Duquesne Light

Nuclear Construction Division
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January 3, 1986

United States Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. Lester S. Rubenstein, Director
PWR Project Directorate No. 2
Office of Nuclear Reactor Regulation

SUBJECT: Beaver Valley Power Station - Unit No. 2
Docket No. 50-412
Mechanical Engineering Branch Questions Dated November 26, 1985

Gentlemen:

This letter forwards responses to the additional Mechanical Engineering Branch (MEB) questions dated November 26, 1985.

Duquesne Light Company, along with Stone & Webster Engineering Corporation, discussed the attached responses with MEB and its consultants, Mr. E. C. Rodabaugh and Mr. S. E. Moore, in a telecon on September 13, 1985. Based on this conversation, it is our understanding that all questions have been answered satisfactorily.

Upon completion of your review of the enclosed documentation, please provide written confirmation that all questions are closed.

DUQUESNE LIGHT COMPANY

By R E Martin for
J. J. Carey
Vice President

JJS/wjs
Attachment

cc: Mr. B. K. Singh, Project Manager (w/a)
Mr. J. Walton, NRC Resident Inspector (w/a)

Ltr Encl
Add: PWR A/PAD-2/MRB 1 1

Kunted Dist 5001 1/1

AD - J. KNIGHT (ltr only)
EB (BALLARD)
EICSB (ROSA)
PSB (GAMMILL)
RSB (BERLINGER)
FOB (BENAROYA)
} Ltr only

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

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

$$= 240 \text{ psi}$$

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 non-standard 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, I99K, 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 I99K, 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.

Response to MEB Questions

1. The mitered joint is internal of the structural assembly and is not considered the critical element of the pump discharge head.

   A supplement to the seismic report has been submitted addressing nozzle loads and developes an equivalent design pressure to show acceptability of the nozzle.

   See Attachment "A" for verification of pump discharge elbow wall thickness.

2. Hydro test report S&W File No. 2702.540-224-009A (See Attachment "B").

3. Yes. (Informal procedure of routing spec. through EMD for approval.)

   BVM-122 Eng. Confirmation/Updated Program

   BVM-166 SQRT and PVORT

   (SQRT = seismic qualification review team)
   (PVORT = Pump and valve operability review team)

   BVM-176 Seismic Qualification Task Group Organization & Procedure

4. Specification used was the purchase specification dated May 20, 1977 confirmed with vendor by telecon and substantiated by the Seismic Analysis report date which was November 5, 1977 (SWEC File No. 2605.450-76A-111B)

5. By SWEC equipment mark numbers. Tie-in in this case is the Posi Seal reference number 15245 and the item number six (6). Both the seismic report and drawing reference these numbers. The drawing also contains the equipment (SWEC) mark number of 2SWS*MOV107.

6. The correlation with the seismic report torque valve of 21068 in. lb is with item "A" on pages 2-6 (Valve seating torque = 1725 ft lb or 20700 in. lb.

   The Seismic Report provides a conservative value of 21008 in. lb or 1,755 ft lb.

7. Shear stress in the stem due to differential pressure was accounted for in the calculation. The stem was analyzed for the combined action of twisting due to operating torque (T) plus bending due to the forces produced by 153 psi differential pressure across the valve seat plus SSE seismic loading (3 g). The radical in the principle stress equation represents the maximum shearing stress in the stem due to the combined action of twisting and bending.

8. The integrity of the keyed connection under the most severe seismic loading condition was demonstrated during operability testing of the valve assembly (See Operability Test Results, SWEC File No. 2606.450-076A-114G). The valve was subjected to an SSE static loading at an angle and location on the valve so as to produce worst case stresses in the valve. Simultaneously, a differential pressure of 160 psi was applied across the valve seat. The valve was then operated (cycled) under the combined loading. Valve was then operated (cycled) under the combined loading. There was no evidence of any physical damage to the valve. The valve operated within specified opening/closing times.

   See Attachment "C" for Operability Test Results.

9. a. The allowable stress limits used in the POSI-SEAL seismic analysis were derived using a factor of 1.5S, which is the allowable membrane stress limit (S_m) for the Emergency Plant Condition Condition (in accordance with ASME III). The stresses calculated in the seismic analysis are representative of faulted plant condition stresses (i.e., normal + SSE seismic). All faulted stress levels are shown in the analysis to be below the emergency membrane stress allowables.

   In 2BVS-76A, the appropriate allowable membrane stress limit specified is defined as Design Condition II (which is analogous to the faulted plant condition allowable stress limits from ASME III). The allowable limit is 2.0S.

   The vendor's approach is conservative since 2.0 S could have been utilized for the analysis instead of 1.5S.

   b. Valve Stem Material: SA-564 GR630; ASME III Subsection ND 1974 Edition through S 1976 Addenda

   Minimum yield: 115 ksi Minimum ult 140
   Allowable stress at 100°F to 300°F = 35 ksi
   1.5S is the allowable membrane stress limit (S_m) for the Plant Emergency condition. This stress limit was incorporated in the W 76 Addenda to the code. They were originally specified in ASME code case 1607, which was annuled in 1976 and incorporated into the winter 1976 Addenda of the code.

10. Manufacturer valve drawing SWEC File No. 2006.450-76A-072K, Attachment "D."

11. SWEC evaluates moment loadings on all flanged joints in ASME III piping as part of pipe stress analysis. These particular flanges are evaluated in pipe stress calc 12241-NP(T)-257-X9, Attachment "E."

12. Seismic Functional Test Report with test results included SWEC File No. 2606.450-76A-114G, Attachment "C."

13a. Yes. SWEC standard STD-SP-1056-1-5 and 3-5 was used in specifications 2BVS-58 and 2BVS-939 to define and control minimum pipe wall thickness at shop and field butt welds.

13b. The minimum wall thicknesses for piping with diameters greater than 24 in. are either identified in the notes of the appropriate pipe class or in the tabulation of Special Wall Pipe in Specification 2BVS-939A (Stone & Webster pipe classes).

The minimum wall thickness for piping, if not specifically identified in Specification No. 2BVS-939A, is the manufacturer's minimum wall thickness as identified in the material specification (i.e., SA106, SA312, SA155, etc). If the Vendor finds a violation of the manufacturer's minimum wall, his quality control procedure, approved by the Engineers, has a method to address and resolve this violation to comply with specification and/or code requirements. If the violation is found by the Purchaser's Shop Inspector (PSI), the PSI issues a Nonconformance and Disposition Report (N&D), which identifies the violation. The Engineers resolve this matter by dispositioning the N&D for specification and/or code requirements.

See Nonconformance Control on page 1-25 of Specification No. 2BVS-58, Rev. 4.

13c. No. The minimum wall thickness in STP-SP-1056-1-5 and 3-5 do not apply to plate-pipe. STD-SP-1056-1-5 and 3-5 are applicable to piping 2½ in. through 24 in. only. The use of plate-pipe is limited to sizes over 24 in. The minimum wall thickness for plate-pipe will be found in the notes of the appropriate pipe class or in the tabulation of Special Wall Pipe in Specification 2BVS-939.

13d. The shop traveler documentation for shop fabricated piping identifies the design minimum pipe wall thickness and actual wall thickness measurement for both shop and field weld end preps. Similar documentation exist for pipe end preps prepared in the field, see Attachment "F" for additional shop travelers.

14. Code allowable values in the piping are as shown in ASME III for attachments to ASME piping; and values for SWEC Class 4 (non-ASME) piping are as shown in ANSI B31.1 code.

a. Code allowable values for nonintegral attachments are taken from the AISC code (used for the support structure members).

b. Code allowable values for integral attachments are taken from the ASME III or B31.1 code (depending on the pipe) for the attachment weld and member.

AISC code allowables are used for the supporting members of the pipe support structure.

The applicability of these codes is described in the specification sections "Technical Requirements" and also in sub-section "Attachments to Piping."

All codes to be used are listed in the "Applicable Documents" section of the specification.

All pipe support calculations and designs are reviewed for structural adequacy by SWEC.

15b. Pipe class 151 needs clarification. The pipe class states for 26 in. through 42 in. pipe the wall thickness is 3/8 in. Also, makes reference to Note 9. Note 9 states that the 42 in. purge line through the containment wall will be ½ in. wall. This is the only 42 in. piping at BVPS-2. Therefore, the pipe class should clearly indicate that 42 in. pipe has ½ in. wall thickness. Inputing ½ in. nominal wall thickness into Eq(4) of NC-3641 P now becomes 323 psi. Therefore, the design pressure of 275 psi in the pipe class is conservative.

15c. As indicated in our response to Question 15(b), the 42 in. purge line through the containment wall is the only 42 in. piping at BVPS-2. Applying Paragraph NC-3461.2 to this piping, it was determined that this piping can withstand 109 psi of external pressure, see Attachment "G" for calculation.

15d. It is an oversight that pipe classes 302 and 602 do not reference ANSI 16.9 for fittings. However, the material specification for stainless steel fitting is SA403. SA403 states that dimensional requirement for butt weld end fittings shall be to ANSI B16.9.

16. Although the purchase order (Item 7) did not state ANSI B16.9, it did, by inference, invoke ANSI B16.9. The purchase order identified the size, wall thickness, material and grade, and type of fitting as well as identifying it would be used in an ASME III construction. SA403 (the material specification) invokes ANSI B16.9. Item 8 (documentation package for power piping spool QSS-64-9 which is a 10 in. Sch. 80 Tee) indicates that the 10 in. Tee is not in compliance with ANSI B16.9. This is a special fitting. The dimensions and weight of this tee has been factored into the piping system design and found acceptable.

The fact that the center-to-end dimension is 8 9/32 in. in lieu of 8½ in. (center-to-end dimension of 10 in. ANSI 16.9 Tee) has no impact on the space available for reinforcement of the opening. The slight deviation is in the weld end prep area.

These 10 in. tees are certified to ASME III, 1971 Edition through Winter 1972 Addenda. The material specification (SA403) to this edition/addenda does not have the supplementary requirement S9. Therefore, to mark the fittings to S9 would be inappropriate.

This tee, although not in compliance with ANSI B16.9, is properly factored into our piping system design.

17a. Neither tee, with heat code D-7110 or D-9983, is describle on the NPP-1 form. The correct tee for spool QSS-64-9 has heat code D-7112 and is referenced on the NPP-1 form and the spool shop traveler, see Attachment "H" for CMTR.

17b. The 0.319 in. and 0.519 in. minimum wall dimensions are the manufacturer's minimum wall for 10 in. Sch. 40S and 10 in. Sch. 80 fittings, respectively. The 0.400/0.419 in. and 0.403/0.415 in. dimensions are measured wall thickness a distance back from the weld end (1 in.).

18. The pump and valve specifications (2BVS-224 and 2BVS-76A) require the pumps and valves be hydrotested to ASME III code requirements in the shop and witnessed by the manufacturer's ANI. This is confirmed by the ANI signature on the test report and the Code Data Report (NPV-1 form). The piping installation specification (2BVS-920) does not specifically state the ANI should witness the hydrotest of piping. The ASME III code and SWEC mechanical test procedure (MTP) for hydrotesting requires the ANI inspect the joints during pressure testing and sign the test report and N-5.

See Attachments "B" and "C" for pump and valve hydrotest results. For procedure of piping system hydrotesting and ANI requirements refer to Mechanical Test Procedure (2MTP-4) and Field Construction Procedure (FCP-216), Attachment "J."

19. See "General Notes" page 4 of 28 of SI-RM-100A1-0 dated August 22, 1984 which supercedes SI-RM-100A-1.

> Note reads: The anticipated number of cycles for conditions 1 through 14 is 7,000 or less.

Refer to Project Procedure No. 2BVM-45, Rev. 10, dated September 25, 1984, (Attachment "K").

20. The calculated SIF's based on the ASME III equation shown on Fig. NC-3672.9(a)-1 of the code are conservative and are based on full size connections.

    The connections in question in stress calculation X99K are boss type reduced outlets. Using paragraph NC-3673.2 of the ASME code results in SIF's that do not exceed the 1.5 which was used in the stress calculation for the decoupled branches.

    The SIF used for Pt. 6 was conservatively calculated by the NUPIPE-SW computer program based on a full size connection using code equations because this branch line was not decoupled from the run pipe analysis.

21. Water Hammer. All ASME systems are reviewed by SWEC EMD and Power groups for the potential of "Water Hammer". Systems which are identified to be subject to Water Hammer are listed in Appendix IV of 2BVM-45 Rev. 10 dated September 25, 1984 (Attachment "K"). NUREG 0582 was used as a guide in the determination of system transient conditions.

