



February 25, 2000

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Operating License DPR-58
Docket No. 50-315

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

LER 315/1999-029-01, "Lack of Verbatim Compliance Results in Violations of Technical Specifications."

The two commitments identified in LER 315/1999-029-00 dated January 14, 2000, are superseded in their entirety and replaced by the following commitments identified in this submittal:

- Battery surveillance and maintenance procedures will be revised by March 15, 2000, to identify the TS-related battery conditions that could impact 250 VDC System operability.
- A TS amendment request will be submitted prior to December 31, 2000, for TS SR 4.8.2.3.2.c.2 to update battery maintenance requirements.

If you have any questions, please contact Mr. Robert C. Godley, Director, Regulatory Affairs, at 616/465-5901, extension 2698.

Sincerely,

A handwritten signature in black ink, appearing to read "A. Christopher Bakken, III".

A. Christopher Bakken, III
Site Vice President

/srd
Attachment

c: J. E. Dyer, Region III
R. C. Godley
D. Hahn
W. J. Kropp
R. P. Powers
R. Whale
NRC Resident Inspector
Records Center, INPO

NRC Form 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION <h2 style="text-align: center;">LICENSEE EVENT REPORT (LER)</h2> <p style="text-align: center;">(See reverse for required number of digits/characters for each block)</p>	APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001 <small>ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-8 F33), 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</small>
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FACILITY NAME (1) Donald C. Cook Nuclear Plant Unit 1	DOCKET NUMBER (2) 05000-315	PAGE (3) 1 of 4
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TITLE (4)
 Lack of Verbatim Compliance Results in Violations of Technical Specifications

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	
11	18	1998	1999	-- 029 --	01	02	25	2000	FACILITY NAME	DOCKET NUMBER	
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
-			20.2201 (b)	20.2203(a)(2)(v)			<input checked="" type="checkbox"/> 50.73(a)(2)(i)		50.73(a)(2)(viii)		
POWER LEVEL (10)			20.2203(a)(1) 20.2203(a)(3)(i) 50.73(a)(2)(ii) 50.73(a)(2)(x)								
0			20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii) 73.71		
			20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv) OTHER		
			20.2203(a)(2)(iii)			50.36(c)(1)			50.73(a)(2)(v)		
			20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii) <small>Specify in Abstract below or on NRC Form 366A</small>		

LICENSEE CONTACT FOR THIS LER (12)

NAME M. B. Depuydt, Regulatory Affairs	TELEPHONE NUMBER (Include Area Code) 616 / 465-5901, x1589
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)								
<input checked="" type="checkbox"/> YES	(If Yes, complete EXPECTED SUBMISSION DATE).			<input checked="" type="checkbox"/> X	<input type="checkbox"/> NO	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;">MONTH</td> <td style="width:33%;">DAY</td> <td style="width:33%;">YEAR</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	MONTH	DAY	YEAR			
MONTH	DAY	YEAR										

Abstract (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

This revised LER is submitted to describe an additional reportable condition with the same root cause discovered during the investigation supporting LER 315/99-029-00.

On December 17, 1999, it was determined that Donald C. Cook Nuclear Plant (CNP) was not in verbatim compliance with the wording of Technical Specifications (TS) Surveillance Requirement (SR) 4.8.2.3.2.c.2 due to minor surface corrosion identified November 18, 1998, on a terminal connection of the 1-BATT-AB battery. No action was taken to declare the battery inoperable in accordance with TS or to correct the condition. During the investigation, CNP discovered that minor surface corrosion had also been identified on a terminal of the redundant 250 VDC safety related 1-BATT-CD battery, and that battery acid had corroded through the side of a horizontal battery rack support member for the 1-BATT-AB battery, but the batteries were not declared inoperable in accordance with TS. The above-described conditions were determined to be reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), as conditions prohibited by the plant's Technical Specifications. The cause was that CNP believed that compliance with the intent of the TS wording was deemed to be acceptable. Contributing causes were that the weekly battery maintenance procedure did not identify battery corrosion as a TS operability concern, and that TS SR 4.8.2.3.2.c.2 was not current with changes in industry standards. Corrective actions were to declare the 1-BATT-AB battery inoperable, verify that the remaining battery cell terminal connections for Units 1 and 2 were free of corrosion, and increase awareness of the need for verbatim compliance with the TS wording. Future actions are to provide training on Operability Evaluations and TS compliance, revise the battery maintenance procedures, and submit an amendment request for the battery TS SR.

