Docket No.: 50-412

NOV 26 1985

Mr. John J. Carey
Vice President, Nuclear
Duquesne Light Company
Robinson Plaza Building, No. 2, Suite 210
PA Route 60
Pittsburgh, Pennsylvania 15205

Dear Mr. Carey:

Subject: Request for Additional Information - Beaver Valley Unit 2

As part of the Mechanical Engineering Branch Design Documentation Review for Beaver Valley, Unit 2, we have determined additional information, delineated in the enclosure, is needed in order to continue our review.

Sincerely,

/S/

George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing

Enclosure:
As stated

cc: See next page

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ENCLOSURE



MECHANICAL ENGINEERING BRANCH

REQUEST FOR ADDITIONAL INFORMATION

**Service Water Pumps**

(1) 2BVS-224, pp. 1-28 and 1-29, prescribe certain stress limits; e.g., for (1/2) SSE plus Design loads, the membrane stress limit is 1.0s. The Spec., p. 2-3, specifies a design pressure of 130 psig. The Seismic Analysis does not appear to address stresses due to the design pressure of 130 psig. Please provide, in particular for the portion of the pressure boundary at the outlet which appears to be like a mitered joint, your checks made to assure that the stress limits shown on p. 1-28 of 2BVS-224 are met.

(2) The hydrostatic test, and its witness by an Authorized Nuclear Inspector, is deemed to be an important part of assuring pressure boundary adequacy. To complete our audit, please provide the completed form which shows that the test has been run and witnessed.

(3) The Seismic Report refers to 2BVS-224, Rev. 2, 12/9/80. The copy of 2BVS-224 furnished us is Rev. 3, 8/27/82, with Addendas 1-4, Addenda 4, dated 2/17/83. Please describe the procedure used to assure that Seismic Reports are appropriate for current Specifications

Motor Operated Butterfly Valves

(4) The "Seismic Analysis" refers to "Spec. No. 2BVS-76A". We find no further reference to that specification in the Seismic Analysis; in particular; it is not included in the references. Please identify the particular 2BVS-76A revision/addenda that you think was used in the Seismic Analysis and explain why you think so.

(5) We have found no obvious tie-in between the Seismic Analysis and the valve identifications given in 2BVS-76A. The Stone & Webster cover sheet appears to have a tie-in by the S&W Equip. I.D. Code; 2SWS*MOV107. This would seem to imply that Spec. pages 1-12 and 2-6 are applicable to the particular valve covered by the Seismic Analysis. In this particular case, the tie-in indicated by the S&W cover sheet appears to be appropriate. However, in general, how do you make sure that a Seismic Analysis is applicable to a specific valve(s) identified in the valve specification?

(6) The Seismic Analysis, p. 11, shows a valve torque of 21068 in-lb. How does this torque correlate with the torques shown on p. 2-6 of 2BVS-76A?

(7) The Stress Analysis, p. 17, appears to ignore the stem shear stress due to the specified (2BVS-76A, p. 1-12) differential pressure of 153 psi. If this is true, why was it ignored?

(8) The drawing with the Stress Analysis indicates the stem is reduced in diameter and is keyed at the connection with the actuator. How was this addressed in the Seismic Analysis?

(9) Page 3 of the Stress Report shows a column headed "Allow Stress". A footnote seems to indicate that the listed allowable stress is 1.5 times the allowable stress listed in ASME Section III for the particular material/temperature involved.

(a) Describe the correlation between the allowable stresses given on p. 1-54 of 2BVS-76A with those used in the Seismic Analysis.

(b) Provide the specifics of the allowable stress of 52500 for the valve stem; i.e., material identification, temperature, Code edition/addenda, Code Table number.

(10) Addendum B of the Stress Analysis states that "... modified bracket by increasing width from 3.25" to 8" long". The Stress Analysis does not say that the valve drawings were changed to reflect the analytical change. Please furnish the appropriate drawings that will provide assurance that the analytical change was incorporated into the valve construction.

(11) The Seismic Analysis does not cover the analysis of the bolted-flanged joint connecting the valve to the piping. This is acceptable provided the adequacy of the joint is checked as some part of the evaluation. To complete our audit on this aspect, please provide the documentation (perhaps a Pipe Stress Calculation package) which includes evaluation of the flanged joint for the valve covered by the Seismic Analysis.

(12) The Seismic Functional Procedure includes a form, "Seismic Functional Test Record". Please provide a completed form for the valve covered by the Seismic Analysis.

Piping

(13) Minimum wall thickness of girth butt welds:

2BVS-939, p. 2-11, appears to define and control minimum thickness of <u>field</u> welds by the '$t_m$' shown on STD-SP-1056-1-5 and -3-5. 2BVS-58, p. 1-53, appears to similarly define and control minimum thickness of <u>shop</u> welds.

(a) Is our interpretation correct?

(b) What are the minimum wall thicknesses used for pipe with diameter greater than 24 inch?

(c) Do the minimum wall thicknesses apply to plate-pipe; e.g., SA155?

(d) Please provide documentation (e.g., shop travelers with minimum allowable and minimum measured wall thicknesses entered thereon) which demonstrates the control of minimum wall thicknesses at (a) shop welds, (b) field welds.

(14) 2BVS-59, p. 1-16, states: "For attachments which are designed by the Seller, the Seller shall be responsible for determining that the design assures total stress levels within code allowable values not only in the support parts, but also in the piping to which the support parts are attached". Because we are not sure what is meant by 'code allowable values' in the piping, please provide examples of this determination for (a) nonintegral attachment and (b) integral attachment.

(15) 2BVS-939A, Pipe Classes

This document is deemed to be significant because it appears to be the major and, in many cases, the only pathway through which the compliance of Beaver Valley piping with the very important requirements of Code NB/NC/ND-3640 are checked.

