



## Nebraska Public Power District

COOPER NUCLEAR STATION  
P.O. BOX 98, BROWNVILLE, NEBRASKA 68321  
TELEPHONE (402) 825-3811

CNSS923570

March 9, 1992

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

Dear Sir:

Cooper Nuclear Station Licensee Event Report 92-003, Revision 0, is being forwarded as an attachment to this letter.

Sincerely,

J. M. Meacham  
Division Manager of  
Nuclear Operations  
Cooper Nuclear Station

JMM/bjs

Attachment

cc: R. D. Martin  
G. R. Horn  
R. E. Wilbur  
V. L. Wolstenholm  
D. A. Whitman  
INPO Records Center  
NRC Resident Inspector  
R. J. Singer  
CNS Training  
CNS Quality Assurance

*Handwritten note:* 4/22/92

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Cooper Nuclear Station										DOCKET NUMBER (2) 0 5 0 0 0 2 9 8 1 OF 0 6											
TITLE (4) Technical Specification Violation And Required Plant Shutdown Resulting From Inoperable 250 Volt Batteries Due To Copper Contamination																					
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(S)					DOCKET NUMBER(S)							
0	2	0	7	9	2	9	2	0	0	3	0	3	0	9	9	2	0 5 0 0 0 0				
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)																			
N		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)							
POWER LEVEL (10)		1 0 0				20.405(a)(1)(i)				50.73(a)(1)				73.71(c)							
		20.405(a)(1)(ii)				50.73(a)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below or on next NRC Form 386A)							
		20.405(a)(1)(iii)				X 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)(ix)											
LICENSEE CONTACT FOR THIS LER (12)																					
NAME John R. Myers										TELEPHONE NUMBER											
										AREA CODE 4 0 2 8 2 5 - 3 8 1 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											
B	E	I	B	T	R	Y	C	1	7	3	Y										
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)											
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO											
										MONTH DAY YEAR											

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

On December 18, 1991, a low individual cell voltage (ICV) condition was discovered on one cell of the Division A 250 Volt Battery. On February 7, 1992, following discussion with NRC Regional management regarding Technical Specification intent, the Battery was declared inoperable. At the time the condition was initially identified, assessment of operability by plant personnel indicated that, while the individual cell was considered degraded, the battery was capable of performing its intended function, and it was therefore considered operable. Since the battery was not recognized as inoperable at that time, the LCO was not entered and the 24 hour report required by Technical Specifications was not made. Upon the subsequent determination that the battery was inoperable, the appropriate Action Statement was entered at 1:20 p.m. on February 7, 1992. The plant was shut down on February 10, after finding a similar low ICV on one cell of the Division B 250 Volt Battery.

The low ICV conditions were due to copper contamination of the cells resulting from manufacturing defects, as described in Information Notice 89-17. The Technical Specification LCO was not entered when the low ICV was initially discovered due to information in the Technical Specification Bases section which was interpreted to allow an evaluation of the effect of the individual cell's condition on overall battery operability. During the plant shutdown, selected contaminated cells were replaced, and the remaining contaminated cells are being monitored frequently. A Technical Specification change has been submitted to the NRC to clarify the requirements for battery operability. Additional enhancements are on-going to ensure that degraded conditions, which may occur in the future, receive appropriate and timely operability reviews.

LICENSEE EVENT REPORT (LER)  
1 TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

Cooper Nuclear Station

0 5 0 0 C 2 9 8 9 2 - 0 0 3 - 0 0 0 2 OF 0 6

TEXT (If more space is required, use additional NRC Form 356A's) (17)

A. Event Description

Surveillance Procedure 6.3.15.1, 125/250 V Station and Diesel Fire Pump Battery Quarterly Check, was performed on December 18, 1991. At that time, cell 110 of the A 250 Volt Battery was found to have an individual cell voltage (ICV) of 2.05 volts, below the 2.15 volts required by the procedure and Technical Specification surveillance requirement 4.9.A.4.6.2. This condition was noted as a discrepancy, and was brought to the attention of the System Engineer for resolution. The initial assessment by the System Engineer concluded that, while the cell was degraded, the battery was capable of performing its intended function and was considered operable. A Nonconformance Report was originated by the System Engineer to disposition the discrepancy, and a Maintenance Work Request was subsequently generated to replace the cell. An inspection was also made in which the System Engineer determined that copper contamination was being experienced by individual cells in both the Division A and B 250 Volt Batteries.

