Nebraska Public Power District

COOPER NUCLEAR STATION
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NLS940113

November 9, 1994

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

Dear Sir:

Cooper Nuclear Station Licensee Event Report 94-026 is forwarded as an attachment to this letter.

Sincerely,

J. T. Herron
Plant Manager

JTH/nr

Attachment

cc: L. J. Callan
G. R. Horn
J. H. Mueller
R. G. Jones
R. A. Sessoms
K. C. Walden
INPO Records Center
NRC Resident Inspector
R. J. Singer
CNS Training
CNS Quality Assurance

IE22

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
COOPER NUCLEAR STATION	05000298	1 OF 4

TITLE (4) Standby Liquid Control System not maintained at proper temperature due to design deficiency and lack of appropriate monitoring.

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 NAME	DOCKET NUMBER
10	09	94	94	-- 026 --	00	11	09	94	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	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)	OTHER
	20.405(a)(1)(iii)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
	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 (Include Area Code)
Alan J. Horn Staff Support Engineer, Nuclear Licensing and Safety	(402) 825-3811

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	BR	EHTR	C268	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 15 single-spaced typewritten lines) (16)

On October 9, 1994, it was determined that the temperature of the solution in the Standby Liquid Control (SLC) System was not being monitored in accordance with Technical Specification requirements for maintaining the temperature for the concentration of sodium pentaborate solution in the system. Specifically, the suction piping has not been monitored and verified above the required temperature. In addition, the pump head is not properly heat traced and insulated. Assuming worst case wintertime room temperatures, a portion of the SLC system could have sodium pentaborate precipitate out and deposit in a film in the bottom of the pump head. However, the pumps are expected to operate when needed and pump out any precipitate present.

The root cause of this event is a Management/Quality Assurance Deficiency (NUREG-1022, Cause Code E) in not identifying the requirement to monitor the SLC system suction piping to satisfy Technical Specifications and not identifying the need to properly heat trace and insulate the pump head and suction piping.

Corrective actions include design changes to improve heat tracing and monitoring capabilities of the SLC system and procedure changes to include required monitoring in the Technical Specification surveillance program. In addition, a Design Basis Reconstitution Program is underway to review design, USAR, and Technical Specification requirements. Also, a surveillance testing verification program is in progress to review surveillances with Technical Specification criteria and verify that component/system testing is satisfactory.

Plant Status

The plant was in Cold Shutdown with the Reactor Coolant System temperature approximately 110 degrees Fahrenheit and the Residual Heat Removal system in the Shutdown Cooling mode of operation when the deficient Standby Liquid Control (SLC) heat trace and monitoring were discovered.

Event Description

On May 18, 1994, a thermostat for a portion of the SLC system (EIIS: BR) heat tracing (EIIS: EHTR) was found improperly installed on the outside of the insulation and did not monitor the actual pipe temperature. A Condition Report (CR) was written to document and resolve the condition. The shift supervisor did not question the operability of the system since the condition was considered a conservative situation that would keep the temperature higher than required. As part of repair activities, it was found that the heat trace on the discharge side of the pump controlled by this thermostat was not working due to an open circuit. This was also determined by the shift supervisor to not affect operability of the system since temperature readings taken on the SLC pump discharge piping were above Technical Specification requirements.

On June 24, 1994, during an audit of the response to the above CR, Quality Assurance considered that the failure of the heat trace should have been the basis for declaring the system inoperable and reportable and initiated another CR. The response to this CR determined that the system was operable, but recommended changes to the system heat tracing to improve its monitoring capability.

On September 27, 1994, while engineering was investigating the system as part of the research for changes to the heat tracing and monitoring capability proposed in the action plan for the June 24 CR, it was determined that the temperature of the SLC piping was not being maintained above the Technical Specification limits for the concentration of sodium pentaborate in the system. Also, it was determined that the pump head was not heat traced and insulated in accordance with the system design specifications. However, it was determined that this condition would not prevent the SLC system from performing its safety function when required.

On October 9, 1994, it was determined that the as built condition of the SLC pumps and suction piping does not satisfy the Technical Specification requirements for maintaining and monitoring the SLC solution temperature since no specific pump and piping temperature measurements have been part of the surveillance program. This condition was reported to the NRC on October 11, 1994, in a Special Evaluation Observation response.

Safety Significance

The temperature of the SLC system is required to be maintained above prescribed levels in order to assure that the sodium pentaborate remains in solution. If the temperature drops below the saturation temperature, the sodium pentaborate can precipitate out of solution forming crystals in the system. This continues until an equilibrium is reached where the concentration in solution is at the value for the ambient temperature. Technical Specification temperature requirements are conservative to allow for uncertainties in temperature control and variations in designs.

At Cooper Nuclear Station the minimum design temperature of the rooms containing the SLC system is 50 degrees Fahrenheit. At this temperature, the solution concentration in the pump heads and unheated piping would drop to approximately 11 percent from the maximum 16 percent in the system. The crystals formed in the pump heads and piping would settle to the bottom and are soft, with little mechanical strength. The positive displacement SLC pumps would have no difficulty in pumping liquid through the system with the crystals and since the SLC tank, being heated by internal heaters, is unaffected by the heat trace deficiency, the warmer, higher concentration solution would soon flush through the system, dissolving any crystals in the pump heads and piping. This action would result in all of the design basis amount of sodium pentaborate being injected into the reactor as required.

Cause

The root cause of this event is the failure to identify the requirement that the pump heads and suction piping should be heat traced and insulated and misinterpreting the Technical Specification requirements for temperature monitoring of the system. Note: When found, the heat tracing was in the original design configuration of the plant.

Corrective Action

The following actions will be completed prior to startup from the present outage.

- A design change will be implemented to upgrade the SLC heat tracing to comply with system design requirements and allow appropriate monitoring.

- Procedure changes will be made to include surveillance requirements for temperature monitoring of all the SLC system that is required to be monitored.

Operator training will be provided on the above changes when they are completed.

The Design Basis Reconstitution Program is currently underway. The validation portion of this program conducts an integrated review of design, USAR, and Technical Specification requirements. This program is ongoing, scheduled to be completed by mid-1995.

In addition, a Cooper Nuclear Station Surveillance Testing Validation Program is in progress to study and review testing requirements for each of the CNS systems with Technical Specification criteria. It is designed to validate the Technical Specification required surveillance program as well as verify that Technical Specification component/system testing provides assurance the intended design function can be met.

Similar Events

LER 94-012 HPCI System operability pressure in Technical Specifications not understood when setting low pressure HPCI turbine trip setpoint.

LER 94-015 Excessive heatup/cooldown during RPV stratification events caused, in part, by not understanding Technical Specification requirements.