There is no safety significance for this event because the 1-BATT-AB and 1-BATT-CD batteries would have been capable of performing their safety related functions even with the surface corrosion on the terminal lugs and the hole in the rack.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)				PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		1999	-- 029 --	01		

Donald C. Cook Nuclear Plant Unit 1

05000-315

2 of 4

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

Conditions Prior to Event

Unit 1 was de-fueled

Description of Event

On December 17, 1999, as a result of a Nuclear Regulatory Commission inspection and the subsequent follow-up investigation, it was determined that Donald C. Cook Nuclear Plant (CNP) was not in verbatim compliance with the wording of Technical Specifications (TS) Surveillance Requirement (SR) 4.8.2.3.2.c.2. The TS SR requires verification, at least once per 18 months, that the 250 VDC safety related battery cell-to-cell and terminal connections are clean, tight, free of corrosion, and coated with anti-corrosion material. Contrary to TS SR 4.8.2.3.2.c.2, on November 18, 1998, minor surface corrosion was identified at an inaccessible location on a terminal connection of cell 30 of the 1-BATT-AB battery; however, no action was taken to declare the battery inoperable in accordance with TS 3.8.2.4, or to correct the condition, until May 15, 1999. Note that TS 3.8.2.4, "DC Distribution – Shutdown," references the surveillance requirements of TS 3.8.2.3, "DC Distribution – Operating," to verify operability of the safety related batteries while in a shutdown condition. An Operability Evaluation was performed on May 15, 1999, which concluded that the battery was operable with a non-conforming item, specifically the minor deposit of corrosion on the surface of the terminal lug that was not part of the conducting path. Following the acceptance of the Operability Evaluation by Operations, the battery was considered to be operable and the corrosion remained. The NRC questioned the operability of the 1-BATT-AB battery due to the corrosion during an inspection in December 1999, and on December 17, 1999, the 1-BATT-AB battery was declared inoperable.

During the investigation, CNP discovered that minor surface corrosion had also been identified on the redundant 250 VDC safety related battery on March 16, 1999. Corrosion was identified on the positive post of cell 109 of the 1-BATT-CD battery, but the battery was not declared inoperable in accordance with TS 3.8.2.4. The Limiting Condition for Operation for TS 3.8.2.4 requires one operable 250 VDC bus and one operable 250 VDC battery bank and associated charger when the plant is in Modes 5 and 6. During the period from March 16, 1999, until the corrosion was removed from the 1-BATT-CD battery on May 26, 1999, both batteries were inoperable, without the TS 3.8.2.4 required Action to establish primary containment integrity within eight hours being taken.

The investigation also identified that on October 7, 1998, corrosion was found on the 1-BATT-AB battery rack. Battery acid had corroded through the side of a horizontal battery rack support member resulting in a small hole, and other areas with minor deterioration were noted. TS SR 4.8.2.3.2.c.1 requires, at least once per 18 months, that the battery racks show no visual indication of physical damage or abnormal deterioration. An Operability Determination was performed which concluded that the battery remained operable based on the fact that there were four horizontal supports on the rack where only two were required by the seismic design. Contrary to the TS requirements, the 1-BATT-AB battery remained operable when it should have been declared inoperable because the rack was not in verbatim compliance with the TS.

Cause of Event

The cause of the event was that CNP subscribed to a standard of TS compliance in which compliance with the intent, rather than verbatim compliance with the TS wording, was deemed to be acceptable.

A contributing cause was that the weekly battery surveillance and maintenance procedure did not identify battery terminal or rack corrosion as TS operability concerns.

A second contributing cause was that TS SR 4.8.2.3.2.c.2 contains requirements that have not been maintained current with changes in industry standards. Specifically, an improved method of determining the effects of corrosion on battery terminal connections is by measurement of terminal connection resistance, and is now part of the surveillance requirements in the Improved Technical Specifications, NUREG-1431, "Standard Technical Specifications."

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)				PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Donald C. Cook Nuclear Plant Unit 1	05000-315	1999	-- 029 --	01	3 of 4	

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

Analysis of Event

On December 17, 1999, the battery terminal corrosion conditions were determined to be reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), as conditions prohibited by the plant's Technical Specifications. On January 26, 2000, the 1-BATT-AB battery rack deterioration condition was determined to be reportable, also in accordance with 10 CFR 50.73(a)(2)(i)(B).