Concurrently, several discussions on the condition of the battery and its operability occurred between plant management and the site engineering staff. The conclusion of these discussions was that the battery was able to perform its intended function and was therefore operable. The fact that there was no Action Statement in the Technical Specifications associated with the individual cell parameters resulted in the operability determination being based on the battery being capable of performing its design basis intent. Additionally, the Bases section of the Technical Specifications dealt with the Battery as a composite system, rather than on an individual cell basis.

On January 8, the weekly inspections of the 250 Volt Batteries was supplemented with ICV checks for contaminated cells. A manufacturer's representative visited the plant on January 13 to inspect the batteries and recommend corrective actions. Twenty-five cells in the Division A 250 Volt Battery and 19 cells in the Division B 250 Volt Battery were found to show varying degrees of copper contamination. A formal operability review was performed on January 15, 1992, to document the previous conclusion that the battery would be capable of performing its required functions. This analysis concluded that the Division A 250 Volt Battery would perform its design function with up to five cells removed from service.

During the week of February 3-7, a Regional NRC inspector questioned the operability of the battery with the degraded cell. The basis for this question was his understanding that Technical Specifications required the battery to be considered inoperable with any parameter of any individual cell being outside the limits stated in the surveillance requirements.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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.

FACILITY NAME (1)  Cooper Nuclear Station	DOCKET NUMBER (2)  0 5 0 0 0 2 9 8	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9 2	— 0 0 3	— 0 0	0 3	OF	0 6

TEXT (If more space is required, use additional NRC Form 306A's) (17)

A. Event Description (Continued)

On February 7, at 1:20 p.m., during a discussion with Region IV and NRR personnel, the NRC indicated that it was their position that the CNS Technical Specifications should be interpreted similar to Standard Technical Specifications, which requires that the Battery be declared inoperable if any individual cell parameters are outside the stated limits. During this conference, CNS notified the NRC that the Division A 250 Volt Battery was being declared inoperable.

Following a review of the increased ICV monitoring results on the Division B 250 Volt Battery on February 10, cell 88 was determined to also be below the required ICV limit. This resulted in declaring the Division B 250 Volt battery inoperable at 1:55 p.m., and, in accordance with Technical Specifications and the Emergency Plan, a plant shutdown commenced, requiring the declaration of a Notification of Unusual Event (NOUE). The reactor was manually scrammed at 7:30 p.m., and Cold Shutdown reached at 7:12 a.m. on February 11. The NOUE was terminated at 8:00 a.m.

B. Plant Status

At the time the low cell voltage was discovered on the Division A 250 Volt Battery, the plant was in operation at approximately 25 percent power, in power ascension following the 1991 refueling outage. Subsequent plant operation was at power levels from 16 percent to 100 percent, until the shutdown on February 10 commenced.

C. Basis for Report

This event is reportable per 10CFR50.73 (a)(2)(i)(A), the completion of a shutdown required by the Technical Specifications, and 10CFR50.73 (a)(2)(i)(B), an operation prohibited by the Technical Specifications. A Notification of Unusual Event was declared for the Technical Specification required shutdown, and a 50.72 (a)(1)(i) and (B)(1)(i)(A) notification made at 2:03 p.m. on February 10, 1992.

D. Cause

The low ICVs experienced were due to copper contamination on the negative plates of the cells, as described in NRC Information Notice 89-17. The contamination of the cells is due to a manufacturing defect which allowed the copper insert in the post to be canted, reducing the depth of lead covering. Porosity in the lead then allows the copper insert to come in contact with the electrolyte. The copper, over time, dissolves into the electrolyte and plates out on the negative plates, reducing the cell's capability to maintain its ICV.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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.

FACILITY NAME (1)  Cooper Nuclear Station	DOCKET NUMBER (2)  0 5 0 0 0 2 9 8 9 2	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 2	0 0 3	0 0	0 4	OF 0 6

TEXT (If more space is required, use additional NRC Form 366A's) (1)

D. Cause (Continued)

The existing Cooper Nuclear Station Technical Specifications do not provide a specific Action Statement for an individual cell which does not meet the parameters specified in the surveillance requirements. The Action Statement for the battery was perceived to be directed at the operability of the battery as a complete entity, rather than as a collection of individual components (cells). This position appeared to be supported by the statements made in the Bases section of the Technical Specifications. As a result, the operability assessments which were performed were based on the ability of the battery to satisfy system design requirements.