    Note: Stroke times of containment isolation valves range from 3.2 to 3.8 sec. to open and 8.6 to 9.2 sec. to close (Reference Specification 2BVS-651).

    Erosion. Class 1502 (1500 lb stainless steel) piping was specifically added to this system as an erosion consideration (see note 4 on flow diagram RM-100A). This 1502 piping is provided through the containment penetration and including the outside containment isolation values. At that point, a pipe class and QA category change is provided (Class 901 Q.A. Category II) and a feedwater injection line is provided for subcooling.

ATTACHMENT A

Byron Jackson Pump Division

P.O. BOX 2017 TERMINAL ANNEX, LOS ANGELES, CALIFORNIA 90054 • TLX 910-321-7171 PAGE NO. _____

CUSTOMER Duquesne Light Co.
P.O. NO. 23V-224
PROJECT Beaver Valley Power Sta. Unit #2
I.D. NO. 2SWS-P21A

RC NO. 153999
ITEM NO. 465
DRG. NO. E3A059
PART NO. Column Pipe

BYRON JACKSON SER. NO.
221-N-0027

KAISER STEEL

KAISER STEEL CORPORATION
STEEL MANUFACTURING DIVISION
9400 CHERRY AVE., FONTANA, CA. 92335
U.S.A.

TEST REPORT

63-05899-X	08/27/76	MILL	X	10/76	16	15	11-S 29993
X CUST TRK			080	X	REQ 1/2% 10TH 25TH NET 30		/A

SOLD TO: OUCOMMUN, INC.
OUCOMMUN METALS & SUPPLY CO DIV.
P.O. BOX 2117 TERM ANNEX
LOS ANGELES CA90054

SHIP TO: OUCOMMUN, INC.
OUCOMMUN METALS & SUPPLY CO DIV.
4890 SO. ALAMEDA ST.
LOS ANGELES CA90058
HZ-233 DEST-101

2550S0 11 76

		1
	09/27/76	PN 09096
140 JOBBER STK - SUBJ TO BLANCHARD GRIND	CUST	13322
KAISER HR STL PLATE CARB ASME-SA-515-748-GR.70-PVQ-AQC-TEST-PER S4.1	CUST TRUCK	NO CHARGE

	DESCRIPTION	ORDERED	SHIPPED	HEAT NO.	TEST	TEMPER	WEIGHT
1	SE C/L 1/2N X 120N X 240N						
2	SE C/L 1/2N X 120N X 240N		6	62943	RI 4704 3-1	3-2, 9800	
3							
4							

TEST REPORT

CERTIFIED REPORT OF CHEMICAL ANALYSIS AND/OR PHYSICAL PROPERTIES.

SEP 29 '76

I CERTIFY THE FOLLOWING TEST INFORMATION TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

Supervisor, Physical Test

ITEM	HEAT OR LOT NUMBER	CLASS	COIL	YIELD POINT KSI	TENSILE STRENGTH KSI	% ELONG.	GRAIN SIZE	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
2	62943	3-1		43.4	75.6	21		29	67	011	023	20						
				43.9	74.4	22												
		3-2		44.2	75.4	21		"	"	"	"	"						
				45.2	76.2	27												

CORRECTED TEST REPORT - CHANGED ITEM BILLED FROM ITEM #1 TO ITEM #2 2-3-77

Byron Jackson Pump Division

P. O. BOX 2017 TERMINAL ANNEX, LOS ANGELES, CALIFORNIA 90051 • TELEX 697-4171 PAGE NO._____

CUSTOMER Duquesne Light Co.
P.O. NO. 78V-1224
PROJECT Beaver Valley Power Sta. Unit #2
I.D.NO. 2SWS-P21B

RC NO. 159387
ITEM NO. —
DRG. NO. E88037
PART NO. Elbow Inlet

BYRON JACKSON SER. NO.
731-N-0028

KAISER STEEL

KAISER STEEL CORPORATION
STEEL MANUFACTURING DIVISION
9400 CHERRY AVE. • FONTANA, CA. 92335
U.S.A.

TEST REPORT

63-05899-X	08/27/76	MILL	X	10/76	16	15	11-5 29993
X	CUST TRK		080	X	1/2% 10TH 25TH NET 30 REQ		/A

SOLD TO: DUCOMMUN, INC.
DUCOMMUN METALS & SUPPLY CO DIV.
P.O. BOX 2117 TERM ANNEX
LOS ANGELES CA90054
255050 11/16

SHIP TO: DUCOMMUN, INC.
DUCOMMUN METALS & SUPPLY CO DIV.
4890 SO. ALAMEDA ST.
LOS ANGELES CA90058
MZ-235 08ST-101

3X			
140 JOBBER STK - SUBJ TO BLANCHARD GRIND		09/27/76	PM 09096
		CUST	13322
KAISER HR STL PLATE CARB		CUST TRUCK	NO CHARGE
ASME-SA-515-748-GR.70-PVQ-ADC-TEST-PER S4.1			

1	SE C/L					
	1/2N X 120N X 240N					
2	SE C/L					
	1/2N X 120N X 240N	A	62963	RT A704 3-1	3-2, 9800	
3						
4						

TEST REPORT

CERTIFIED REPORT OF CHEMICAL ANALYSIS AND/OR PHYSICAL PROPERTIES.

SEP 29 '76

I CERTIFY THE FOLLOWING TEST INFORMATION TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

ITEM	HEAT OR LOT NUMBER	CLASS	LOC.	YIELD POINT KSI	TENSILE STRENGTH KSI	% ELONG. 2"	BEND TEST	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Ca
2	62963	3-1		43.4	75.8	21		.29	.67	.011	.023	.20						
				43.9	74.4	20												
		3-2		44.2	75.4	21		"	"	"	"	"						
				45.2	76.2	27												

CORRECTED TEST REPORT - CHANGES WERE WRITTEN FROM ITEM #1 TO ITEM #3 9-1-77.

Byron Jackson Pump Division

P.O. BOX 2017 TERMINAL ANNEX, LOS ANGELES, CALIFORNIA 90051 • TLX 67-4171 PAGE NO._____

CUSTOMER Duquesne Light Co.
P.O. NO. 28V-1224
PROJECT Beaver Valley Power Sta.
I.D. NO. 2SWS-P21C Unit #2

RC NO. 152888
ITEM NO. —
ORG. NO. EAA039
PART NO. Elbow Pipe
BYRON JACKSON SER. NO.
231-N-0039

KAISER STEEL

KAISER STEEL CORPORATION
STEEL MANUFACTURING DIVISION
9400 CHERRY AVE., FONTANA, CA. 92335
U.S.A.

TEST REPORT

08/27/76								
63-05899-X	MILL	X	10/76	16	15	11-5 29993		
X CUST TRK		080	X	1/2% 10TH 25TH NET 30				

DUCOMMUN, INC.
DUCOMMUN METALS & SUPPLY CO DIV.
P.O. BOX 2117 TERM ANNEX
LOS ANGELES CA90054

DUCOMMUN, INC.
DUCOMMUN METALS & SUPPLY CO DIV.
4890 SO. ALAMEDA ST.
LOS ANGELES CA90058
MZ-235 DEST-101

2590S0 11 16

09/27/76 | PR 09096

140 JOBBER STK - SUBJ TO BLANCHARD GRIND | CUST | 13322

KAISER HA STL PLATE CARB | CUST TRUCK | NO CHARGE

ASME-SA-515-748-GR.70-PVQ-ADC-TEST-PER S4.1

1	SE C/L 1/2N X 120N X 240N					
2	SE C/L 1/2N X 72N X 240N	4		62943	RI 4704 3-1	3-2, 4700
3						
4						

TEST REPORT

CERTIFIED REPORT OF CHEMICAL ANALYSIS AND/OR PHYSICAL PROPERTIES

SEP 29 '76

I CERTIFY THE FOLLOWING TEST INFORMATION TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

Supervisor, Physical Test

ITEM	HEAT OR LOT NUMBER	CLASS	LOC.	YIELD POINT KSI	TENSILE STRENGTH KSI	% ELONG. 2"	NOTCH TEST	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
2	62943	3-1		43.6	75.6	21		.29	.67	.011	.023	.20						
				43.2	74.4	20												
		3-2		44.2	75.4	21		"	"	"	"	"						
				43.2	76.2	27												

CORRECTED TEST REPORT - CHANGED ITEM BILLED FROM ITEM #1 TO ITEM #2 2-1-77.

ATTACHMENT B

* CORRECTED REPORT

FORM NPV-1 N CERTIFICATE HOLDERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES*

As Required by the Provisions of the ASME Code, Section III, Div 1

1. Manufactured by BYRON JACKSON PUMP DIV. 2700 E VERNON AVE. VERNON CALIF. 90058
(Name and Address of N Certificate Holder)

2. Manufactured for STONE AND WEBSTER ENG. CORP. BOSTON MASS. 02107
(Name and Address of Purchaser or Owner)

* 3. Location of Installation BEAVER VALLEY POWER STATION ~~SHIPPINGPORT, TEXAS~~ SHIPPINGPORT BOROUGH, PENNSYLVANIA
(Name and Address)

4. Pump or Valve PUMP Nominal Inlet Size N/A (inch) Outlet Size 24 (inch)

	(a) Model No., Series No. or Type	(b) N Certificate Holder's Serial No.	(c) Canadian Registration No.	(d) Drawing No.	(e) Class	(f) Nat'l Bd. No	(g) Year Built
(1)	36RXM	731-N-0027	N/A	1E-7511	3	N/A	1982
(2)	2 STG. VCT.			REV. D			
(3)							
(4)							
(5)							
(6)							
(7)							
(8)							
(9)							
(10)							

5. SERVICE WATER PUMPS FOR COMPONENT/SYSTEM COOLING.
(Brief description of service for which equipment was designed)

6. Design Conditions 130 (Pressure) psi 100 (Temperature) °F or Valve Pressure Class N/A (1)

7. Cold Working Pressure N/A psi at 100°F

8. Pressure Retaining Pieces

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
TOP CASE	SA-216 GR. WCB		P/S 162335
SERIES CASE	SA-216 GR. WCB		P/S 162336
SUCTION BELL	SA-216 GR. WCB		P/S 154430
STUFF. BOX	SA-216 GR. WCB		P/S 47179A
(b) Forgings			
HALF COUPLING	SA-105 GR. 2		P/S 43969

(1) For manually operated valves only

* Supplemental sheets in form of lists, sketches or drawings may be used provided (1) size is 8-1/2" x 11", (2) information in items 1, 2, and 5 on this Data Report is included on each sheet, and (3) each sheet is numbered and number of sheets is recorded at top of this form.

This form (60003) may be obtained from the Order Dept., ASME, 345 E. 47th St., New York, N.Y. 10017

FORM NPV-1 (Back)

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
STUDS	SA-193 GR. B7		RIS 115041
HEX. HD. CAP SCR.	SA-193 GR. B7		RIS 115037
HEX. NUT	SA-194 GR. 7		RIS 97736
(d) Other Parts			
COL. FLANGE	SA-515 GR. 70		RIS 47948
ELBOW PIPE	SA-515 GR. 70		RIS 153339
THROTTLE SUPPORT	SA-515 GR. 70		RIS 158690
SUPPORT PIPE	SA-106 GR. B		RIS 158295
UPPER FLANGE	SA-515 GR. 70		RIS 158641
LOWER FLANGE	SA-515 GR. 70		RIS 159641
COL. PIPE	SA-515 GR. 70		RIS 153871
COL. PIPE	SA-515 GR. 70		RIS 153870
COL. PIPE	SA-515 GR. 70		RIS 153869

9. Hydrostatic test 2000 psi. Disk Differential test pressure N/A psi.

CERTIFICATE OF COMPLIANCE

We certify that the statements made in this report are correct and that this pump, or valve, conforms to the rules of construction of the ASME Code for Nuclear Power Plant Components, Section III, Div. 1, Edition 1971, Addenda WINTER 1972 (Date), Code Case No. N-146-1, Date 6 Oct. 1982

Signed BYRON JACKSON Pump DIV. (N Certificate Holder) by C.W. Hanel

Our ASME Certificate of Authorization No. 1130 to use the N (N) symbol expires 16 JUNE 1984 (Date)

CERTIFICATION OF DESIGN

Design information on file at BYRON JACKSON Pump DIV.

Stress analysis report (Class 1 only) on file at N/A

Design specifications certified by (1) STEPHEN A. SHUMAN

PE State PENNSYLVANIA Reg. No. PE-30264-E

Stress analysis certified by (1) N/A

PE State N/A Reg. No. N/A

(1) Signature not required. List name only.

