to the safety related systems. The system should have been designed to withstand a loss of the non-seismic piping without the resultant loss of chilled water to the safety related systems. Following the reporting of this event, Gilbert reviewed the designs of other plants they have designed for similar deficiencies. They identified a similar potential deficiency in the PNPP design and reported it to the Plant on December 4, 1990.

Following the identification of the problem, the CRER system was declared inoperable on December 4, 1990. The plant was in Cold Shutdown following a refueling outage and Technical Specification Action Statement 3.7.2.b.2 was met. An engineering analysis was performed. Interim corrective actions were taken to lower the normal operating level in the CCCW expansion tanks such that a low level isolation will occur in a shorter period of time following a break. The CCCW isolation valves were throttled to 60 degrees open rather than 90 degrees (full) open and flow was rebalanced to restrict the loss of inventory and to allow the isolation valves to close faster. The CRER system was declared operable again on December 20, 1990, with the interim corrective actions evaluated to be sufficient for winter conditions until at least March 22, 1991.

The PNPP CCCW system provides mechanically chilled water to the cooling coils associated with the HVAC systems which service the Control Complex. Three of these systems: Control Room HVAC and Control Room Emergency Recirculation; MCC, SWGR and Misc. Area HVAC; and Emergency Closed Cooling Pump Area Cooling are safety related HVAC systems and the piping and cooling coils associated with

these systems are seismically qualified. The other two systems: Control Access Area HVAC and Computer Rooms HVAC are not safety related and the cooling coils associated with these two systems are not seismically qualified. Thus, a seismic event is assumed to result in a break at the interface between the pipe and the cooling coils. The CCCW system was supposedly designed to accommodate this failure by isolating the portion of CCCW which services the two non-safety related HVAC systems from the portion of the CCCW system which services the three safety related systems, on a low expansion tank level before the three safety related HVAC systems could be adversely affected.

The design discrepancy identified by Gilbert was that guillotine breaks in the piping to cooling coil interfaces following a seismic event resulted in the excessive loss of CCCW system inventory prior to the automatic isolation of the piping associated with the non-safety related HVAC systems and thus affected the ability of the CCCW system to adequately cool the remaining three safety related systems. Technical Specification 3.7.2 requires that the Control Room Emergency Recirculation System be operable during all Operational Conditions and Technical Specification 4.7.2.a requires that the Control Room air temperature be maintained at less than or equal to 90 degrees F. Analysis has shown that a loss of CCCW would not allow the Control Room air temperature to rise to greater than 90 degrees F in less than 2 hours.

The root cause of this event is design error. The time it takes the CCCW expansion tank low level isolation of the piping associated with the non-safety related systems to occur following guillotine breaks is too great for the combination of pump flow, valve closure times and system capacity. As a result, the safety related systems serviced by CCCW may receive less than design CCCW flow.

Without operator intervention, the postulated loss of the CCCW system due to this event could potentially result in excessive temperatures in the areas serviced by the three safety-related HVAC systems. This could lead to electrical and mechanical failures of equipment necessary for the safe shutdown and cooldown of the plant following a seismic event. Under accident conditions, it could also result in the Control Room becoming uninhabitable and further complicating plant cooldown. However, it is expected that under an actual loss of CCCW system inventory, adequate time exists to allow operators to refill the system and restore it to service. Thus, this deficiency is not considered safety significant.

Based upon plant heat loads, the interim solution is sufficient for winter conditions. The rebalancing is such that CCCW flow to the three safety-related HVAC systems and to the Computer Rooms HVAC system has not been reduced. An independent evaluation of the seismic qualification of the non-safety piping and cooling coils is being amde. If necessary, permanent design changes will be made before March 22, 1991.

Energy Industry Identification System Codes are identified in the text as [XX].