E. Safety Significance

A review of the battery capacity indicates that, although one cell in each battery did not meet the surveillance requirement, the batteries would have been able to meet their functional requirements. Five severely degraded cells, which were among those removed during the aforementioned shutdown, were tested as a group, including cell 110 from the Division A 250 Volt Battery. After four hours of testing, which simulated a service test in accordance with Technical Specification requirements, all cells performed satisfactorily, with cell 110 having the lowest ICV (1.85V). Cell 110 lasted approximately 5 1/2 hours, after which its ICV dropped to zero followed by a polarity reversal. This test indicated that severely contaminated battery cells would have met their design basis performance requirement.

F. Safety Implications

The 250 Volt batteries supply power to station emergency equipment and selected safeguard system loads. The Division A battery also supplies RCIC equipment, and the Division B Battery supplies HPCI equipment. Sufficient redundancy is provided to assure that the loss of either battery will not result in the inability to effectively respond to accident conditions. For the condition of the batteries in this event, sufficient power was available to cope with the accident sequences. Calculations show that sufficient power is available with as many as five cells jumpered on the Division B Battery and six cells jumpered on the Division A Battery. Additionally, as noted in the Technical Specifications, the degradation of the cells occurs at a speed which allows sufficient time for corrective actions.

G. Corrective Action

Upon reaching Cold Shutdown, the two cells which were below the Technical Specification voltage limits were replaced with spare, freshly charged cells. Based on a review of the condition of other cells, eight additional cells exhibiting the most severe copper contamination were replaced. Upon completion of testing, the batteries were declared operable. Plant operation resumed at 6:30 a.m. on February 16, 1992.

LICENSEE EVENT REPORT (LER)  
1 TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH: (F-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)

LER NUMBER (6)

PAGE (3)

Cooper Nuclear Station

0 | 5 | 0 | 0 | 0 | 2 | 9 | 8 | 9 | 2 | — | 0 | 0 | 3 | — | 0 | 0 | 0 | 5 | OF | 0 | 6

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

G. Corrective Action (Continued)

To ensure continued operability of the batteries, a Battery Action Plan was developed to address actions to inspect, monitor, and trend continued performance of individual battery cells. As part of this plan, the quarterly surveillance is being performed weekly for the 250 VDC Batteries. Increased monitoring of cells which indicate copper contamination is being performed on a twice per week basis. Cells which are categorized as showing "advanced copper contamination" will be monitored on a daily basis. No cells are currently classified as having "advanced copper contamination." The monitoring described includes a visual inspection for the extent of contamination, IGV measurement, and review of the change in IGV each day. The results of the monitoring are trended, to predict the degradation rate and ensure that Technical Specification limits are not exceeded.

Procedures and safety evaluations have been developed to either replace or jumper cells which approach the Technical Specification limit. To ensure adequate battery capacity, the number of cells required by the battery load profile was re-evaluated. Based on this evaluation, sufficient capacity remains available with 5 cells jumpered out on the Division B Battery and 6 cells on the Division A battery.

Cells have been ordered from the original equipment manufacturer to replace those which indicate significant copper contamination. Replacement of the contaminated cells is anticipated following receipt of the new cells.

A Technical Specification change has been submitted to the NRC requesting an update to the Surveillance Requirements, LCOs, Action Statements, and Bases for the batteries. This change clarifies the performance criteria, Action Statements, and surveillance requirements by reformatting them in accordance with the Standard Technical Specifications. Additionally, a feedback program to capture and resolve Technical Specification inconsistencies is being implemented.

To enhance the determination of equipment operability, the operability determination procedure is being revised to separate operability determinations from corrective actions, provide additional documentation of the operability determination process, and establish timeliness requirements commensurate with the safety significance of degraded conditions.

The nonconformance and corrective action program will also be improved to more clearly separate operability determinations from corrective actions.

A review of past nonconformances related to battery or charger operability is being conducted to determine if similar instances exist and will be followed up with a supplemental response, if required. Finally, open nonconformances were reviewed to ensure no other incorrect operability determinations have been made.

LICENSEE EVENT REPORT (LER)  
1 TEXT CONTINUATION

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 (F-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.

FACILITY NAME (1)  Cooper Nuclear Station	DOCKET NUMBER (2)  0 5 0 0 0 2 9 8 9 2	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
			0 0 3	0	0 6	OF	0 6

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

H. Similar Events

LER 91-008 documents a Technical Specification violation which was partially the result of inconsistent Technical Specifications. The corrective action for that event involved a review and correction of the Action Statement for Containment Isolation valves in the Technical Specifications, rather than clarity of operability requirements for batteries. The Technical Specification change has been submitted.

Supplemental Information

The 250 Volt Batteries are manufactured by C&D Power Systems, Model LCR-25. Each 1800 Ampere-Hour battery consists of 120 Lead-Calcium cells.