THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

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Al Kaplan

VICE PRESIDENT
NUCLEAR GROUP

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PERRY NUCLEAR POWER PLANT

January 19, 1990
PY-CEI/NRR-1123 L

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

Perry Nuclear Power Plant
Docket No. 50-440
LER 89-032

Dear Sir:

Enclosed is Licensee Event Report 89-032 for the Perry Nuclear Power Plant.

Very truly yours,

Al Kaplan
Vice President
Nuclear Group

AK/njc

Enclosure: LER 89032

cc: T. Colburn
NRC Resident Inspector

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

IE22

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 4

TITLE (4): Division 3 Battery Low Electrolyte Temperature Cause High Pressure Core Spray System Inoperability

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	2 2	8 9	8 9	—	0 3 2	— 0 0	0 1	1 9	9 0		0 5 0 0 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)(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)	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)(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
Henry L. Hegrat, Compliance Engineer, Extension 6855	2 1 6 2 5 9 - 3 7 3 7

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	
X	V I	F U	G 1 8 7	N							
X	K M	T C U	F 1 3 0	N							

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 December 22, 1989, and on January 5, 1990, Unit 2 Division 3 battery electrolyte temperature was discovered to be below Technical Specification limits. Because Unit 1 Division 3 battery was inoperable due to maintenance being performed, Plant Technical Specifications required the High Pressure Core Spray (HPCS) system to be declared inoperable. Operators took actions to raise battery room temperature and declared the HPCS system operable when battery electrolyte temperatures returned to acceptable levels.

The cause of the December 22, 1989 event was Equipment Failure, specifically, a blown fuse in the battery room ventilation duct heater circuitry. Loss of the heater combined with the low heat load in the Unit 2 Division 3 battery room resulted in the battery electrolyte temperature decrease. The January 5, 1990 event was caused by a temperature control valve malfunction which allowed excess cooling water to the battery room ventilation system at a time when cooling water was not desired. This also resulted in the decrease of battery electrolyte temperature.

To prevent recurrence, the blown fuse for the ventilation duct heater was replaced and the heater checked to ensure proper operation. The temperature control valve actuator hydromotor pump was replaced and the valve checked for proper operation. Additionally, operators revised the plant equipment round procedure to include checking battery room temperature once per shift, and a design change proposal to install low temperature alarm instrumentation for the battery rooms is presently being evaluated. As part of the established requalification training program, all plant licensed operators will be instructed on the lessons learned from this event.

On December 22, 1989, and on January 5, 1990, the High Pressure Core Spray [BG] (HPCS) system was declared inoperable due to the inoperability of the associated Division 3 battery [EJ]. At the time of both events, the plant was in Operational Condition 1 (Power Operation) at approximately 100 percent of rated thermal power with the Reactor Pressure Vessel [RPV] at saturated conditions at approximately 1000 psig. The Unit 1 Division 3 battery [BTRY] was inoperable due to a low pilot cell voltage and a cell with a slow electrolyte leak.

On December 22, 1989, at 1027, Unit 2 Division 3 battery electrolyte temperature was discovered to be approximately 69 degrees Fahrenheit (F). In accordance with Technical Specification action requirements associated with D.C. electrical power sources, operators declared High Pressure Core Spray (HPCS) system and the Division 3 Diesel Generator inoperable and initiated troubleshooting efforts to determine the cause of the low temperature. Maintenance troubleshooting revealed a blown power fuse [FU] in a heater circuit for the MCC, Switchgear, and Miscellaneous Electrical Equipment Areas HVAC system [VI]. The fuse was replaced and HPCS/Division 3 operability was declared on December 23, 1989 at 0445, after the battery electrolyte temperature increased above 72 degrees F. All action statements of associated Technical Specifications were satisfied.

