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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

May 16, 1986

IE INFORMATION NOTICE NO. 86-37: DEGRADATION OF STATION BATTERIES

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice is provided to alert recipients to a significant problem occurring in station batteries. It is expected that recipients will review this information for applicability to their facilities and consider action, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

While shut down, recent inspections at the Rancho Seco Nuclear Power Plant revealed substantial degradation of all station batteries. The batteries exhibited flaking of the cell plates and flaking of the plate's hook area where the plates connect to the cell posts. Although the licensee performed visual inspections that included examination of the electrolyte level and accumulation of sediment in the bottom of the cell, the severe flaking went unnoticed. The deteriorated cells were of the Planté design and over 15 years old. The batteries were expected to last about 20 years and an inspection by the battery vendor 1 year earlier did not reveal abnormal degradation. Subsequent NRC inspections related to the cell-to-cell spacing and cell-to-rack spacing also revealed that the batteries were not installed in accordance with the battery vendor's seismic qualification recommendations. As a result of the flaking, the battery vendor advised the licensee that the batteries at Rancho Seco should be replaced and the licensee is now in the process of replacing the batteries.

On April 16, 1986, North Anna Unit 2 declared three out of four station batteries inoperable. The specific gravities in the pilot cells of the affected batteries were found below the technical specification limit. In two of the batteries, approximately half of the cells had specific gravities that were out of specification. The cause was attributed to the inadequate float voltage. These three batteries had recently been replaced with a different make and model that required a different float voltage. The corrective action included readjusting the float voltage and applying an equalizing charge to the batteries.

Discussion:


Although the batteries at Rancho Seco passed a duty cycle discharge test, this has little relevance to the ability of the batteries to survive a seismic event which could cause mechanical failure of internal connections weakened by flaking. The NRC has sponsored a series of tests of the seismic response of naturally aged nuclear station safety-related batteries. One of these tests concluded that while case cracks were propagated and leaks were observed in the propagation tests at high g-levels, it appears that this failure mechanism is less significant than failures of the interface between the bus-bar and post. (See NUREG/CR-3923, SAND84-1737, "Test Series 1: Seismic-Fragility Tests of Naturally-Aged Class 1E Gould NCX-2250 Battery Cells".) Although the type of cells in this test were different than those that experienced severe flaking at Rancho Seco, the test results suggest the importance of examining the internal connection between the plates, the bus-bar, and post.

The event at North Anna demonstrates the need for continuing attention to the detailed requirements for station batteries.

Other IE information notices on problems related to batteries include:

<u>Number</u>	<u>Title</u>	<u>Date of Issuance</u>
85-74	Station Battery Problems	August 29, 1985
84-83	Various Battery Problems	November 19, 1984
83-11	Possible Seismic Vulnerability of Old Lead Storage Batteries	March 14, 1983

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.


Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

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Attachment: List of Recently Issued IE Information Notices

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-36	Change In NRC Practice Regarding Issuance Of Confirming Letters To Principal Contractors	5/16/86	All power reactor facilities holding an OL or CP
86-35	Fire In Compressible Material At Dresden Unit 3	5/15/86	All power reactor facilities holding an OL or CP
86-34	Improper Assembly, Material Selection, And Test Of Valves And Their Actuators	5/13/86	All power reactor facilities holding an OL or CP
86-33	Information For Licensee Regarding The Chernobyl Nuclear Plant Accident	5/6/86	Fuel cycle licensees and Priority 1 material licensees
86-32	Request For Collection Of Licensee Radioactivity Measurements Attributed To The Chernobyl Nuclear Plant Accident	5/2/86	All power reactor facilities holding an OL or CP
86-31	Unauthorized Transfer and Loss of Control of Industrial Nuclear Gauges	5/6/86	All power reactor facilities holding an OL or a CP
86-30	Design Limitations of Gaseous Effluent Monitoring Systems	4/29/86	All power reactor facilities holding an OL or a CP
86-29	Effects of Changing Valve Motor-Operator Switch Settings	4/25/86	All power reactor facilities holding an OL or a CP
86-28		4/28/86	

OL = Operating License
CP = Construction Permit