NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 666-6911

April 3, 1985

Docket No. 50-423
A04615

Director of Nuclear Reactor Regulation
Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: (1) B. J. Youngblood letter to W. G. Counsil, Request for Additional Information, dated January 18, 1985.

Dear Mr. Youngblood:

Millstone Nuclear Power Station, Unit No. 3
Response to Question 271.1

Enclosed is Northeast Nuclear Energy Company's response to NRC Question 271.1 concerning the operability of the containment purge and vent valves contained in Reference (1). This response should fully resolve the Staff's concern regarding the question.

If you have any questions, please contact our licensing representative directly.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY
et. al.

BY NORTHEAST NUCLEAR ENERGY COMPANY
Their Agent

W. G. Counsil
W. G. Counsil
Senior Vice President

By: R. W. Bishop
Secretary

B001
1/1

50-423

STATE OF CONNECTICUT)
) ss. Berlin
COUNTY OF HARTFORD)

Then personally appeared before me R. W. Bishop, who being duly sworn, did state that he is Secretary of Northeast Nuclear Energy Company, an Applicant herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Applicants herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Notary Public
~~March 31, 19~~
My Commission Expires March 31, 1988

NRC Letter: January 18, 1985

Question No. 271.1

Demonstration of operability of the containment purge and vent valves and the ability of these valves to close during a design basis accident is necessary to assure containment isolation. This demonstration of operability is required by NUREG-0737, "Clarification of TMI Action Plan Requirements," II.E.4.2 for containment purge and vent valves which are not sealed closed during operational conditions 1, 2, 3, and 4.

1. For each purge and vent valve covered in the scope of this review, the following documentation demonstrating compliance with the "Guidelines for Demonstration of Operability of Purge and Vent Valves" (attached, Attachment #5) is to be submitted for staff review:

   A. Dynamic Torque Coefficient Test Reports (Butterfly valves only) - including a description of the test setup

   B. Operability Demonstration or In-situ Test Reports (when used)

   C. Stress Reports

   D. Seismic Reports for Valve Assembly (valve and operators) and associated parts

   E. Sketch or description of each valve installation showing the following (Butterfly valves only):

      1. direction of flow

      2. disc closure direction

      3. curved side of disc, upstream or downstream (asymetric discs)

      4. orientation and distance of elbows, tees, bends, etc., within 20 pipe diameters of valve

      5. shaft orientation

      6. distance between valves

   F. Demonstration that the maximum combined torque developed by the valve is below the actuator rating.

2. The applicant should respond to the "Specific Valve Type Questions" (attached) which relate to his valve.

3. Analysis, if used, should be supported by tests which establish torque coefficients of the valve at various angles. As torque coefficients in butterfly valves are dependent on disc shape, aspect ratio, angle of closure

flow direction and approach flow, these things should be accurately represented during tests. Specifically, piping installations (upstream and downstream of the valve) during the test should be representative of actual field installations. For example, nonsymetric approach flow from an elbow upstream of a valve can result in fluid dynamic torques of double the magnitude of those found for a valve with straight piping upstream and downstream.

4. In-situ tests, when performed on a representative valve, should be performed on a valve of each size/type which is determined to represent the worst case load. Worst case flow direction, for example, should be considered.

   For two valves in series where the second valve is a butterfly valve, the effect of nonsymetric flow from the first valve should be considered if the valves are within 15 pipe diameters of each other.

5. If the applicant takes credit for closure time vs. the build-up of containment pressure, he must demonstrate that the method is conservative with respect to the actual valve closure rate. Actual valve closure rate is to be determined under both loaded and unloaded conditions and periodic inspection under technical specification requirements should be performed to assure closure rate does not increase with time or use.

The following considerations apply when testing is chosen as a means for demonstrating valve operability:

Bench Testing

A. Bench testing can be used to demonstrate suitability of the in-service valve by reason of its traceability in design to a test valve. The following factors should be considered when qualifying valves through bench testing.

   1. Whether a valve is qualified by testing of an identical valve assembly or by extrapolation of data from a similarly designed valve.

   2. Whether measures were taken to assure that piping upstream and downstream and valve orientation are simulated.

   3. Whether the following load and environmental factors were considered:

      a. Simulation of LOCA
      b. Seismic Loading
      c. Temperature Soak
      d. Radiation Exposure
      e. Chemical Exposure
      f. Debris

B. Bench testing of installed valves to demonstrate the suitability of the specific valve to perform its required function during the postulated design basis accident is acceptable.

1. The factors listed in items A.2 and A.3 should be considered when taking this approach.

In-Situ Testing

In-situ testing of purge and vent valves may be performed to confirm the suitability of the valve under actual conditions. When performing such tests, the conditions (loading, environment) to which the valve(s) will be subjected during the test should simulate the design basis accident.

NOTE: Post test valve examination should be performed to establish structural integrity of the key valve/actuator components.

Response:

The containment purge air subsystems consists of a supply and an exhaust subsystem and is designed to reduce the airborne radioactivity in the containment and to provide outdoor air during extended periods of occupancy, such as refueling. The containment isolation valves in the containment purge air subsystem are administratively controlled closed during modes 1 through 4 and the containment is not purged. The containment purge inlet and outlet isolation valves are automatically closed on receipt of a high radiation signal from the containment fuel drop monitors. To permit containment access, the concentration of airborne particulates and iodine is reduced by use of the containment air filtration subsystem. The NRC Staff has reviewed Millstone 3's containment isolation system design for conformance to the provisions of BTP CSB 6-4, "Containment Purging During Normal Plant Operation," and found it acceptable (Reference (1)).

Reference (1): B. J. Youngblood letter to W. G. Counsil, SER for Millstone Nuclear Power Station, Unit No. 3, dated July, 1984.