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State or Province of CALIFORNIA and employed by* ABC MFG. MUTUAL INS. Co. of WALTHAM, MASS. have inspected the pump, or valve, described in this Data Report on Oct. 1 St. 19 82 and state that to the best of my knowledge and belief, the N Certificate Holder has constructed this pump, or valve, in accordance with the ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the equipment described in this Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date October 1 St 1982

Signed [illegible] Commissions [illegible]

CERTIFICATE OF AUTHORIZATION NO. N-1130
CERTIFICATE OF AUTHORIZATION EXPIRES: 16 JUNE 1984
BY: [illegible] (OA MGR. BJ) DATE: 7 JUL 1983
AND: Mahlon N. Conwell DATE: 2-7-83

FORM NPV-1 N CERTIFICATE HOLDERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES
(SUPP.)

1. Manufactured By: BYRON JACKSON PUMP DIV. 2300 E. VERNON AVE. VERNON CALIF. 90058
2. Manufactured For: STONE AND WEBSTER ENG. CORP. BOSTON MASS. 02107
3. Location of Installation: BEAVER VALLEY POWER STATION SHIPPING PORT ~~Beaver~~ PENNSYLVANIA
4. Pump S/N: 731-N-0027
5. SERVICE WATER PUMPS FOR COMPONENT/SYSTEM COOLING
   (Brief description of service for which equipment was designed)
8. Pressure Retaining Pieces

Mark No.	Material Spec. No.	Manufacturer	Remarks
(D) OTHER PARTS			
COL. PIPE	SA-515 GR. 70		RS 153367
LOWER FLANGE	SA-515 GR. 70		RS 1586-2
COL. PIPE	SA-515 GR. 70		RS 158330
LOWER FLANGE	SA-515 GR. 70		RS 1596-2C
COL. PIPE	SA-515 GR. 70		RS 153934
PIPE 1½" SCH. 80	SA-106 GR. B		RS 175450

CERTIFICATE OF AUTHORIZATION TO USE N AND NPT CERTIFICATE OF AUTHORIZATION NO. 1130 EXPIRES 15 JUNE 1984 QUALITY CONTROL SYSTEM DATED 7 FEB 1983

For ASME Certificate of Authorization No. 1130 to use the "N" symbol expires 15 June 1984

Verification Signatures

Manufacturer: C W Harris 10 Oct 1983

Authorized Nuclear Inspector: Nathaniel N. Cantrell Jr.
October 10 1983
Cert. #1498 Comm. NC-2457

 * CORRECTED REPORT

FORM NPV-1 N CERTIFICATE HOLDERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES*
As Required by the Provisions of the ASME Code, Section III, Div. 1

1. Manufactured by BYRON JACKSON PUMP DIV. 2360 E. VERNON AVE. VERNON CALIF. 90058
(Name and Address of N Certificate Holder)

2. Manufactured for STONE AND WEBSTER ENG. CORP. BOSTON MASS. 02107
(Name and Address of Purchaser or Owner) SHIPPING PORT PORTLAND

3. Location of Installation BEAVER VALLEY POWER STATION, ~~SHIPPINGPORT~~ PENNSYLVANIA
(Name and Address)

4. Pump or Valve PUMP Nominal Inlet Size N/A (inch) Outlet Size 24 (inch)

	(a) Model No., Series No. or Type	(b) N Certificate Holder's Serial No.	(c) Canadian Registration No.	(d) Drawing No.	(e) Class	(f) Nat'l Bd. No	(g) Year Built
(1)	36RXM	731-N-0023	N/A	1F-7511	3	N/A	1982
(2)	2 STG. VCT			REV. D			
(3)							
(4)							
(5)							
(6)							
(7)							
(8)							
(9)							
(10)							

5. SERVICE WATER PUMPS FOR COMPONENT/SYSTEM COOLING
(Brief description of service for which equipment was designed)

6. Design Conditions 130 (Pressure) psi 100 (Temperature) °F or Valve Pressure Class N/A (1)

7. Cold Working Pressure N/A psi at 100°F

8. Pressure Retaining Pieces

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
TOP CASE	SA-216 GR. WCB		R/S 154432
SERIES CASE	SA-216 GR. WCB		R/S 162333
SUCTION BELL	SA-216 GR. WCB		R/S 156977
STUFF. BOX	SA-216 GR. WCB		R/S 161194
(b) Forgings			
HALF COUPLING	SA-105 GR. 2		R/S 48969

(1) For manually operated valves only

* Supplemental sheets in form of lists, sketches or drawings may be used provided (1) size is 8-1/2" x 11", (2) information in items 1, 2, and 5 on this Data Report is included on each sheet, and (3) each sheet is numbered and number of sheets is recorded at top of this form.

FORM NPV-1 (Back)

Mark No.	Material Spec. No	Manufacturer	Remarks
(c) Bolting			
STUDS	SA-193 GR. B7		R/S 115641
HEX. HD. CAP SCR.	SA-193 GR. B7		R/S 115637
HEX. NUT	SA-194 GR. 7		R/S 97736
(d) Other Parts			
CRK. FLANGE	SA-515 GR. 70		R/S 47949
ELBOW PIPE	SA-515 GR. 70		R/S 153937
THROTTLE SUPPORT	SA-515 GR. 70		R/S 153690
SUPPORT PIPE	SA-106 GR. B		R/S 153895
UPPER FLANGE	SA-515 GR. 70		R/S 153641
LOWER FLANGE	SA-515 GR. 70		R/S 153641
CRK. PIPE	SA-515 GR. 70		R/S 153963
CRK. PIPE	SA-515 GR. 70		R/S 153879
CRK. PIPE	SA-515 GR. 70		R/S 153877

9 Hydrostatic test 300 psi. Max Differential test pressure N/A psi

CERTIFICATE OF COMPLIANCE

We certify that the statements made in this report are correct and that this pump, or valve, conforms to the rules of construction of the ASME Code for Nuclear Power Plant Components, Section III, Div. 1, Edition 1971, Addenda WINTER 1972 (Date), Code Case No. N-146-1, Date 10 Oct. 1982

Signed BYRON JACKSON PUMP DIV. (N Certificate Holder) By [signature]

Our ASME Certificate of Authorization No. 1130 to use the N (Int) symbol expires/6 JUNE 1984 (Date)

CERTIFICATION OF DESIGN

Design information on file at BYRON JACKSON PUMP DIV.

Stress analysis report (Class 1 only) on file at N/A

Design specifications certified by (1) STEPHEN A. SHULMAN

PE State PENNSYLVANIA Reg. No. PE-3C264-E

Stress analysis certified by (1) N/A

PE State N/A Reg. No. N/A

(1) Signature not required. List name only.

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State or Province of CALIFORNIA and employed by ARGO MFG. MUTUAL INS. CO. of WALTHAM MASS. have inspected the pump, or valve, described in this Data Report on 16-1-82 and state that to the best of my knowledge and belief, the N Certificate Holder has constructed this pump, or valve, in accordance with the ASME Code, Section III.

By signing this certificate, neither the inspector nor his employer makes any warranty, expressed or implied, concerning the equipment described in this Data Report. Furthermore, neither the inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 16-1-82

[signature] Commissions Cert. # 1405, Penn-NC 2457

(Inspector) (Nat'l Bd. State, Prov. and No.)

CERTIFICATE OF AUTHORIZATION TO USE N, A OR PP SYMBOL EXPIRES 6 JUNE 1984 DATE 7 JULY 1983

FORM NPV-1 N CERTIFICATE HOLDERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES
(SUPP.)

1. Manufactured By: BYRON JACKSON PUMP DIV. 2300 EVERNON AVE. VERNON CALIF 90058
2. Manufactured For: STONE AND WEBSTER ENG. CORP. BOSTON MASS. 02107
3. Location of Installation: BEAVER VALLEY POWER STATION, ~~BEAVER COUNTY~~ SHIPPINGPORT BOROUGH PENNSYLVANIA
4. Pump S/N: 731-N-0028
5. SERVICE WATER PUMPS FOR COMPONENT / SYSTEM COOLING
   (Brief description of service for which equipment was designed)
6. Pressure Retaining Pieces

Mark No.	Material Spec. No.	Manufacturer	Remarks
(D) OTHER PARTS			
Cab. Pipe	SA-515 GR. 70		R/S 158872
Lower Flange	SA-515 GR. 70		R/S 158642
Cab. Pipe	SA-515 GR. 70		R/S 158879
Lower Flange	SA-515 GR. 70		R/S 158640
Cab. Pipe	SA-515 GR. 70		R/S 158883
Pipe 1 1/2" SCH. 80	SA-106 GR. B		R/S 175450

CERTIFICATE OF AUTHORIZATION NO. 1130 TO USE THE "N" SYMBOL EXPIRES 15 JUNE 1984
BY: [illegible]

ASME Certificate of Authorization No. 1130 to use the "N" symbol expires 15 June 1984

Verification Signatures

Manufacturer: C. W. Hynes 10 Oct. 1982

Authorized Nuclear Inspector: [illegible] Mahoning N. Contractors
10-1-1982

FORM NPV-1 N CERTIFICATE HOLDERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES*

As Required by the Provisions of the ASME Code, Section III, Div. 1

1. Manufactured by BYRON JACKSON PUMP DIV. 2300 E. VERNON AVE. VERNON, CALIF. 90058
(Name and Address of N Certificate Holder)

2. Manufactured for STONE AND WEBSTER ENG. CORP. BOSTON, MASS. 02107
(Name and Address of Purchaser or Owner)

* 3. Location of Installation BEAVER VALLEY POWER STATION, ~~SHIPPINGPORT~~ SHIPPINGPORT BOROUGH, PENNSYLVANIA
(Name and Address)

4. Pump or Valve PUMP Nominal Inlet Size N/A (inch) Outlet Size 24 (inch)

	(a) Model No., Series No. or Type	(b) N Certificate Holder's Serial No.	(c) Canadian Registration No.	(d) Drawing No.	(e) Class	(f) Nat'l Bd. No.	(g) Year Built
(1)	36 RXM	731-N-0029	N/A	1F-7511	3	N/A	1982
(2)	2 STG. VCT			REV. D			
(3)							
(4)							
(5)							
(6)							
(7)							
(8)							
(9)							
(10)							

5. SERVICE WATER PUMPS FOR COMPONENT/SYSTEM COOLING
(Brief description of service for which equipment was designed)

6. Design Conditions 130 (Pressure) psi 100 (Temperature) °F or Valve Pressure Class N/A (1)

7. Cold Working Pressure N/A psi at 100°F

8. Pressure Retaining Pieces

Part No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
TOP CASE	SA-216 GR. WCB		R/S 162834
SERIES CASE	SA-216 GR. WCB		R/S 154431
SUCTION BELL	SA-216 GR. WCB		R/S 156976
STUFF[illegible]	SA-216 GR. WCB		R/S 161195A
(b) Forgings			
HALF COUPLING	SA-105 GR. 2		R/S 48969

(1) For manually operated valves only

* Supplemental sheets in form of lists, sketches or drawings may be used provided (1) size is 8-1/2" x 11", (2) information in items 1, 2, and 5 on this Data Report is included on each sheet, and (3) each sheet is numbered and number of sheets is recorded at top of this form.

FORM NPV-1 (Back)

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
STUDS	SA-193 GR. B7		R/S 115041
HEX HD. CAP SCR.	SA-193 GR. B7		R/S 115037
HEX NUT	SA-194 GR. 7		R/S 97736
HEX HD. CAP SCR.	SA-193 GR. B7		R/S 55455
(d) Other Parts			
COL. FLANGE	SA-515 GR. 70		R/S 47948
ELBOW PIPE	SA-515 GR. 70		R/S 158888
THROTTLE SUPPORT	SA-515 GR. 70		R/S 158690
SUPPORT PIPE	SA-106 GR. B		R/S 158885
UPPER FLANGE	SA-515 GR. 70		R/S 158641
LOWER FLANGE	SA-515 GR. 70		R/S 158641
COL. PIPE	SA-515 GR. 70		R/S 158876
COL. PIPE	SA-515 GR. 70		R/S 158875
COL. PIPE	SA-515 GR. 70		R/S 158873

9. Hydrostatic test 2000 psi. Disc Differential test pressure N/A psi.

CERTIFICATE OF COMPLIANCE

We certify that the statements made in this report are correct and that this pump, or valve, conforms to the rules of construction of the ASME Code for Nuclear Power Plant Components, Section III, Div. 1., Edition 1971 Addenda WINTER 1972 (Date), Code Case No. N-146-1. Date 10 DEC 1982

Signed BYRON JACKSON PUMP DIV. (N Certificate Holder) by C.W. Yuma

Our ASME Certificate of Authorization No. 1130 to use the N (N) symbol expires 16 JUNE 1984 (Date)

CERTIFICATION OF DESIGN

Design information on file at BYRON JACKSON PUMP DIV.

