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August 5, 1981

Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Attn: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
Washington, DC 20555

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334
Seismic Qualification of Auxiliary Feedwater Systems - Generic
Letter 81-14

Gentlemen:

In response to your letter of February 10, 1981, we are providing the following information concerning the seismic design of the Auxiliary Feedwater System (AFS) at Beaver Valley Power Station Unit No. 1.

The AFS has been designed, constructed, and maintained to withstand a Safe Shutdown Earthquake (SSE) utilizing analytical, testing, evaluation methods and acceptance criteria consistent with other safety grade systems in the station. The AFS was within the scope and considered in the reviews conducted to satisfy the requirements of I.E. Bulletins 79-02, 79-04, 79-07, 79-14, 80-11, and I.E. Information Notice 80-21.

The AFS piping was reanalyzed as part of the effort to satisfy the NRC Order to Show Cause dated March 13, 1979. The seismic reanalysis was performed using the NUPIPE-SW computer analysis program. The NUPIPE-SW code utilizes modal response combinations as follows:

Intermodal - Square Root Sum of the Squares (SRSS) grouping method for modal combination between modes, where closely spaced modes are combined by absolute sum.

Intramodal - SRSS for combination of earthquake directional effects within the mode.

Piping was analyzed utilizing amplified response spectra (ARS) that were developed using soil structure interaction techniques (SSI-ARS). The resultant stresses and loads were used to evaluate piping, supports, equipment nozzles, penetrations and equipment supports. Acceptance criteria was based on allowable stresses contained in B31.1.

The analysis methods are explained in more detail in the "Report on the Reanalysis of Safety Related Piping Systems for Beaver Valley Unit No. 1". The report and subsequent revision were submitted in our letters dated June 29, 1981, July 11, 1979, July 18, 1979, July 27, 1979, August 8, 1979, and August 11, 1980.

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Beaver Valley Power Station, Unit No. 1

Docket No. 50-334

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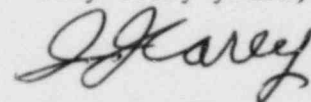
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The AFS pumps seismic calculations have been reviewed and determined to be seismically qualified to the criteria specified in the Beaver Valley Power Station FSAR.

The remaining equipment was qualified either by test or engineering evaluations to the appropriate seismic Criteria specified in FSAR.

The installation of electrical equipment was in accordance with standard specification that met the seismic criteria contained in the FSAR. The specification provided the required support type and spacing to meet seismic qualification. The distances were developed by calculating the first mode fundamental natural frequency of the supported system and then comparing it to the DBE amplified response spectra curves for the area where the equipment was to be installed. The ARS curves were peak spread $\pm 15\%$ to establish an exclusion band for supported system frequencies. The completed support systems were reviewed in the field to confirm conformance with installation specifications, and all discrepancies were either corrected or determined to be acceptable by analysis.

Very truly yours,



J. J. Carey

Vice President, Nuclear

cc: Mr. D. A. Beckman, Resident Inspector
U.S. Nuclear Regulatory Commission
Beaver Valley Power Station
Shippingport, PA 15077

U.S. Nuclear Regulatory Commission
c/o Document Management Branch
Washington, DC 20555

COMMONWEALTH OF PENNSYLVANIA)

COUNTY OF BEAVER

SS:

On this 5th day of August, 1981, before me, Judith D. Anthony, a Notary Public in and for said Commonwealth and County, personally appeared J. J. Carey, who being duly sworn, deposed, and said that (1) he is Vice President of Duquesne Light, (2) he is duly authorized to execute and file the foregoing Submittal on behalf of said Company, and (3) the statements set forth in the Submittal are true and correct to the best of his knowledge, information and belief.

Judith D. Anthony
Notary Public

JUDITH D. ANTHONY, Notary Public
Shippingport Borough, Beaver Co., Pa.
My Commission Expires Dec. 12, 1983