Each CNP unit has two separately located sets of battery trains, which include the battery banks, distribution cabinets, control panels, buses, and individual feeders connecting the various loads. Each 250 VDC battery bank is comprised of 116 individual, series-connected, lead-acid cells. The individual battery cells and interconnecting cables are required to support the safety function of the 250 VDC Distribution System under normal operating or accident conditions.

The TS surveillance requirements for maintaining the battery terminal connections free of corrosion are in place to ensure that the interconnections for the battery cells do not degrade and impact overall battery bank output. Once initiated, battery cell connection corrosion increases with time and can lead to connector degradation and an increase in cell connection resistance. Increased resistance would result in a corresponding decrease in overall battery bank output voltage and a decrease in load capacity.

The industry guidance provided by the latest revision to Institute of Electrical and Electronics Engineers (IEEE) Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," allows that, if terminal corrosion is noted, clean the visible corrosion off of the terminal and check the resistance of the connection. CNP battery maintenance procedures incorporate the guidance provided in IEEE Standard 450-1995. Inspections for corrosion are performed weekly as part of routine battery maintenance, and any accessible corrosion buildup is removed. If corrosion is identified and removed from the battery connections during the inspection, a battery terminal connection resistance check is performed to verify resistance less than a threshold value of 150 micro-ohms.

Further industry guidance is provided by NUREG-1431, which includes surveillance requirements to measure the resistance of the battery cell terminal connections to determine if degradation is occurring. To determine if any degradation of the terminal connection on cell 30 of the 1-BATT-AB battery had occurred, resistance measurement results were reviewed for the past 30 months. The comparison showed that the terminal connection resistance for cell 30 has remained constant throughout the period. Therefore, there is reasonable assurance that the electrical connection is free of corrosion, that the 1-BATT-AB battery would have been capable of performing its safety related function even with surface corrosion on a terminal lug of cell 30, and that the intent of TS SR 4.8.2.3.2.c.2 is met. The same reasoning applies for the condition with both redundant batteries inoperable due to surface corrosion on battery cell terminal connections during the period from March 16 through May 26, 1999.

Based on the low resistance values of the battery cell terminal connections, there is no safety significance associated with the failure to comply verbatim with the TS requirement for maintaining the battery terminal connections free of corrosion.

There is no safety significance associated with the failure to comply verbatim with the TS requirement for maintaining the 1-BATT-AB battery rack free of visible damage or abnormal deterioration. The rack is designed to support the weight of the battery under seismic conditions with two horizontal support members under the battery shelf. The as-built battery rack has four support members, and therefore has ample support margin for the shelf, even with the small hole in the battery rack support member.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)				PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		1999	-- 029 --	01		
Donald C. Cook Nuclear Plant Unit 1	05000-315				4 of 4	

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

Corrective Actions

The immediate corrective actions were to declare the 1-BATT-AB battery inoperable, and to verify that the remaining battery cell terminal connections for Units 1 and 2 were free of corrosion. The 1-BATT-AB battery has been replaced and the battery rack repaired, which resolved the terminal and rack corrosion concerns.

The terminal corrosion was removed from the 1-BATT-CD battery on May 26, 1999, and the battery was restored to operable status.

CNP has increased awareness of the need for verbatim compliance with the Technical Specifications wording. The Director of Regulatory Affairs issued a memo to all Department Heads for dissemination to all departmental personnel regarding the need to comply with both the exact wording and intent of TS. Although Operations is responsible for implementing the TS, the memo defined Regulatory Licensing as the point of contact for assistance in resolution of situations when TS cannot be followed as written. As a communication tool, an article was published in the plant newsletter, for all personnel to read, that reinforced the need for compliance with both the letter and intent of TS.

Corrective actions to prevent recurrence include the following:

1. Information related to verbatim TS compliance and wording of TSs was incorporated into procedure PMP 7030. OPR.001, "Operability Determination."
2. Training is being provided to appropriate personnel on these issues to emphasize that an Operability Evaluation cannot override compliance with the TS, and to reinforce verbatim compliance with the TS.
3. Battery surveillance and maintenance procedures will be revised by March 15, 2000, to identify the TS-related battery conditions that could impact 250 VDC System operability.
4. A TS amendment request will be submitted prior to December 31, 2000, for TS SR 4.8.2.3.2.c.2 to update battery maintenance requirements to those of the industry.

Previous Similar Events

- 315/99-004-01
- 315/99-009-01
- 315/99-024-00
- 315/99-025-00
- 315/99-030-00