Stress analysis report (Class 1 only) on file at N/A

Design specifications certified by (1) STEPHEN A. SHUMAN

PE State PENNSYLVANIA Reg. No. PE-30264-E

Stress analysis certified by (1) N/A

PE State N/A Reg. No. N/A

(1) Signature not required. List name only.

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State or Province of CALIFORNIA and employed by ABO MFG. MUTUAL INS. CO of WALTHAM, MASS. have inspected the pump, or valve, described in this Data Report on 10 DEC, 19 82 and state that to the best of my knowledge and belief, the N Certificate Holder has constructed this pump, or valve, in accordance with the ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the equipment described in this Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 10 DEC, 19 82

Marlen Gene De Canterbury (Inspector) Commissions Calif-1463 Penn. w/c-2457 (Nat'l Bd., State, Prov. and No.)

* GRK WRIGHT - BOSTON MFG MUTUAL INS CO (FACTORY MUTUAL SYSTEM)

CERTIFICATE OF AUTHORIZATION NO. N-1130 EXPIRES 16 JUNE 1984

BY: W. Yuma DATE 7-26-1983

ANI: Marlen Gene De Canterbury DATE 7-26-83

FORM NPV-1 (Back)

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
STUDS	SA-193 GR.B7		R/S 115041
HEX HD. CAP SCR.	SA-193 GR.B7		R/S 115037
HEX NUT	SA-194 GR.7		R/S 97736
HEX HD. CAP SCR.	SA-193 GR.B7		R/S 55455
(d) Other Parts			
COL. FLANGE	SA-515 GR.70		R/S 47948
ELBOW PIPE	SA-515 GR.70		R/S 158888
TRIPPLE SUPPORT	SA-515 GR.70		R/S 158690
SUPPORT PIPE	SA-106 GR.B		R/S 158885
UPPER FLANGE	SA-515 GR.70		R/S 158641
LOWER FLANGE	SA-515 GR.70		R/S 158641
COL. PIPE	SA-515 GR.70		R/S 158876
COL. PIPE	SA-515 GR.70		R/S 158875
COL. PIPE	SA-515 GR.70		R/S 158873

9. Hydrostatic test 200 psi. Disc Differential test pressure N/A psi.

CERTIFICATE OF COMPLIANCE

I certify that the statements made in this report are correct and that this pump, or valve, conforms to the rules of construction of the ASME Code for Nuclear Power Plant Components, Section III, Div. 1., Edition 1971, Addenda WINTER 1972 (Date), Code Case No. N-146-1. Date 10 Dec. 1982

Signed BYRON JACKSON PUMP DIV. (N Certificate Holder) by C.W. Lyons

Our ASME Certificate of Authorization No. 1130 to use the N (N) symbol expires 16 JUNE 1984 (Date)

CERTIFICATION OF DESIGN

Design information on file at BYRON JACKSON PUMP DIV.

Stress analysis report (Class 1 only) on file at N/A

Design specifications certified by (1) STEPHEN A. SHILALAN

PE State PENNSYLVANIA Reg. No. PE-30264-E

Stress analysis certified by (1) N/A

PE State N/A Reg. No. N/A

(1) Signature not required. List name only.

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State or Province of CALIFORNIA and employed by ARC MFG. MUTUAL INS. CO* of WALTHAM, MASS. have inspected the pump, or valve, described in this Data Report on 10 Dec, 19 82 and state that to the best of my knowledge and belief, the N Certificate Holder has constructed this pump, or valve, in accordance with the ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the equipment described in this Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 10 Dec, 19 82

Michael Sam De Canterbury (Inspector) Commissions Calif-1463 Penn. W/C-2457 (Nat'l Bd., State, Prov. and No.)

* GRK WRIGHT - BOSTON MFG MUTUAL INS. CO. (FACTORY MUTUAL SYSTEM)

NUCLEAR

POSI-SEAL INTERNATIONAL, INC.

NUCLEAR

FINAL TEST REPORT

Page 1 of ~~8~~ 4

Traveler No.	PSI Serial No.
77-15245-06-0800	15245-6-C

Customer	Purchase Order No.	Item	Tag No.
Stone and Webster	2BV-76A	6	2SWS* MOV107C

Valve Size	ANSI Rating	Body Type
24"	150 Lb.	Single Flange

Shell Test per PSI Specification 15245 TP-6	Test Medium Air
Seat Test per PSI Specification	Test Medium

Allowable Leakage: Shell	None	Seat	

TEST RESULTS

Shell Test

Disc Position	Pressure	Time	Leakage	Accept	Reject	Remarks
Open	425 PSIG	10 min.	0	✓		Para. 5.3 of ST-1

Seat Test

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away From Seal						

Seat Test per PSI Specification:	Test Medium
Allowable Leakage: Seat	

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away from Seal						

Tested By:	Date	Inspected By:	Date
R. Randall	6-13-78	F. Ross	6-13-78

Comments:

Posi-Seal International, Inc.
Rts. 49 & U.S. 95
North Stonington, Conn. 06359

DUQUESNE LIGHT COMPANY Page 71
BEAVER VALLEY POWER STATION #2
P.O. NO. 2BV-76A J.O. NO. 1224
MOTOR OPERATOR BUTTERFLY VALVES
FLANGED AND WAFER TYPE CAT. I

Witnessed By:	Date	Authorized Inspector	Date

SEISMIC FUNCTIONAL TEST RECORD

POSI-SEAL REFERENCE NO. 15245

VALVE SIZE	ANSI RATING	SERIAL NUMBER	ITEM NO.	NUCLEAR CLASS	ASSEMBLY DWG. NO.	REV.	VALVE TAG NUMBER
24"	150 Lb.	15245-6-C	6	B	15245-6	J	23WS*MOV107C

MOTOR OPERATOR DATA:

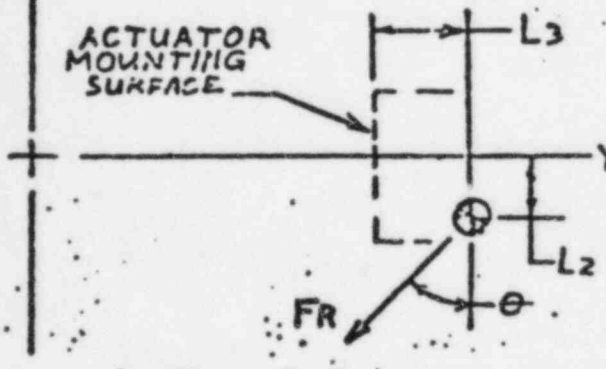
Manufacturer: Limitorque Model H2BC SMB 0015 Pos. B
Serial No. 261651
Motor Rating: HP .33 Phase 3 Frequency 60 Hz Full Load Current 2.3
Voltage 460 Volt Locked Rotor Current 11.9 amps

GIVEN DATA:

Diff. Pressure Across Seat 153 PSI (TABLE I) Specified Opening/Closing Time 40 sec / 60 sec
Equivalent Seismic Force
Voltage/Fluid Press.

TEST DATA (ACTUAL):

Diff. Pressure Across Seat (Applied) 160 PSI
Equivalent Seismic Force (FR) (Applied) 1700 LB



	REQUIRED	ACTUAL
(in.) L_1 =	2.25	2.25
(in.) L_2 =	7.0	7.0
(in.) L_3 =	4.5	4.5
(deg.) θ =	45°	45°

NOTE: θ is the angle of the seismic force that causes the worst stresses in the valve member.

	First Cycle	Second Cycle	Third Cycle
Cycle Time	Open: 59 Close: 59	Open: 59 Close: 59	Open: 59 Close: 5[illegible]
Voltage	Open: 470 Close: 470	Open: 470 Close: 470	Open: 4[illegible] Close: 4[illegible]
Max. Current	Open: 15amp Close: 5amp	Open: 15amp Close: 5amp	Open: 15amp Close: 5[illegible]

COMMENTS: (ie. describe impairment of operability, excessive operating times, or visual damage)

Posi-Seal International, Inc.
Rts. 49 & U.S. 95
North Stonington, Conn. 06359

Test Supervised By: Ronald A. Olmsen Data Recorded By: F. Rose + J. L

Witnessed By: GM VanVlack DLC 8-13-78 PSI Inspector: Frank Rose

DOMESTIC LINE
BEAVER VALLEY R STATION #2
P.O. NO. 28V-76A J.O. NO. 1224
MOTOR OPERATOR BUTTERFLY VALVES
FLANGED AND WAFER TYPE CAT. I

POSI-SEAL INTERNATIONAL, INC. NUCLEAR

NUCLEAR FINAL TEST REPORT Sheet 3 of 4

Traveler No. 77-15245-06-0800		PSI Serial No. 15245-6-C	
Customer Stone and Webster	Purchase Order No. 2BV-76A	Item 6	Tag No. 2SWS*MOV107C
Valve Size 24"	ANSI Rating 150 lb.	Body Type Single Flange	
Shell Test per PSI Specification 15245 TP-6		Test Medium Demineralized Water	
Seat Test per PSI Specification 15245 TP-3		Test Medium Demineralized Water	
Allowable Leakage: Shell	None	Seat	None

TEST RESULTS

Shell Test

Disc Position	Pressure	Time	Leakage	Accept	Reject	Remarks
Open	425 PSIG	10 min.	0	✓		Para. 5.12 of ST-1

Seat Test

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away From Seal	80 PSIG	10 min.	0	✓		Para. 5.12 of ST-1

Seat Test per PSI Specification:	Test Medium
Allowable Leakage: Seat	

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away from Seal						

Tested By: H. WAY	Date 9/2/88	Inspected By: D. Tobin	Date 9/2/88

Comments:

Posi-Seal International, Inc.
Rts. 49 & U.S. 95
North Stonington, Conn. 06359

DUQUESNE LIGHT COMPANY Page 73
BEAVER VALLEY POWER STATION #2
P.O. NO. 2BV-76A J.O. NO. 1224
MOTOR OPERATOR BUTTERFLY VALVES
FLANGED AND WAFER TYPE CAT.I

Witnessed By:	Date	Authorized Inspector	Date

NUCLEAR — FINAL TEST REPORT

Page 2 of 4

Traveler No. 77-15245-06-0800	PSI Serial No. 15245-6-C		
Customer Stone and Webster	Purchase Order No. 2BV-76A	Item	Tag No. 2SWS*MOV107C
Valve Size 24"	ANSI Rating 150 lb.	Body Type Single Flange	

Shell Test per PSI Specification See Page 1		Test Medium	
Seat Test per PSI Specification 15245 TP-8		Test Medium	Demineralized Water
Allowable Leakage: Shell	None	Seat	None

TEST RESULTS

Shell Test

Disc Position	Pressure	Time	Leakage	Accept	Reject	Remarks
Open						

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away From Seal	152 PSIG	2 min.	0	✓		

Disc Test per PSI Specification: 15245 TP-7 — Test Medium: Demineralized Water

Allowable Leakage: None

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away from Seal	275 PSIG	1 min.	0	✓		

Tested By:	Date	Inspected By:	Date
J. Lewis	6-15-78	J. Rou	6-15-78

Comments:

DUQUESNE LIGHT COMPANY Page 73A
BEAVER VALLEY POWER STATION #2
P.O. NO. 2BV-76A J.O. NO. 1224
MOTOR OPERATOR BUTTERFLY VALVES
FLANGED AND WAFER TYPE CAT.I

Posi-Seal International, Inc.
Rte. 49 & U.S. 95
North Stonington, Conn. 06359

Seal & Disc Test.

Witnessed By:	Date	Authorized Inspector	Date

ATTACHMENT C

NUCLEAR

POSI-SEAL INTERNATIONAL, INC.