On January 5, 1990, at 0241, train "B" of the battery room ventilation system was shifted to recirculation mode due to Unit 2 Division 3 battery room temperature decreasing to 73 degrees F. The ventilation system shift was ineffective due to a malfunctioning temperature control valve [TCV] which, unknown to operators, was the initial cause of the decrease in battery room temperature. The temperature control valve remained closed approximately 50 percent instead of 100 percent as it was supposed to. The failure of the temperature control valve to completely close allowed cooling water to continue flowing to the ventilation system cooler while temperature conditions required cooling flow to be secured. As a result, the Unit 2 Division 3 battery room temperature continued to drop instead of increase as was intended. At approximately 1010, the Unit 2 Division 3 battery room temperature was discovered to be below 72 degrees F and the battery electrolyte temperature was also below 72 degrees F. Operators declared the HPCS system inoperable at that time. At 1024 operators shifted the battery room ventilation system to train "A" in recirculation mode which caused battery room temperature to increase. On January 5, 1990 at approximately 2130 Unit 2 Division 3 battery electrolyte temperature had risen to 72.9 degrees F and battery room temperature had risen to 76 degrees F. Operators then declared Unit 2 Division 3 battery, Division 3 diesel generator and HPCS system operable.

The cause of the December 22, 1989 event was equipment failure, specifically, a blown power fuse in the ventilation duct heater circuitry. The loss of the heater combined with the low heat load in the Unit 2 Division 3 battery room resulted in the battery electrolyte temperature decreasing below the Technical Specification limit. The absence of a battery room low temperature alarm to alert operators to low temperature conditions is considered to be a contributing factor.

The cause of the January 5, 1990 event was equipment malfunction. A temperature control valve in the Control Complex Chilled Water [KM] (CCCW) system did not close completely when its control signal required full closure. Although operators were aware of decreasing Unit 2 Division 3 battery room temperature and took action to shift to the recirculation mode which should have prevented exceeding the Technical Specification limit for electrolyte temperature, the valve malfunction resulted in continued cooling of the Unit 2 Division 3 battery room. Again the absence of a battery room low temperature alarm to alert operators to low temperature conditions is considered to be a contributing factor as this would have provided more time to evaluate system conditions and take corrective action.

The objective of the Division 3, 125-volt dc power system is to provide a continuous and independent 125-volt dc source of control and motive power as required for HPCS system logic, HPCS diesel generator control and protection, and all Division 3 related 125-volt dc control. Upon loss of these control power systems, the HPCS system is required by Technical Specification to be declared inoperable.

The HPCS system pumps water through a peripheral spray ring sparger mounted above the reactor core. Coolant is supplied over the entire range of system operation pressures. The primary purpose of HPCS is to maintain reactor vessel inventory after small breaks which do not depressurize the reactor vessel. HPCS also provides spray cooling heat transfer during leaks in which core uncovery is calculated. During the periods of time the HPCS system was declared inoperable, the Automatic Depressurization System and Low Pressure Core Spray, as well as the Low Pressure Coolant Injection Systems were operable ensuring adequate core cooling as described in Chapter 15 of the Updated Safety Analysis Report. Additionally, although the batteries were required to be declared inoperable, the HPCS system was not removed from service and would have automatically initiated if required. Engineering calculations indicate that the Unit 2 Division 3 battery would perform its intended function with electrolyte temperature as low as 65 degrees F. Therefore, these events are not considered to be safety significant.

One other previous event involving low battery electrolyte temperature was documented by LER 87-008. A faulty thermostat had caused Division 1 battery electrolyte temperature to be less than 72 degrees F. The Division 1 battery room thermostat was replaced. Additionally, to address a delay by maintenance personnel in notifying the control room of their findings, maintenance personnel were counseled to ensure prompt notification of the Unit Supervisor if Technical Specification acceptance criteria is exceeded. These corrective actions could not have prevented the December 22, 1989 and January 5, 1990 events.

To prevent recurrence, on December 23, 1989, the blown power fuse for the battery room ventilation duct heater circuit was replaced and voltage and current readings were taken to ensure the heater was working as designed. On January 12, 1990, the CCCW temperature control valve actuator hydromotor pump was replaced due to internal leakage, and subsequently the temperature control valve was tested satisfactorily in the system. Additionally, operators revised the plant equipment round procedure to include checking battery room temperatures once per shift. Finally, a previously submitted design change proposal to install low temperature alarm instrumentation for the battery room is presently being evaluated. As part of the established requalification training program, all plant licensed operators will be instructed on the lessons learned from this event.

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