Jersey Central Power & Light Company

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MEMBER OF THE General Public Utilities Corporation

May 15, 1975

Mr. James P. O'Reilly, Director
Office of Inspection and Enforcement, Region 1
United States Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. O'Reilly:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Inspection and Enforcement Bulletin No. 75-05
Information on Hydraulic Shock Suppressors

The following responds to Inspection and Enforcement Bulletin No. 75-05, dated April 14, 1975. The actions required by this bulletin are restated in Attachment 1 and followed by our response. The responses to items 1.a and 1.b are for Bergen-Paterson hydraulic shock suppressors. Bergen-Paterson units are installed on all systems at the Oyster Creek Nuclear Generating Station except the recirculation piping system where Grinnell units are used (these compose less than 20% of the total number of units installed). Preinstallation test data and design calculations for the Grinnell units are unavailable at this time. It will be forwarded to you as soon as possible.

Very truly yours,

Donald A. Ross

Donald A. Ross, Manager
Generating Stations-Nuclear

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Attachments

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Attachment 1

1.a Provide the design requirements which the various suppressors are intended it meet, such as velocity, acceleration, load, etc. Also, indicate the margin available between the design requirements and the requirements specified for purchase of these components.

Response

The design loads of each individual hydraulic suppressor (snubber) have been calculated and range from 162 pounds-force to 7356 pounds-force. Since all units installed at the Oyster Creek Station are rated at 10,000 pounds-force, the design margin of safety ranges from 9838 pounds-force to 2644 pounds-force or 6072 percent to 36 percent with the majority falling in the range of 1000 percent to 300 percent margin.

At the Oyster Creek Station, hydraulic shock suppressors fall into two general categories. Namely, those used for restraint during a seismic event and those used to absorb thrust resulting from relief valve actuation. In the case of the former, the suppressor characteristics (See Table 1) were evaluated for units generally used for this purpose and were considered adequate. The threshold values for these parameters were not calculated. For those used for thrust restraint, the same basic approach was employed except that conservative values of restraint dynamic characteristics obtained from test results were actually incorporated into the piping analysis to ensure no piping was overstressed during the anticipated transients.

1.b Describe the testing of the hydraulic suppressors conducted by you or your supplier(s) prior to installation to assure their operation in accordance with design requirements.

Response

The operational characteristics of each assembled Bergen-Paterson unit was established by the manufacturer by determining the control valve fluid flow characteristics at the various phases of operation. This was done by setting up each individual control valve in a fluid test stand and physically capturing and measuring the fluid flow volume over a specific time period and comparing the results to establish minimum/maximum flow rates at the test pressure that are equivalent to flow rates at actual design rated pressure. These values were originally determined by calculations and by physical experiment using valves from units whose fully assembled characteristics had been established as being within the piston velocity tolerance ranges for the various phases of operation; such as, valve closure and bypass rates. The fluid containment integrity of the cylinders

with valve body attached was established by applying 3500 psi fluid pressure through the valve port to which the accumulator is normally attached and visually checking for leaks over a specific time period. The accumulator was then connected and charged with fluid, the unit was cleaned and allowed to stand for a period of time and then checked visually for leakage.

In addition to the above-described testing procedures performed on each individual Bergen-Paterson unit, dynamic testing was performed on selected units to demonstrate operational characteristics during shock loading and vibration conditions.

1.c Describe the surveillance (including testing) programs now underway or planned by you to assure continued operability of the hydraulic suppressors under the design conditions throughout the life of the facility.

Response

In his letter of February 7, 1975, Mr. Ivan R. Finfrock, Jr., Vice President of Generation for Jersey Central Power & Light Company, informed Mr. K. R. Goller, Assistant Director for Operating Reactors, of the surveillance program for hydraulic shock suppressors that the Oyster Creek Nuclear Generating Station would follow. This letter summarized the evolution of the Oyster Creek evaluation program for snubbers and delineated the results of operating experience, laboratory tests, and inspection programs since September 1973. Supporting documentation for these programs (e.g., inspection and testing descriptions) and results were referenced in this letter.

Mr. Finfrock told Mr. Goller that since the testing, rebuilding, and inspection program had significantly improved snubber service life and reliability, future surveillance would consist of:

1. Inspection of those snubbers in the drywell only when the drywell must be entered and the snubber inspection has not been performed within the previous 120 days. Defective units will be repaired or replaced before returning to power. Only EP seals will be used in repairing and rebuilding these units. Snubbers that are not in the drywell and are not accessible during reactor operation will be inspected when they are accessible but not more frequently than 120-day intervals. Defective units will be replaced or repaired only with EP seals.

2. Inspection of those snubbers in the Reactor Building (i.e., those accessible during reactor operation) at least every 60 days. This inspection will include a fluid level determination and a general visual examination. Units leaking fluid severely will be removed to determine the cause of the leakage. Repaired and/or rebuilt replacement units for the Reactor Building snubbers will contain only EP seals except for the main shaft packing seal. EP main shaft packing seals are not available for some of the snubber models currently in use in the Reactor Building. Operating experience has shown that this 60-day inspection interval is sufficient to detect conditions that could lead to snubber inoperability (e.g., leaking).

TABLE 1

OPERATIONAL DESIGN CRITERIA

Bergen-Paterson HSSA-10 (10,000# Rated Load)

1. Piston shall be free to move in either direction with poppet valves remaining fully open for all piston velocities 10 inches per minute and slower. *(Tolerance plus or minus 2 inches per minute.)

2. Poppet valves shall be designed for closure when piston velocity reaches 10 inches per minute for both compression and extension stroke. *(Tolerance on velocity for closure shall be plus or minus 2 inches per minute.)

3. Orifice shall permit continued piston movement in either direction after valve closure at a rate of approximately 15 inches per minute at rated design capacity.

* Bergen-Paterson Pipesupport Corporation points out that the piston rod velocity of 10 inches per minute was established as a standard by Bergen-Paterson in order to maintain uniformity. This value was selected as being greater than any normally anticipated thermal growth rate and less than any expected imposed shock loading. In reality, this condition should be considered as a velocity range and it is suggested that for normal piping installations, the accepted actuation velocity range should be approximately 5 to 20 inches per minute.