NUCLEAR

FINAL TEST REPORT Page 1 of ~~8~~ 4

Traveler No. 77-15245-06-0800	PSI Serial No. 15245-6-C		
Customer Stone and Webster	Purchase Order No. 2BV-76A	Item 6	Tag No. 2SWS*MAV107C
Valve Size 24"	ANSI Rating 150 Lb.	Body Type Single Flange	

Shell Test per PSI Specification 15245 TP-6		Test Medium Air	
Seat Test per PSI Specification		Test Medium	
Allowable Leakage: Shell	None	Seat	

TEST RESULTS

Shell Test

Disc Position	Pressure	Time	Leakage	Accept	Reject	Remarks
Open	425 PSIG	10 min.	0	✓		Para. 5.3 of ST-1

Seat Test

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away From Seal						

Seat Test per PSI Specification:		Test Medium	
Allowable Leakage: Seat			

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away from Seal						

Tested By: R. RonDall	Date 6-13-78	Inspected By: F. Ron	Date 6-13-78

Comments:

Posi-Seal International, Inc.
Rts. 49 & U.S. 95
North Stonington, Conn. 06359

DUQUESNE LIGHT COMPANY Page 71
BEAVER VALLEY POWER STATION #2
P.O. NO. 2BV-76A J.O. NO. 1224
MOTOR OPERATOR BUTTERFLY VALVES
FLANGED AND WAFER TYPE CAT. I

Witnessed By:	Date	Authorized Inspector	Date

SEISMIC FUNCTIONAL TEST RECORD

POSI-SEAL REFERENCE NO. 15245

VALVE SIZE	ANSI RATING	SERIAL NUMBER	ITEM NO.	NUCLEAR CLASS	ASSEMBLY DWG. NO.	REV.	VALVE TAG NUMBER
24"	150 Lb.	15245-6-C	6	3	15245-6	J	2SWS*MOV107C

MOTOR OPERATOR DATA:

Manufacturer: Limitorque Model H2BC SMB 0015 Pos. A
Serial No. 2616651
Motor Rating: HP .33 Phase 3 Frequency 60 Hz Full Load Current 2.3
Voltage 460 Volt Locked Rotor Current 11.9 amps

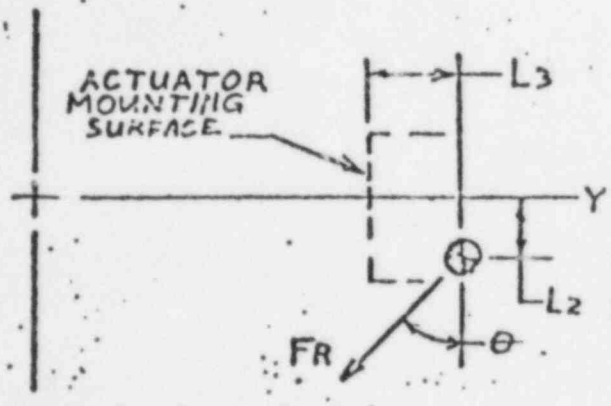
GIVEN DATA:

Diff. Pressure / 153 PSI (TABLE I) Specified Opening/Closing Time 60 sec / 60 sec
Equivalent
Voltage/Fluid Pr

BEAVER VALLEY ER STATION #2
P.O. NO. 28V-76A J.O. NO. 1224
MOTOR OPERATOR BUTTERFLY VALVES
FLANGED AND WAFER TYPE CAT. I

TEST DATA (ACTUAL):

Diff. Pressure Across Seat (Applied) 1600 PSI
Equivalent Seismic Force (FR) (Applied) 1700 LB



	REQUIRED	ACTUAL
(in.) L_1 =	2.25	2.25
(in.) L_2 =	7.0	7.0
(in.) L_3 =	4.5	4.5
(deg.) θ =	45°	45

NOTE: θ is the angle of the seismic force that causes the worst stresses in the valve member.

	First Cycle		Second Cycle		Third Cycle	
Cycle Time	Open: 59	Close: 59	Open: 59	Close: 59	Open: 59	Close: 59
Voltage	Open: 470	Close: 470	Open: 470	Close: 470	Open: 470	Close: 470
Max. Current	Open: 15amp	Close: 5amp	Open: 15amp	Close: 5amp	Open: 15amp	Close: 5amp

COMMENTS: (ie. describe impairment of operability, excessive operating times, or visual damage)

Posi-Seal International, Inc.
Rts. 49 & U.S. 95
North Stonington, Conn. 06359

Test Supervised By: Ronald A. Olsen Data Recorded By: F. Rose & J. L.

Witnessed By: GM VanVlack DLC 6-13-78 PSI Inspector: Frank Rose

POSI-SEAL INTERNATIONAL, INC.

NUCLEAR NUCLEAR

FINAL TEST REPORT Sheet 3 of 3 4

Traveler No. 77-15245-06-0800		PSI Serial No. 15245-6-C	
Customer Stone and Webster	Purchase Order No. 2BV-76A	Item 6	Tag No. 2SWS2MOV107C
Valve Size 24"	ANSI Rating 150 Lb.	Body Type Single Flange	
Shell Test per PSI Specification 15245 TP-6		Test Medium Demineralized Water	
Seat Test per PSI Specification 15245 TP-3		Test Medium Demineralized Water	
Allowable Leakage: Shell	None	Seat	None

TEST RESULTS

Shell Test

Disc Position	Pressure	Time	Leakage	Accept	Reject	Remarks
Open	425 PSIG	10 min.	0	✓		Para. 5.12 of ST-1

Seat Test

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away From Seal	80 PSIG	10 min.	0	✓		Para. 5.12 of ST-1

Seat Test per PSI Specification:	Test Medium
Allowable Leakage: Seat	

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away from Seal						

Tested By:	Date	Inspected By:	Date
H. WAY	9/2/78	D. Thiel	9/2/78

Comments:

Posi-Seal International, Inc.
Rts. 49 & U.S. 95
North Stonington, Conn. 06359

DUQUESNE LIGHT COMPANY Page 73
BEAVER VALLEY POWER STATION #2
P.O. NO. 2BV-76A J.O. NO. 1224
MOTOR OPERATOR BUTTERFLY VALVES
FLANGED AND WAFER TYPE CAT.I

Witnessed By:	Date	Authorized Inspector	Date

NUCLEAR FINAL TEST REPORT Page 2 of 4

Traveler No. 77-15245-06-0800	PSI Serial No. 15245-6-C		
Customer Stone and Webster	Purchase Order No. 2BV-76A	Item	Tag No. 2SWS#MOV107C
Valve Size 24"	ANSI Rating 150 lb.	Body Type Single Flange	

Shell Test per PSI Specification See Page 1		Test Medium	
Seat Test per PSI Specification 15245 TP-8		Test Medium	Demineralized Water
Allowable Leakage: Shell	None	Seat	None

TEST RESULTS

Shell Test

Disc Position	Pressure	Time	Leakage	Accept	Reject	Remarks
Open						

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away From Seal	153 PSIG	2 min.	8	✓		

Disc Test per PSI Specification: 15245 TP-7 Test Medium: Demineralized Water

Allowable Leakage: None

Flow Direction	Pressure	Time	Leakage	Accept	Reject	Remarks
Into Seal						
Away from Seal	275 PSIG	1 min.	0	✓		

Tested By:	Date	Inspected By:	Date
J. Lewis	6-15-78	J. Rou	6-15-78

Comments:

DUQUESNE LIGHT COMPANY Page 73A
BEAVER VALLEY POWER STATION #2
P.O. NO. 2BV-76A J.O. NO. 1224
MOTOR OPERATOR BUTTERFLY VALVES
FLANGED AND WAFER TYPE CAT.I

Posi-Seal International, Inc.
Rte. 49 & U.S. 95
North Stonington, Conn. 06359

Seal & Disc Test.

Witnessed By:	Date	Authorized Inspector	Date
[illegible]			

ATTACHMENT D

⊗ CENTER OF GRAVITY OF ACTUATOR

⊗ RECOMMENDED SPARE PARTS

	PC NO	QTY	DWG NO	DESCRIPTION	MATERIAL	MATL SPECIFICATION
G	28	4		HEX HD BOLT 3/4-10 UNC 2A x 2 LG	CS	ASTM A193 GR B7
A	27	1	LIMITORQUE	MOTOR OPERATOR	M2BC SMB 00/5	
A	26	1		KEY - WC [illegible]		AISI 1018
	25	12		LOCKWASHER [illegible]		C 1060
G	24	8		HEX HD BOLT [illegible]		[illegible]
G B A	23	1	16068	MTG BRACKET		ASTM A 500
	22	1	1134-300-B	GASKET RETAINER		ASME SA [illegible]
⊗		1		GASKET [illegible] THK		
	20	1	7171	DISC STOP	CS	ASME [illegible]
A	19	8		RETAINING SCREW 1/2-13 UNC 2A x 3/4 LG	316 SS	ASTM A 193 GR B8M
	18	4		LOCKWASHER - 3/8 SIZE	316 SS	ASTM A 276 TY 316
C	17	4		HEX HD BOLT 3/8-16 UNC - 2B x 1 1/4 LG	CS	ASME SA [illegible] GR B 7
	16	2		HEX NUTS 1/2-13 UNC 2B	316 SS	ASTM A 194 GR 8M
C	15	2	42-43 3	GLAND STUD - COATED 7E HERCUBE 620	316 SS (STRENGTH)	ASTM A 193 GR B8M
A ⊗	14	SET		PACKING RINGS 3/8 SQ SET I.D.	ASTEX [illegible]	JOHN CRANE 1811X [illegible]
	13	1	3143	PACKING GLAND	316 SS	ASTM A 351 GR CF8M
	12	1	3709	GLAND FOLLOWER	316 SS	ASTM A 351 GR CF8M
	11	2	301-241	THRUST WASHER	316 SS	MICROSEAL
⊗	10	2	300-445	LOWER BEARING	316 SS	MICROSEAL
⊗	9	2	300-445	UPPER BEARING	316 SS	MICROSEAL
A ⊗	8	1	2-392	BACKUP RING	ESR	PARKER E-692-70
⊗	7	1	1444 2nd 4	SEAL RING	URETHANE	DURALLOY 70 DURO
	6	3	3216 32	STEM/DISC PIN	17-4PH CONDITION A	ASME SA 564 GR 630
A	5	1	3212 441	LOWER STEM 2 1/2 DIA	17-4PH CONDITION A	ASME SA 564 GR 630
	4	1	8942	UPPER STEM 2 1/2 DIA.	17-4PH CONDITION A	ASME SA 564 GR 630
	3	1	1144-140-4	RETAINING RING	CS	ASTM A 353 GR 70
	2	1	1144-140-11	DISC	316 SS	ASME SA 351 GR CF8M
	1	1	2144-140-1	BODY	CS	ASME SA 515 GR 70

LIST OF MATERIAL FOR ONE ASSY.

DIMENSIONS CERTIFIED CORRECT

BY: [illegible] DATE: 5/10/77

CUSTOMER P.O. # SEE ABOVE

POSI SEAL REF. # 15245-6

TAG NO. SEE ABOVE

DIMENSIONS ARE IN INCHES

DRAWN	DW	DATE 4-3-77
CHECKED	LC	5-10-77
APPROVED		
APPROVED	[illegible]	

POSI SEAL INTERNATIONAL INC.

NORTH STONINGTON, CT. 06359

ASSY TITLE

24" CO/SS/150/STS SINGLE EDGE VALVE ASSY
W/ LIMITORQUE M2BC SMB 00/5

SIZE	SCALE	DRAWING NUMBER	REV
D	5-10-77	15245-6 (145-PAT)	J

SILVER VALLEY POWER STATION - UNIT 2
DUQUESNE LIGHT COMPANY
J.O. 12241

MANUFACTURER'S DRAWING DATA FORM

RESP ENG P. DOHERTY (E1)

RESP DES ENG P BIAGIOTTI (E1)

INSTRUCTIONS TO DESIGN (E1)

✓ AGE REVIEW AND COMMENT

✓ REV REVISED

DATE TO DESIGN 7/5/78

REQUIRED RETURN DATE (E1) 7/19/78

NOTES

2006.45-A-764-072 J

AS BUILT

ZSWSHMSV107 NA

15245-6 Rev J

Posi Seal

07 0578 M 21

24" 150 C.S. BUTTERFLY VLV
W/MTR OPERA - CAT. I.

2006.45-07-764-072 K

12241.00

ATTACH TO DES DRAWING

ATTACHMENT E

STONE & WEBSTER ENGINEERING CORPORATION

CALCULATION TITLE PAGE

*SEE INSTRUCTIONS ON REVERSE SIDE

A 5010 54 (FRONT)

CLIENT & PROJECT
DUQUESNE LIGHT CO. - BEAVER VALLEY UNIT NO. 2

PAGE 1 OF 241
TOTAL PAGES - 242

CALCULATION TITLE (Indicative of the Objective):

PIPE STRESS CALCULATION FOR SERVICE WATER PIPING IN AUXILIARY BUILDING AND BURIED PIPE UP TO VALVE PIT AND WASTE HANDLING BUILDING.

