



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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January 1, 1980

Docket No. 50-213

Mr. W. G. Council, Vice President
Nuclear Engineering and Operations
Connecticut Yankee Atomic Power Company
Post Office Box 270
Hartford, Connecticut 06101

Dear Mr. Council:

Recent seismic design evaluations conducted in the Systematic Evaluation Program (SEP) have indicated a potential safety concern relative to the anchorage and support of safety related electrical equipment. It has also been observed that non-seismic Category I auxiliary items (dolleys, gas bottles, etc.) may be dislodged by an earthquake and damage safety related equipment. These issues were identified during site visits to Dresden 2, Haddam Neck, Ginna, Oyster Creek, Palisades and Millstone 1 by review teams consisting of NRC representatives and consultants. Since operability of the subject equipment may be essential during and after a seismic disturbance, we request that you assess the capability of all safety related electrical equipment (as well as non-seismic Category I auxiliary items) to resist seismic forces and implement remedial measures, as necessary, to increase safety margins. All operating licensees of nuclear power facilities are being notified of this issue by an I&E Information Notice (Enclosure 1).

Within 30 days, you are requested to develop an action plan for resolution of this issue and to submit it for our review. The following issues should be addressed:

1. Does positive anchorage exist (load carrying mechanism other than friction);
2. If positive anchorage exists, has the anchorage system been engineered with adequate capacity; and
3. Was the anchorage fabricated to quality standards?

The results of your investigation of Item 1 should be submitted within 60 days of the date this letter is received. It should describe any corrective action considered necessary. The overall issue, including any required modifications, should be resolved by September 1, 1980.

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Although the final seismic design basis for your facility has not been resolved, and other changes may be required, appropriate action on this matter should not be delayed. If necessary, consideration should be given to providing temporary supports with more permanent supports being installed after all seismic questions have been resolved.

Sincerely,



Darrell G. Eisenhut, Acting Director
Division of Operating Reactors
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc w/enclosure:
See next page

cc w/enclosure:
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

NOVEMBER , 1979

IE Information Notice No. 79-

ANCHORAGE AND SUPPORT OF SAFETY RELATED ELECTRICAL EQUIPMENT

Description of Circumstances

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

In general, a lack of engineered supports of safety related electrical equipment has been observed at certain SEP plants. Typical components affected include:

- | | |
|----------------------------------|----------------|
| -AC and DC motor control centers | -transformers |
| -switch gear | -inverters |
| -control room panels | -battery racks |
| -instrument panels | -cable trays |

Also, a related observation indicates that non-seismic Category I ancillary items (dolleys, gas bottles, block and tackle gear, ductwork, etc.) are located such that they may dislodge, impact and damage safety related equipment during an earthquake.

The types of anchorage systems utilized in these 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.

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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 judgement is supported by computations 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 I 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 action has been taken on one SEP plant to date.

This Information Notice is provided as an early notification of a possible significant matter. It is expected that recipients will review the design criteria for anchorage and support of safety related electrical equipment including as-built installation details to assure adequate capability to resist seismic forces. No written response is required. If you have any questions regarding this matter, please contact the Director of the appropriate NRC Regional Office.