



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RE: ANCHORAGE AND SUPPORT OF SAFETY-RELATED ELECTRICAL EQUIPMENT

NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-245

1.0 INTRODUCTION AND BACKGROUND

The seismic design evaluations conducted by the NRC with the Systematic Evaluation Program (SEP) indicated a potential safety concern relative to the anchorage and support of safety-related electrical equipment (Reference 1). It also concluded that some non-seismic Category I auxiliary items (dolleys, gas bottles, etc.) may be dislodged by an earthquake and damage safety-related equipment. The licensee was requested to develop an action plan for resolution of this issue and to submit it for NRC review.

The licensee provided a summary of the results of its investigation of the anchorage and support of safety-related electrical equipment in its submittal of April 13, 1981 (Reference 2). The summary included the components reviewed, their location, type of anchorage, and whether a modification of this anchorage was required. For those components requiring modification, the licensee also provided the type of modification performed to upgrade the anchorage.

As a result of the work involved in the replacement of the gas turbine generator batteries, the licensee identified that the supports for these batteries were not subjected to the review conducted in response to SEP findings. In its transmittal of June 14, 1985, (Reference 3) the licensee identified those subsystems which were not reviewed for seismic adequacy in addition to the non-Category I equipment which was identified as requiring seismic restraint to eliminate the potential of causing damage to adjacent IE equipment in the event of an earthquake.

2.0 EVALUATION

In Reference 3 the licensee identified the following gas turbine subsystems as being reviewed for seismic adequacy:

Control house containing:

- One AC and one DC Motor Control Center
- Battery Charger
- Inverter
- Control Panel (Turbine and Generator)
- Batteries and Racks

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The licensee also identified the following non-Category I equipment as being reviewed to evaluate the adequacy of existing supports for impact on adjacent IE equipment:

Strip Chart Recorder Instrument Rack

Two Compartment Heaters

Carbon Dioxide Fire Suppression Bottles

Air Conditioner

The licensee provided a summary of the calculations performed for the evaluation of the above identified equipment anchorage and the control house structural support and internal framing. The calculations utilized the Safe Shutdown Earthquake (SSE) response spectra which was developed for Millstone 1 during the SEP review. The peak horizontal acceleration at 2% structural damping multiplied by a factor of 1.5 (to account for the participation of high frequency modes) was used for application to the subject equipment. The analysis utilized three directional seismic loading in addition to the dead-weight of the equipment being evaluated. The resultant loads and stresses on the supports were computed by adding the deadweight contribution to the square-root-sum-of-the-squares of the seismic forces. The acceptance criteria for the evaluation of the equipment anchorage and restraints was that prescribed in the AISC Manual of Steel Construction (8th Edition), and the AWS D1.1-85 code for Structural Welding.

The evaluation concluded that all items with existing supports (with the exception of the Strip Chart Recorder Instrument Rack) were adequately supported to withstand the postulated seismic forces.

Modification of the Instrument Rack requires the installation of a seismic restraint.

The staff also performed a sample review of the calculations performed for the qualification of the following items:

- Battery and Battery Rack Replacement
- Strip Chart Recorder Instrument Rack Restraint
- The AC and DC Motor Control Center

3.0 CONCLUSION

The staff concluded, based on the review of the licensee evaluation and the sample calculations provided, that the safety related Gas Turbine subsystems and the adjacent non-category I equipment identified above, were adequately supported to withstand postulated earthquake loadings on the order of the safe shutdown earthquake.

4.0 REFERENCES

- 1) D. Eisenhut letter to Northeast Utilities (W. Council), dated January 1, 1980
- 2) W. Council letter to the NRC (J. Zwolinski), dated March 22, 1985
- 3) Northeast Utilities (J. Opeka) letter and attachment to the NRC dated June 14, 1985

5.0 ACKNOWLEDGEMENT

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