(a) As a comment (no response needed), the "Memo describing how maximum Design Conditions are determined for Pipe Classes" would be clearer if the relative simple equations used to determine P by "equation (4) of NC-3641" were written out. Eq. (4) of NC-3641 depends upon which Code Edition/Addenda is being used and there is a minor ambiguity in the Code definition of "d". (Are diameter tolerances to be included?)

(b) Applying the zero-corrosion/erosion-allowance equation for P:

$$P = 2St_m/(D_o-2yt_m)$$

to Pipe Class 151 for 42-inch, 3/8 inch nominal wall, SA155 Grade C55, Class 1 pipe, gives

$$P = 2x13,700x0.365/(42-0.8x0.365)$$

$$\approx 240 \text{ psi}$$

This calculated allowable pressure, even with zero corrosion/erosion allowance, is less than the 275 psi shown in the Class 151 Table. Your comments on this calculation are requested.

(c) NC-3641.2 is on straight pipe under external pressure. How is this Code requirement checked? For example, 2BVS-76A, p. 1-26, indicates a possibility of a 45 psi pressure existing inside containment, which implies a possibility of a 45 psi external pressure on piping inside containment. 2BVS-939A, for Class 151, includes pipe up to 42-inch size with 3/8-inch wall. The Code allowable external pressure for that pipe is about 15 psi. We do not find any restriction or warning that this pipe may not be suitable for use inside containment.

(d) Tables for Pipe Classes 302 and 601 do not invoke the use of B16.9 for butt weld end fittings. Accordingly, fittings purchased to meet the requirements of these two Tables would not provide fittings in accordance with NC-3649. While most of the Pipe Class Tables include a heading "Not applicable for ASME III", Pipe Class Tables 302 and 602 do not have that heading. Your explanation as to why B16.9 is not invoked in Tables 302 and 602 is requested.

(16) Conformance to ANSI B16.9,

Your Piping Date Item 7 involves a purchase order for elbows; Item 8 involves a purchase order for a tee. Neither of these purchase orders invoke B16.9. For Item 7, the inclusion of 'L/R' appears to provide sufficient assurance that NC-3649 has been met. However, it is <u>not</u> apparent that the tee in Item 8 meets the requirements of NC-3649.

The center-to-end dimension of the 10NPS tee is given as 8-9/32". The center-to end dimension of a B16.9 10NPS tee is 8-1/2". Accordingly, the tee has nonstandard dimensions. From the standpoint of meeting the pressure-design requirements of NC-3649, this is not necessarily a trivial deviation because it controls the space available to provide reinforcement of the opening.

SA-403 says: "Fittings different from these standards (e.g., B16.9) may be

furnished in accordance with S9." S9 says that, if so furnished, they must be marked with S9. We see no evidence that S9 was invoked in the P.O. or the tee is so marked.

However, even if the tee were marked S9 in formal compliance with SA403, the requirements of NC-3649 would not necessarily be met. While B16.9 also permits non-standard dimensions (with the WP marking deleted), it does not waive the requirement of Par. 9, Design Proof Test. This is the significant difference between B16.9 and SA403 (or SA234) from the standpoint of adequacy of pressure design. Note that the Code Dimensional Standard Table invokes ANSI B16.9; not SA403 or SA234.

In view of the preceding, we require:

(a) A list of butt welding end tees used, or to be used, in Beaver Valley Code Class 1, 2 or 3 piping that have dimensions not in accordance with B16.9.

(b) Data (calculations or tests) which demonstrate that each of these tees meets the requirements of NB/NC/ND-3640, as appropriate.

(17) Seeming Anomalies in Piping Data, Item 8

(a) The package includes Custom Alloy sheets for two tees which, seemingly, differ in Heat Code (D-7110, D-9983) and end bevels. Which one of these tees is actually the tee described by the NPP-1 form?

(b) The shop fabrication sheet shows two "Min. wall", 0.319" and 0.519". The in-process control sheet shows "Minimum wall, .400/.419 and .403/.415. What is the significance of these minimum walls?

(18) Witness of Hydrostatic Tests by ANI

2BVS-920, pp. 1-114 and 1-115, discusses hydrostatic tests. We see no mention of the witness of these tests by the ANI as required by the Code. This also seems to be the case with your pump specification and your valve specification. Please describe the procedure you have that assures that the ANI will be notified of a pending hydrostatic test and that he is present during those tests to the extent required by the Code.

(19) The f-factor

We note that 2BVM-45, p. 12, discusses the dependence of f on number of cycles. Your Stress Analysis Data Package RM-100A lists a number of system conditions but we find no indication that any consideration was given to this Code requirement. For example, P. 6 of RM-100A describes "a large temperature swing" with no indication of how many times this might occur. Please identify that portion of your specifications which provides the basis for the not including the number of times the "large temperature swing" occurs.

(20) SIF for branch connections

Your Pipe Stress Calculation, X99K, on p. 8 states:

> "At points 41, 45, 56 and 35, (Pt. of intersection with small bore piping), the stress intensification factor for the run pipe is assumed to be 1.5. This is conservative. "

On p. 36 of X99K, the SIF for point 6 is appropriately calculated by the Code equation:

$$SIF = 0.9(R/T)^{2/3} = 0.9(1.25/0.375)^{2/3} = 2.009$$

For points 41, 45, 56 and 35, the Code equation gives:

$$SIF = 0.9(1.6/0.300)^{2/3} = 2.747$$

Noting that the Code SIF is 1.8 times as high as your assumed 1.5, what is the basis for your "This is conservative"?

(21) The steam generator blow-down line covered by Stress Analysis Data Package RM-100A would seem to be potentially subject to water hammer and erosion of valves and piping. Please describe how these aspects were considered in your evaluations.