QA CATEGORY (✓)
☑ I - NUCLEAR SAFETY RELATED
☐ II ☐ III ☐ ____ OTHER

CALCULATION IDENTIFICATION NUMBER

J.O. OR W.O. NO.	DIVISION & GROUP	CURRENT CALC. NO.	OPTIONAL TASK CODE	OPTIONAL WORK PACKAGE NO.
12241	NP(T)	257	X9	66C

* APPROVALS - SIGNATURE & DATE

PREPARER'S NAME SIGNED PRINTED & DATE	REVIEWER'S NAME SIGNED PRINTED & DATE	INDEPENDENT REVIEWER'S NAME SIGNED PRINTED & DATE	REV. NO. ~~OR NEW CALC NO.~~	SUPERSEDES * CALC. NO. OR REV. NO.	CONFIRMATION *REQUIRED (✓) YES	NO
H J Solanky JUNE 29, 1983 HEMANT SOLANKY	K T Chow JUNE 30, 1983 KT CHOW	S. Esmail JUNE 30, 1983 S. ESMAIL	0	12241-NP(N)-X19D, 12241-NP(T)-193-K9-4 12241-NP(T)-268-K9-0	✓ REFER TO PAGE 11	
R. Luck. 11.28.84 R. LUCK.	S. Esmail 11/28/84 S. ESMAIL	S. Esmail 11/28/84 S. ESMAIL	1	0	✓ SEE P. 11a	

RECONCILED

DISTRIBUTION

** FIREFILE-MICROFILM ARCHIVES DISTRUBUTED BY BV 2 PROJECT RECORDS MANAGEMENT

GROUP	NAME & LOCATION	COPY SENT (✓) 0	1	2	GROUP	NAME & LOCATION	COPY SENT (✓) 0	1	2
BV-2 Project Records Mangmt. (Firefile Microfilm Archives)**	R. Washington 245/8		✓	✓	EMD-SEG Principal Stress Engineer	C. Houmiller SEG		✓	✓
Power Division Lead Engineer	A. Fiorente 245/8		✓	✓	SWCL BV#2 Project	R. Luck (Toronto)		✓	✓
EMD-Principal Mech. Engineer	J. Spizuoco 245/8		✓	✓	EMD-SWEC-NY BV-2 Proj. Engr.	H. Moscow -NY/37		✓	✓
					Structural Div. Lead Engineer	P. Talbot 245/7		✓	✓
EMD-Lead Engr./ SRC	R. Obadiah- 245/8 (Job Book 211-NP-D)			✓					

▲ INDICATES A
● INDICATES C ANAT
□ INDICATES GA AT TYPE
· INDICATES ANCHOR
◎ INDICATES INFORMATION POINT
→ INDICATES DIRECTION OF FLOW

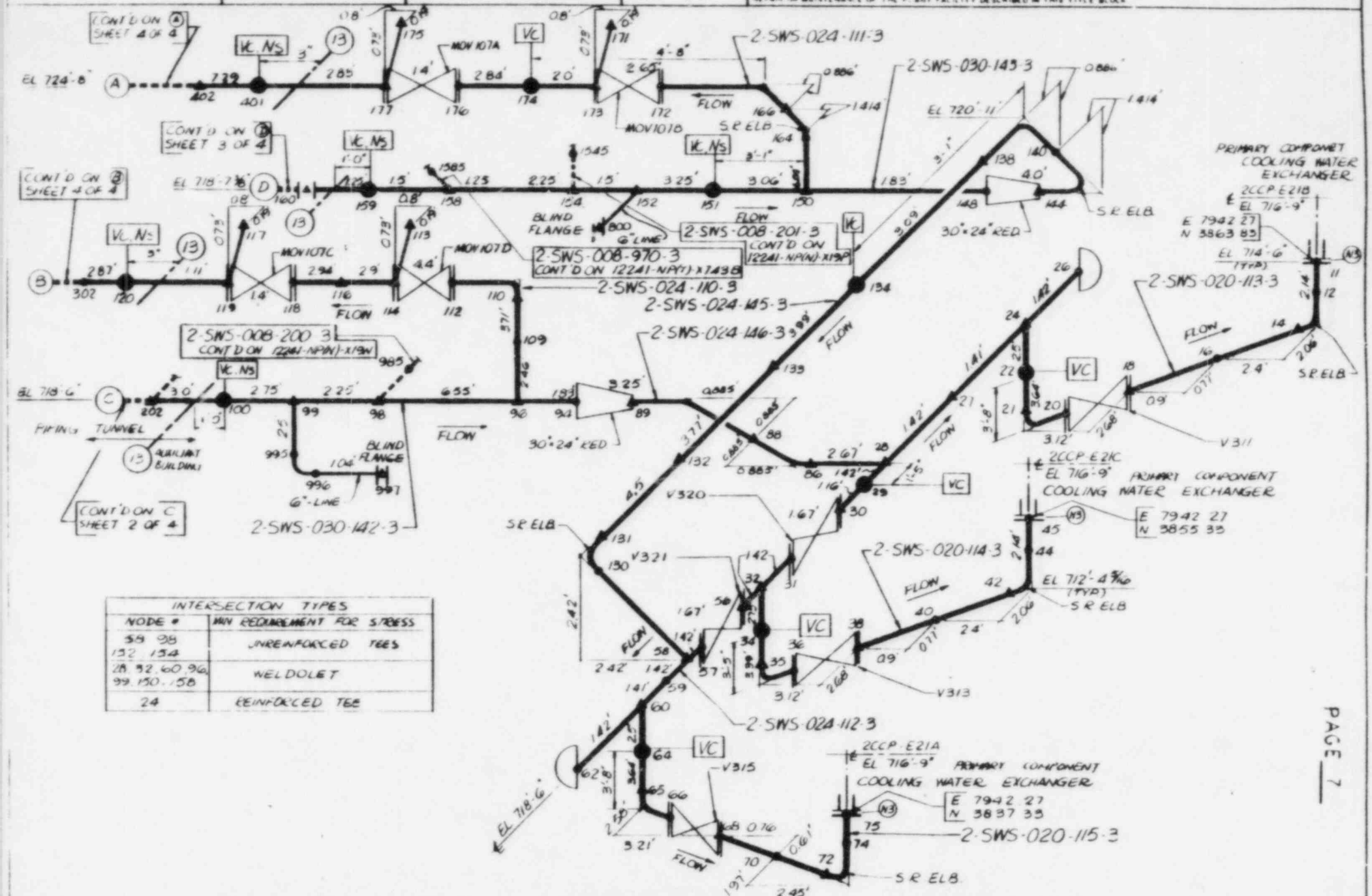
CS - CONSTANT SUPPORT
VS - VERTICAL SUPPORT
VC - VERTICAL CONSTRAINT
LC - LATERAL CONSTRAINT
AC - AXIAL CONSTRAINT
NS - NORTH SOUTH CONSTRAINT
EW - EAST WEST CONSTRAINT

SH - SPRING HANGER (VARIABLE)
RH - ROD HANGER
VSS - VERTICAL SHOCK SUPPRESSOR
LSS - LATERAL SHOCK SUPPRESSOR
ASS - AXIAL SHOCK SUPPRESSOR
NSS - NORTH SOUTH SHOCK SUPPRESSOR
EWS - EAST-WEST SHOCK SUPPRESSOR

STONE & WEBSTER ENGINEERING CORPORATION
PIPE STRESS SKETCH

CLIENT PUGET SOUND LIGHT CO LOCATION B Y Z
SYSTEM SERVICE WATER PIPING (AUX BLDG & BURIED) SHEET 1 OF 4
CALCULATION No 12241 NP(T) x 257 - X9 REV. : 0

THE INFORMATION ON THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE LICENSING, CONSTRUCTION OPERATION REPAIR OR MAINTENANCE OF THE PLANT FACILITY DESCRIBED IN THIS TITLE BLOCK



INTERSECTION TYPES	
NODE #	MIN REQUIREMENT FOR STRESS
59 98 132 154	UNREINFORCED TEES
28 92 60 96 99 150 158	WELDOLET
24	REINFORCED TEE

PAGE 7

▲ 5010 65

CALCULATION IDENTIFICATION NUMBER				PAGE 22
J.O. OR W.O. NO.	DIVISION & GROUP	CALCULATION NO.	OPTIONAL TASK CODE	
12241	NP (T)	257	X9	

REFERENCES

1. ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition and all applicable addenda up to and including winter 1972 addendum.

1a. American National Standards Institute, ANSI B31.1.0, 1967 and all addenda thereto including addenda dated 6/30/72.

2. NUPIPE-SW USERS MANUAL, Rev. 14 dated 7/82 which corresponds to NUPIPE-SW PROGRAM, Version 3, Level 14.

3. Stress Analysis Data Package SI-RM-47A, 47B REV.0 dated 1/7/81 & 3/19/81.

4. S & W Drawing No.:

   12241-RP-198-6K
   12241-RP-207A-8N, 207C-7G, 207D-5K, 207E-6P, 207H-8F.

5. Line designation table for Beaver Valley Power Station Unit No. 2, Rev. 28 dated 3/15/83.

6. Determination of Coefficient of Vertical and Horizontal Modulus of Subgrade Reaction for Buried Pipes. S & W Calculation #12241-211A-G-36 dated 8/13/76.

7. 2BVM-150: Analysis of Buried Safety-Related Nuclear Plant piping and recommendations for its structural penetration, unissued. (REFER TO ASSUMPTION #9)

8. Amplified response spectrum calculation with displacements profile data for the AUXILIARY BUILDING
   Diskfile: NUPIPE.SEISMIC.A0112241 CURVE SET NO. 11, 12
   Calculation #12241-NP(N)-1009-X6-0 DATED 4/8/81.

9. Specification for piping engineering and design for Beaver Valley Power Station Unit No. 2, 2BVS-939, dated 6/29/84 AND E&DCR 2P-4489A ⚠1

10. Specification for Stone & Webster pipe classes for Beaver Valley Power Station Unit No. 2, 2BVS-939A, dated 12/15/82.

11. Power Piping Company, Pipe Hangers and Support, Catalogue 77.

12. "Stiffness Representation of supports, anchors and restraints for Pipe Stress Analysis and Pipe Support Design", EMD-80-02 Rev. 0 dated 3/5/80.

13 NOT USED.

14. NOT USED

▲ 5010 65

CALCULATION IDENTIFICATION NUMBER				
J.O. OR W.O. NO.	DIVISION & GROUP	CALCULATION NO.	OPTIONAL TASK CODE	PAGE 23
12241	NP (T)	257	X9	

REFERENCES (continued)

15. IOC - FROM T. DANIAL TO R. LORANGER : ROLLED & WELDED PLATE PIPE MINIMUM WALL VIOLATION - DATED 11-3-80. (ATT. #1)

16. Equipment Seismic Requirements - EMTP-10.16-0 dated 3/30/81.

17. Preparation of system design information required for pipe stress analysis for Beaver Valley Power Station Unit No. 2, 2BVM-45, dated 1/25/83.

18. Seismic classification for structures, systems and component, 2BVM-116, dated 12/3/82.

19. Design and analysis for protection against piping system rupture, EMTR-608-0, dated 7/29/77.

20. ASME Boiler and Pressure Vessel Code, Section III, 1980 Edition - For flange qualification method and stress intensification data.

21. NOT USED.

22. NOT USED.

23. Design and erection tolerances for pipe supports, EMD-81-02 dated 11/12/81.

24. Preparation, Review and Control of Manual and Computerized Calculations - EMTP-8.26-0 dated 3/30/81.

25. Tube Turns, Welding Fittings/Flanges, Catalogue 311.

26. Specification for Excavation and Placement of Fill under Structures and Final Backfilling around Structures - Beaver Valley Power Station Unit No. 2, 2BVS-928, dated 5/22/78, and including all addenda up to addenda dated 4/22/81.

27. J.M.W. Audibert and K.J. Nyman, "Coefficients of Subgrade Reaction for the Design of Buried Piping," Second ASCE Specialty Conference on Structural Design of Nuclear Plant Facilities," Vol. I-A, pp. 109-141, New Orleans, 1975.

