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ACCESSION NBR: 8602100334 DOC. DATE: 86/02/05 NOTARIZED: NO DOCKET #
FACIL: 50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
50-441 Perry Nuclear Power Plant, Unit 2, Cleveland Electric 05000441
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RECIP. NAME RECIPIENT AFFILIATION
DENTON, H. R. Office of Nuclear Reactor Regulation, Director (post 851125

SUBJECT: Provides overview of 860131 seismic event, including description, investigations & impact assessments. On 860131, earthquake occurred. Emergency plan implemented as precautionary measure. Personnel dispatched to survey damage.

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MURRAY R. EDELMAN
VICE PRESIDENT
NUCLEAR

February 5, 1986
PY-CEI/NRR-0433 L

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Seismic Event Evaluation

Dear Mr. Denton:

This letter provides a brief summary of the Cleveland Electric Illuminating Company's response and activities related to the seismic event that occurred on January 31, 1986 in the vicinity of the Perry Nuclear Power Plant. Although much of the information is preliminary in nature, the following overview describes the event, our immediate investigations and the impact assessments we are continuing to conduct to fully evaluate the significance of this event to the Perry plant.

Event

At approximately 11:48 a.m. on January 31, 1986, an earthquake occurred, which was located about 10 miles south of the Perry site and had a Richter magnitude of approximately 5.0. Although Perry does not yet have its operating license, CEI nevertheless implemented the Perry emergency plan in response to the seismic event. A site area emergency was declared at 12:06 as a precautionary measure for site personnel accountability and for informational notification to local officials. Timely notifications were made and plant staff responded professionally and successfully implemented the plant procedures for this type of an event. Immediately following the earthquake, plant operations personnel were dispatched into the plant to survey for any major damage. The initial reports indicated no damage. Subsequently, a team of approximately 65 engineers and technicians was organized to perform a detailed walkdown of all plant areas. These inspections found no damage to any systems, structures or components. The hairline cracks in concrete walls that were observed have been reviewed and found to be typical of reinforced concrete structures which have not experienced seismic events. More than 20 safety-related systems in operation or standby readiness continued to operate without incident. Two pieces of non-safety operating equipment, the Auxiliary Steam Boiler and the Instrument Air Compressor, tripped on protective signals in accordance with the design.

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1/0

Seismic Design

The seismic design basis for the Perry Nuclear Power Plant is established by NRC requirements in 10 CFR Part 100, Appendix A and in particular, Regulatory Guide 1.60. In accordance with the Regulatory Guide 1.60, the Perry seismic design is defined by input ground response spectra (plot of acceleration vs. frequency) anchored at an acceleration of .15g. The design response spectra envelops the 84th percentile of the site specific response spectra developed from a set of strong motion data from a number of earthquakes. The average magnitude of the analyzed earthquakes was 5.53 (Richter) and average epicentral distance was approximately 8.5 mi.

Based on United States Geological Survey (USGS) recorded data, the earthquake of January 31, 1986 was centered about 10 miles south of the Perry Site and had a Richter magnitude of approximately 5.0. This is a lesser magnitude than the earthquakes for which the Perry Plant has been analyzed and had substantially lower total energy content than the Perry design response spectra. The January 31 earthquake is consistent with the previously established geology and historical seismicity of the region, as described in the Final Safety Analysis Report. The earthquake does not change the conclusions of the FSAR on the geology and seismicity of the site area.

Preliminary acceleration data taken from the in-plant seismic recorders indicates that the recorded floor response spectra in certain locations may have been outside the design spectra at high frequencies. As noted above, the design spectra are based on a statistical envelope of historical earthquakes (84th percentile) and, therefore, some instances of recorded responses exceeding predicted floor responses are expected. The possibility of high frequencies outside the spectra has been evaluated at other nuclear plant sites and concluded to have insignificant effect on plant structure and components.

For several reasons, CEI, together with our geologic and seismological consultants, have concluded that the measurement of high frequency acceleration data outside the predicted responses is not significant. The high frequency accelerations involved are of a very short duration (on the order of a fraction of a second), and the velocities are well below those which could cause damage even to non-engineered structures. The total energy associated with these high frequency accelerations is small and therefore has no adverse impact on plant structures and equipment. Due to margins inherent in design, such as the damping values used, the required loading combinations and allowable stress limits, the effects of the earthquake experienced at Perry are well within the seismic capability of the plant. This has been verified by the continued operation of numerous plant systems through the earthquake, as well as by the plant walkdowns which showed no evidence of plant damage from the earthquake.

Further analytical evaluations are in-process to confirm the preliminary findings described above. In addition, longer term studies are underway to update the general geological and seismological characterization of the plant region. These long term efforts involve well recognized experts in the field, including Gilbert Commonwealth and Weston Geophysical personnel, as well as cooperative efforts with other industry groups, including EPRI and seismic owners groups.

In summary, based on the preliminary investigations to date, including extensive plant walkdowns of structures, piping and equipment, preliminary USGS seismological data on the earthquake, and in-plant seismic recording instruments, the earthquake did not exceed the plant seismic design capability. We anticipate providing an interim report on our response and activities by February 12, 1986. We will continue our ongoing analysis and evaluations as well as continue to work with your staff to achieve timely resolution.

Very truly yours,

Murray R. Edelman

Murray R. Edelman
Vice President
Nuclear Group

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