

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

May 16, 1980

IE Information Notice No. 80-21

ANCHORAGE AND SUPPORT OF SAFETY-RELATED ELECTRICAL EQUIPMENT

Description of Circumstances:

Seismic design evaluations in connection with the NRC Systematic Evaluation Program (SEP) have indicated a potential safety deficiency in the anchorage and support of safety-related electrical equipment. This subject was highlighted for more in-depth evaluation after site visits to several facilities. The site reviews indicated that equipment was supported in a non-uniform manner. In some cases, design modifications were required to render acceptable seismic design margins. The deficiencies in anchorage and support may be due to the fact that earlier engineering design criteria did not require rigorous analyses.

Letters were issued in January 1980 to the SEP plants which requested a review of the anchorage of safety-related electrical equipment. The findings from the reviews at Haddam Neck, Big Rock Point, Dresden 2, Oyster Creek, and Palisades identified various safety-related electrical equipment that did not have positive anchorage. The reviews at other SEP plants are continuing. A summary is provided below of those items so far identified.

| | |
|---|---|
| Station Service Transformers (4160 V - 480V) | Motor Control Centers |
| DC to AC Inverters | Cable Trays |
| Emergency Diesel Generator | Computer |
| Room Heater | Control Panels - MG Set |
| Batteries - Emergency Diesel Generator | - Air Compressor |
| - Diesel Fire Pump | - Control Room |
| - Station | Instrument Rack |
| Station Battery Rack | Battery Room Main Breaker and Distribution Panel |

A related item has been identified at Comanche Peak (under construction) in which the welds to the floor supports for the main control panels were found to be undersized and improperly spaced. Also, the SEP reviewers observed that non-seismic Category I ancillary items (dolleys, gas bottles, block and tackle gear, ductwork, etc.) may be located such that they could potentially dislodge, impact, and damage safety related equipment during an earthquake.

The type of anchorage systems utilized in the SEP plants and their expected capacities vary widely. For example, high uncertainty exists relative to the capacity of non-engineered tack welds and attachments that rely on frictional clamping forces. In some cases, equipment has been found free standing with no means of positive lateral support. (Friction being the only lateral load

carrying mechanism). Most often, heavier equipment is anchored using (1) tack welds to steel angles embedded in concrete; (2) clips that rely on frictional resistance; (3) concrete embedded anchor bolts; or (4) external braced frames. Lighter equipment housed in cabinets or attached to panels or racks has been anchored using (1) bolts; (2) sheet metal screws; (3) tack welds; and (4) braced racks.

The potential concern is that certain pieces of equipment may not have adequate levels of seismic resistance capability due to limited anchorage capacity. The potential problems relate to overturning and/or sliding of large equipment and gross movement or unacceptable forces on smaller attached equipment that may render it inoperable during an earthquake. For certain large battery racks, this judgment is supported by analysis that predict unacceptable seismic behavior.

Section 3.10 of the Standard Review Plan provides acceptance criteria for the seismic qualification of Category I electrical equipment. These criteria include IEEE Std. 344, "Guide for Seismic Qualification of Class 1E Electrical Equipment for Nuclear Power Generating Stations", first issued in 1971. Facilities designed before about 1971 without benefit of such design and testing criteria may have some anchorage deficiencies.

The NRC staff is continuing to evaluate this issue on the SEP plants as part of the seismic review in the SEP. Remedial actions have been planned for the affected plants.

This Information Notice is provided as notification of a possibly significant matter. It is expected that recipients will review the information for possible applicability to their facilities. No specific action or response is requested at this time. If NRC evaluations so indicate, additional actions may be requested or required. If you have any questions regarding this matter, please contact the Director of the appropriate NRC Regional Office.

IE Information Notice No. 80-21
May 16, 1980

Enclosure

RECENTLY ISSUED
IE INFORMATION NOTICES

| Information Notice No. | Subject | Date Issued | Issued To |
|------------------------|--|-------------|--|
| 80-20 | Loss of Decay Heat Removal Capability at Davis-Besse Unit 1 While in a Refueling Mode | 5/8/80 | All light water reactor facilities holding power reactor OLs or CPs |
| 80-19 | NIOSH Recall of Recirculating-Mode (Closed-Circuit) Self-Contained Breathing Apparatus (Rebreathers) | 5/6/80 | All holders of a power reactor OL, Research Reactor License, Fuel Cycle Facility License and Priority I Material License |
| 80-18 | Possible Weapons Smuggling Pouch | 5/5/80 | All power reactor facilities with an OL, fuel fabrication and processing facilities and Materials Priority I licensees (processors and distributors) |
| 80-17 | Potential Hazards Associated With Interchangeable Parts On Radiographic Equipment | 5/5/80 | All radiography Licenses |
| 80-16 | Shaft Seal Packing Causes Binding In Main Steam Swing Check And Isolation Valves | 4/29/80 | All power reactor facilities in your Region with an OL or CP |
| 80-15 | Axial (Longitudinal) Oriented Cracking In Piping | 4/21/80 | All Light Water Reactor Facilities holding power reactor OLs or CPs |
| 80-14 | Safety Suggestions From Employees | 4/2/80 | All power reactor facilities with an OL or CP |
| 80-13 | General Electric Type SBM Control Switches - Defective Cam Followers | 4/2/80 | All light water reactor facilities holding power reactor OLs or CPs |