28. Vendor Drawing Reference:

EQUIPMENT NAME	MARK NO.	S & W MFG. FILE NO.
PRIMARY C.C.W. EXCHANGERS	2-CCP-E21A, B, C	2004.110.012.001F
24" MOTOR OPERATED VALVE	2SWS-MOV 107 A, B, C, D	2006.460.76A.072K
20" BUTTERFLY VALVE (V311, V313 & V315)	VVF-016-A-3	2006.390.069.044F
24" BUTTERFLY VALVE (V320, V321)	VVF-015-A-3	2006.390.069.051B
6" VALVE - V370	VGF-015-B-3	2006.310.073.023D
6" GATE VALVE - V392	VGN-060-A-3	2006.310.073.027E

STONE & WEBSTER ENGINEERING CORPORATION

CALCULATION SHEET

A 5210 65

CALCULATION IDENTIFICATION NUMBER				
J.O. OR W.O. NO. 12241	DIVISION & GROUP NP (T)	CALCULATION NO. 257	OPTIONAL TASK CODE X9	PAGE 204

FLANGE QUALIFICATION

* REFERENCE NO 20 (PAR. NC-3658 and PAR. ND-3658)

REF.	FLANGE DATA
4	FLANGE LOCATIONS (POINT NUMBERS) 30, 31, 56, 57, 112, 114, 118, 119, 172, 173, 176 & 177
5	PIPE CLASS TO WHICH FLANGE IS ATTACHED 151
10	FLANGE SIZE, TYPE, AND ANSI PRESSURE RATING 24", WN, 150 LB RF.
3	DESIGN TEMPERATURE 344 °F DESIGN PRESSURE 150 PSIG
10	FLANGE MATERIAL SA 101 GR I BOLT MATERIAL SA 193 GR B7
25	C = 29.5 IN. A_b = 17.796 IN^2 D_f = 27.25 IN.
1	Sy = 30 KSI

A. MAXIMUM ALLOWABLE MOMENTS*

1. Normal and Upset Conditions

Sustained Loading

$$M_{fsa} = \frac{3125\left(\frac{Sy}{36}\right) C A_b}{12} = 113\,928 \text{ Ft. Lbs.}$$

Sustained + Occasional Loading

$$M_{fda} = \frac{6250\left(\frac{Sy}{36}\right) C A_b}{12} = 227\,857 \text{ Ft. Lbs.}$$

2. Faulted Condition

$$M_{ffa} = \frac{\left[11250\, A_b - \frac{\pi}{16} D_f^2\, P\right] C\left(\frac{Sy}{36}\right)}{12} = 365\,339 \text{ Ft. Lbs.}$$

Sy = yield strength (ksi) of flange material at design temp. (from table 1-2 of appendix 1 of reference no. 1) Sy not to exceed 36 ksi

C = diameter of flange bolt circle (in.)

A_b = total (no. of bolts x cross sectional area of 1 bolt) cross sectional area of bolts taken at root of thread (in^2)

P = design pressure (psi)

D_f = outside diameter of raised face of flange (in.)

STONE & WEBSTER ENGINEERING CORPORATION

CALCULATION SHEET

CALCULATION IDENTIFICATION NUMBER				
J.O. OR W.O. NO.	DIVISION & GROUP	CALCULATION NO.	OPTIONAL TASK CODE	PAGE 205
12241	NP(T)	257	X9	

FLANGE QUALIFICATION (Cont'd)
(TO SATISFY OBJECTIVE NO. 9)

B. Flange Loading Conditions NODE 177

Normal & Upset (Sustained Loading)

Condition	Torsion M_x (Ft. Lbs.)	Bending M_y (Ft. Lbs.)	Bending M_z (Ft. Lbs.)
Thermal	-1134	- 9004	-1058
Deadweight	368	257	4467
BUILDING SETTLEMENT. Other Sustained	-5547	-366	-36430
* Total Sustained (Algebraic)	M_{xs} = -6313	M_{ys} = -9113	M_{zs} = -33021

Maximum Torsional Moment M_{xs} = 6313 Ft. Lbs.

Maximum Bending Moment $M_{fs} = \sqrt{M_{ys}^2 + M_{zs}^2}$

M_{fs} = 34 255 Ft. Lbs.

Are M_{xs} and $M_{fs} \leq M_{fsa}$? Yes ✓ No ____

Normal & Upset (Sustained + Occasional)

	Condition	Torsion M_x (Ft. Lbs.)	Bending M_y (Ft. Lbs.)	Bending M_z (Ft. Lbs.)
	OBE(WAVE + INERTIA)	2774	3154	2733
	Other Occasional	-	-	-
(1)	$\sqrt{OBE^2 + OCCAS^2}$	2774	3154	2733
(2)	OBEA	1858	3362	5842
(3)	Total Sustained *	M_{xs} = -6313	M_{ys} = -9113	M_{zs} = -33021
	Total (Absolute) (1) + (2) + (3)	M_{xd} = 10 945	M_{yd} = 15629	M_{zd} = 41596

Maximum Torsional Moment M_{xd} = 10 945 Ft. Lbs.

Maximum Bending Moment $M_{fd} = \sqrt{M_{yd}^2 + M_{zd}^2}$

M_{fd} = 44 435 Ft. Lbs.

Are M_{xd} and $M_{fd} \leq M_{fda}$? Yes ✓ No ____

* Not to be less than Deadweight alone.

FLANGE QUALIFICATION (Cont'd)
(TO SATISFY OBJECTIVE NO. 9)

NODE 177 — Faulted Condition

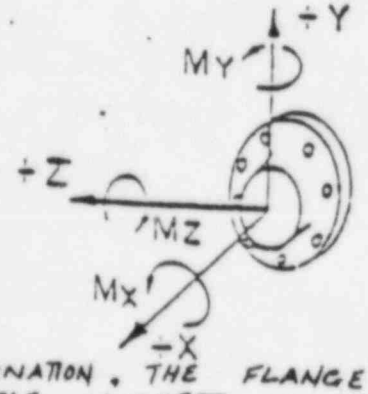
		Torsion	Bending	
	Condition	M_x (Ft Lbs)	M_y (Ft Lbs)	M_z (Ft Lbs)
	Thermal	-1134	-9004	-1845
	Deadweight	368	257	Δ467
	BUILDING SETTLEMENT Other Sustained	-5547	-366	-36430
(1)	* Total Sustained (Algebraic)	-6313	-9113	-33808
	SSE(WAVE + INERTIA)	5092	6226	5105
	Other Occasional	-	-	-
(2)	$\sqrt{SSEI^2 + OCCAS^2}$	5092	6226	5105
(3)	SSEA	3682	6624	11689
	Total (Absolute) (1) + (2) + (3)	M_{xf} = 15087	M_{yf} = 21963	M_{zf} = 50602

Maximum Torsional Moment M_{xf} = 15087 Ft Lbs

Maximum Bending Moment $M_{ff} = \sqrt{M_{yf}^2 + M_{zf}^2}$

M_{ff} = 55163 Ft Lbs

Are M_{zf} and $M_{ff} \leq M_{ffa}$? Yes ✓ No



FROM VISUAL EXAMINATION, THE FLANGE AT NODE 177 HAD THE HIGHEST MOMENTS.

NOTE: ALL MOMENTS ARE LOCAL AXIS

* Not to be less than Deadweight alone.

ATTACHMENT F

POWER PIPING COMPANY

P O BOX

DONORA, PA. 15033

November 22, 1978

CERTIFICATE OF COMPLIANCE
FOR
ACME SECTION III, DIVISION 1

DUQUESNE LIGHT COMPANY
BEAVER VALLEY UNIT NO. 2
PURCHASE ORDER 2BV-58
J. O. NO. 12241
POWER PIPING AUTHORIZATION NO. N-1141

This is to certify that the piping fabrication as identified below:

ISO. NO. 110703

MARK NO. CCP-95-2

SHOP SHEET NO. 1107-095-10 REV. NO. 0

SERIAL NO. N-1141-3482

conforms to the material, fabrication, assembly and test requirements of Stone & Webster Specification Number 2BV-58, dated October 31, 1972, and all revisions and addenda thereto [illegible] Piping Addenda No. 5, dated June 24, 1978, for Class 3 piping [illegible] Division 1 - 1971, and all addenda thereto [illegible]

POWER PIPING COMPANY

BY: [signature]

DATE: [illegible]

Distribution:
1 - [illegible]
2 - [illegible] Inspector

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Stone & Webster
Engineering Corporation
Document Review

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING SUBASSEMBLIES*

As Required by the Provisions of the ASME Code Rules, Section III, Div. 1 **B-1141-3482**

1. Fabricated by Power Piping Company, Donora, PA 15033 Order No. N-1141
2. Fabricated for Beaver Valley Power Station, Unit #2 Order No. 28V-58, J.O. No. 12241
3. Owner Duquesne Light Company, Pittsburgh, PA 4. Location of Plant Shippingport Borough, PA
5. Piping System Identification **Primary Component Cooling Annulus Piping MK CCP-95-2/1107-095-10 LBO Tic**
   (Brief description of piping furnished per data sheets)
   (a) Drawing No. **RP-107 D, F, M** Prepared by Stone & Webster Engineering Corp
   (b) National Board No. **N/A** Boston, Massachusetts
6. The material, design, construction and workmanship complies with ASME Code Section III Class **3**
   Edition 1971 Addenda Date Winter 1972 Case No. **N/A**
   Remarks: Manufacturers' Data Reports properly identified and signed by Commissioned Inspector have been furnished for the following items of this report
   (Name of Part, Item number, Manufacturer's name and Identifying stamp)
7. Shop Hydrostatic Test **By Field** psi
8. Description of piping inspected
   (Line Code, mark no., material spec., nom. pipe size, schedule or thickness, length, fittings, flanges, etc.)

1 Pc. - 18" Std. Wt. Smls. Stl. Pipe, SA 106, Gr. B, Item No. 3, Lgth.-6'-10 5/16"lg., L.C. No. P-1096, Ht. ID L-62721
1 - 18" 150# F.S. W/N Flg., RF Std. Wt. Bore, SA 105, Item No. 10, L.C. No. M-3039, Ht. ID UJZKL
2 - 18" Std. Wt. Smls. Stl. O.D. Build-ups (FT) P-782551
1 - 18" Std. Wt. Smls. Stl. Buttweld (FT) P-782551
1 - Tank Weld Code Plate

NOTE: Welding Electrodes L.C. No. E-44, E-47, E-50

We certify that the statements made in this report are correct and that the fabrication of the described piping conforms with the requirements of SECTION III of the BOILER AND PRESSURE VESSEL CODE

12-12-78 Signed Power Piping Company By [signature]

Expires January 7, 1980 Certificate of Authorization No. N-1623

CERTIFICATE OF SHOP INSPECTION N-1141- **3482**

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of PENNSYLVANIA and employed by HARTFORD STEAM BOILER INSPECTION & INSURANCE COMPANY of HARTFORD CONN have inspected the piping described in this Data Report on 11/22/78 to ____ and state that to the best of my knowledge and belief, the N.P.T. Certificate Holder has constructed this piping in accordance with the applicable Subsections of ASME Code, Section III.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the piping on this Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 12/22/78 Signed [signature] Commissions PA 2-87

QUALITY CONTROL

WELD SPEC	SK 100
CUSTOMER NOTIFICATION	YES
PQR REQUIRED	YES
PWHT PWPS	SK 101
MIN. WALL	18" - 0.328"
BACKING RINGS	N/R
STRIP ROOT	YES
PREHEAT	N/R
	N/R
	N/R
	BUILD UPS & TRANSITIONS
	N/R
	N/R
	N/R
	SHOT BLAST BASE METAL / N.I.H. P.T.
	WELDS SK-100 ALTERNATE ENDS / SK-100
	N/R
	SK 100
CAPPING	

