



## Nebraska Public Power District

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CNSS923088  
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U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

Subject: Supplemental Information - Station Battery Cell Degradation  
Cooper Nuclear Station  
NRC Docket No. 50-298/DPR-46

Reference: Cooper Nuclear Station Licensee Event Report No. 92-003, Revision 0,  
dated March 9, 1992

Gentlemen:

This letter provides supplemental information to that given in the reference regarding the degradation observed in certain Cooper Nuclear Station (CNS) safety-related battery cells. This information is being provided per discussions with Region IV management personnel and may provide further insight into the problem as described in NRC Information Notice 89-17.

Extensive investigation of the battery cell degradation at Cooper Nuclear Station has confirmed that copper contamination, as described in NRC IN 89-17, is the root cause. Furthermore, it was also determined that this contamination resulted from an error made during the manufacture of the battery cell terminal posts. Each post consists of a copper insert imbedded within a lead casting. An alignment pin is used during the casting process to maintain the copper insert in the proper orientation. The pin has been shown to bend, or in some cases break, allowing the copper insert to become canted within the casting during the manufacturing process. If the amount of canting is excessive, the lead which covers the copper insert will be of an insufficient thickness to seal the copper from exposure to the cell electrolyte. When the electrolyte attacks the copper insert, the copper slowly dissolves from the insert and deposits electrochemically on the negative plates of the cell. The deposits exhibit a dark reddish color and laboratory analysis has confirmed that they contain copper compounds.

It has also been determined that copper contamination is a slowly developing process, typically requiring several years to impact cell performance. Repeated tests have shown that the copper contamination has an inconsequential impact on cell performance unless the copper deposits become large enough to short adjacent plates. Existing monitoring of the CNS battery cells provides ample advanced notification of the need to schedule replacement of contaminated cells.

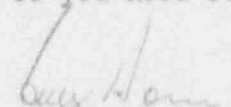
The District is investigating means to detect the existence of canting of the copper insert in the cells presently installed at CNS. Some success has been achieved in utilizing both destructive testing and radiography of disassembled cell posts. Other means of detecting the canting of the copper insert

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(e.g. templating) are being evaluated. Knowledge gained of which cell posts may have a high degree of canting will be factored into our battery cell monitoring program. New cells being procured for CNS will have their insert configuration verified by an NPPD representative who will be in attendance at critical times during the manufacture of cells. This arrangement will continue until the District is assured the vendor has corrected the steps in their manufacturing practices that allow the canting configuration to occur.

If you need further information, please advise.

  
G. R. Horn  
Nuclear Power  
Group Manager

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cc: U. S. Nuclear Regulatory Commission  
Region IV  
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NRC Senior Resident Inspector  
Cooper Nuclear Station