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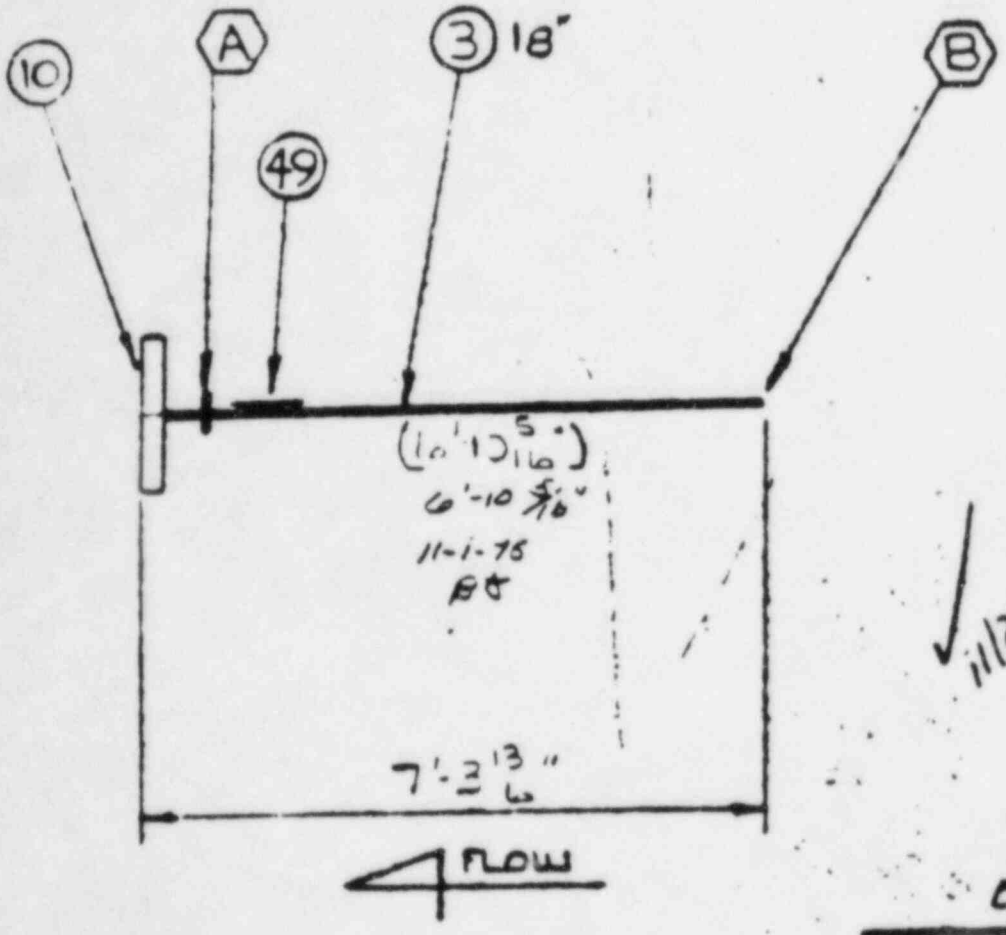
NOV 3 0 1979

Stone & Webster Engineering Corporation

Document Review

NO	BY	DATE	DESCRIPTION



11/27/76

ONE (1) REQUIRED

NUCLEAR CL. 3

B & W CLASS 151

PRIMARY COMPONENT COOLING

NUCLEAR PIPING

ASME SEC III CL 2 WINTER 72

ISOMETRIC 110703

DUQUESNE LIGHT COMPANY
BEAVER VALLEY - UNIT NO 2

FAB MARK NO - 110703
CCP05-2
110703-10

CODE SERIAL NO. 3482

DWG REVISION 6a39

B&W FABRICATION SHEET

DRAWN McDONOUGH DWG NO 103 AUTH NO N-1141

CHKD CUPTAK

DATE APR 11 '78

PROJ ENG JANASZEK

SHEET NO 095 10 REV 0

PAGE 1 OF 2

POWER PIPING CO. SHOP FABRICATIO

ITEM	QTY	DESCRIPTION	CODE	A NO.	QUALITY ASSURANCE HEAT	QUALITY ASSURANCE HEAT NO.	DISC	DISC
1		18" STD WT. BORE STL PIPE						
2		SA-106 GR B						
3	1	PIECE 6'-10 5/16" LG BEV/SK-101	SP-18	15879	P-1098	DSS	L-62721	
4								
5								
6								
7								
8		150# FB W/N FLG R/F						
9		STD. WT. BORE SA-105 BEV/SK-101						
10	1	18"	SP-3	13770	M-3039	Ladish Co	UJ2HL	
11								
12								
13								
14	1	18" J BEV END PROT'R W/PLYWOOD DISC						
15	1	18" FLANGE PROTR (PLYWOOD)						
16								
17	16	1/2" ϕ x 3" LG. C.S. MACH BOLT W/1						
18		H. N. EA. FOR FLG PROTR						
19								
20	1	18" PIPE CUT						
21		18" BUILD-UP O.D.						
22		18" BUILD-UP I.D.						
23	2	18" INT-MACHINE						
24		18" MACH O.D.						
25	2	18" I-BEVEL						
26								
27								
28	1	18" TIG BOOT-ARGON PURGE						
29	1	18" B/W						
30		18" GRIND O.D. B/W						

ION SHEET

10		18" GRIND O.D. S/W						
11								
12								
13	1	18" BEV DEOXALUMINATE						
14								
15								
16								
17								
18		18" LIQ. PENETRANT BUILD-UPS						
19	1	18" LIQ. PENETRANT S/W						
20								
21								
22								
23								
24								
25	639	AS-SHOT BLAST WHITE METAL SP-11(A-2-3)						
26								
27	1	STEEL STAMP MARK NO.						
28	1	HARTFORD INSPECTION						
29	1	CORE MARK PLATE						
30	1	QA TRAVELER						
31		DOCUMENTATION REQUIRED						
32		QC REPORTS (ONE WELD DATA)						
33	2	RADIOGRAPHS FOR FRACTABILITY						
34								
35								

CODE SERIAL NO	3482
AUTH NO	N-1141
DWG NO	1107095 10
PAGE	2 of 2
REV	0

QUALITY CONTROL

END PREPARAT

END IDENT.	A PIPE		B-PIPE			
SKETCH NO.	101 a 5	QC/DATE 10.17.78	101 a 5	QC/DATE 10.17.78	a	QC/DATE
MINIMUM WALL	.393 / .403	ANI	.390 / .407	ANI		ANI
COUNTERBORE	17.301 / 17.312	CI	17.300 / 17.307	CI		CI
MICROMETER NO	P-25?? / P-25??		P-25?? / P-25??			
WELD PROCEDURE NO.	104A a 0	QC/DATE 10-19-78	104A a 0	QC/DATE 10-19-78	a	QC/DATE
WELDING PROCESS	SAW	ANI	SAW	ANI		ANI
MIN. PREHEAT / [redacted]	60°F		60°F		°F	
WELDERS NO.	80	CI	80	CI		CI
FILLER METAL NO.	E-44		E-44			
WELD PROCEDURE NO.	R.	QC/DATE	R.	QC/DATE	R.	QC/DATE
WELDING PROCESS		ANI		ANI		ANI
MIN. PREHEAT / [redacted]	°F		°F		°F	
WELDERS NO.		CI		CI		CI
FILLER METAL NO.						
HOLD	ANI	CI	ANI	CI	ANI	CI
PT [redacted] REPORT NO.	* SEE BELOW	QC/DATE	* SEE BELOW	QC/DATE		QC/DATE
HOLD	ANI N/R	CI —	ANI N/R	CI —	ANI	CI
RT REPORT NO.		QC/DATE —		QC/DATE —		QC/DATE
PROCEDURE NO.	R.	QC/DATE —	R.	QC/DATE —	R.	QC/DATE
BEFORE/AFTER N.D.E.						
TEMPERATURE (ACTUAL)	°F	ANI —	°F	ANI —	°F	ANI
HOLDING TIME (ACTUAL)		CI —		CI —		CI
HEAT CHART NO						
		QC/DATE		QC/DATE		QC/DATE
NON-CONFORMANCE		QC/DATE		QC/DATE		QC/DATE

FIELD EN

END IDENT.	B PIPE					
SKETCH NO.	101 a 5	QC. DATE 11.17.78	R.	QC/DATE	R.	QC/DATE
MINIMUM WALL	.423 / .430	ANI		ANI		ANI
COUNTERBORE	17.293 / 17.303	CI		CI		CI
MICROMETER NO	D.2543 / D.2541					
NON-CONFORMANCE		QC/DATE		QC/DATE		QC/DATE

* P-782551 / Before Grinding 10.19.78 BF After Grinding 11.17.78 DE

* P-782551 / Before Grinding 10.19.78 BF After Grinding 11.17.78 DE

10. URA SHUP

S - POWER PIPING

R	QC/DATE	R	QC/DATE
	ANI		ANI
	CI		CI
R.	QC/DATE	R.	QC/DATE
	ANI		ANI
°F	CI	°F	CI
R.	QC/DATE	R.	QC/DATE
	ANI		ANI
°F	CI	°F	CI
ANI	CI	ANI	CI
	QC/DATE		QC/DATE
ANI	CI	ANI	CI
	QC/DATE		QC/DATE
R.	QC/DATE	R.	QC/DATE
	ANI		ANI
°F	CI	°F	CI
	QC/DATE		QC/DATE
	QC/DATE		QC/DATE

PREPARATIONS

R	QC/DATE	R.	QC/DATE
	ANI		ANI
	CI		CI
	QC/DATE		QC/DATE

Power Piping

POWER PIPING COMPANY

DONORA PA 15033

CERTIFICATE OF COMPLIANCE
FOR
ASME SECTION III, DIVISION 1

DUQUESNE LIGHT COMPANY
BEAVER VALLEY UNIT NO. 2
PURCHASE ORDER 2BV-58
J. O. NO. 12241
POWER PIPING AUTHORIZATION NO. N-1141

This is to certify that the piping fabrication as identified below:

ISO. NO. 101704

MARK NO. FWS-17-2

SHOP SHEET NO. 1017-017-12 REV. NO. 3

SERIAL NO. N-1141-5312

conforms to the material, fabrication, assembly and test requirements of Stone & Webster Specification Number 2BVS-58, Revision 2, Add. 5, dated June 17, 1982, for Class 2 piping and ASME Section III, Division 1 - 1971, and all addenda thereto including Winter 1972.

POWER PIPING COMPANY

BY: Lucio Fantella

DATE: Nov. 1, 1982

Distribution:
1 - With Shipment
4 - Duquesne Light Inspector

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING SUBASSEMBLIES*

As Required by the Provisions of the ASME Code Rules, Section III, Div. 1 N-1141-5312

1 Fabricated by Power Piping Company, Donora, PA 15033 Order No N-1141

2 Fabricated for Beaver Valley Power Station, Unit #2 Order No 28V-58, J.O. No. 12241

3 Owner Duquesne Light Company, Pittsburgh, PA 4 Location of Plant Shippingport Borough, PA

5 Piping System Identification Steam Generator Feedwater MK-FWS-17-2/1017-017-12 ISO 10170A

(a) Drawing No RP-17 A Prepared by Stone & Webster Engineering Corp.

(b) National Board No N/A Boston, Massachusetts

6 The material, design, construction and workmanship complies with ASME Code Section III Class 2

Edition 1971 Addenda Date Winter 1972 Case No N-252

Remarks Manufacturers Data Reports properly identified and signed by Commissioned Inspector have been furnished for the following items of this report

(Name of Part, Item number, Manufacturer's name and identifying stamp)

7 Shop Hydrostatic Test By Field psi

8 Description of piping inspected

(Include mark no., material spec., nom. pipe size, schedule or thickness, weight, fittings, flanges, etc.)

1 Pc. - 16" Sch. 80 Smls. C.S. Pipe, SA 106, Gr. B, Item #3, L.C. No. P-1576, Ht. ID 68681, Tube #1-6750, Lgth. = 6'-2" Lg.

1 - 4" X-Stg. Smls. C.S. Pipe, SA 106, Gr. B, Item #7, L.C. No. P-1235, Ht. ID L64414, Lgth. = 0'-6" Lg.

1 - 16" Sch. 80 Smls. CS. L/R 90° Ell, SA 234, WP-B, Item #11, L.C. No. M-96, Ht. ID UX3J

1 - 16" Sch. 80 Smls. C.S. S/R 90° Ell, SA 234, WP-B, Item #12, L.C. No. M-101, Ht. ID WA3AH

1 - 4" on 16" X-Stg. F.S. W-O-L, SA 105, Item #14, L.C. No. M-4843, Ht. ID 417AA

NOTE: Welding Electrode L.C. No. E-49, E-59, E-69, E-83, E-88, E-89, E-111, E-112, E-113, E-115

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DEC 21 1982

Stone & Webster

Engineering Corporation

Document Review

We certify that the statements made in this report are correct and that the fabrication of the described piping conforms with the requirements of SECTION III of the ASME BOILER AND PRESSURE VESSEL CODE

Date Oct. 29, 1982 Signed Power Piping Company By Alice E Rotella

Certificate of Authorization Expires January 7, 1983 Certificate of Authorization No N-1623

CERTIFICATE OF SHOP INSPECTION N-1141-5312

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of PENNSYLVANIA and employed by Lumbermens Mutual Casualty Co. of Long Grove, IL have inspected the piping described in this Data Report on 10-29-82 and state that to the best of my knowledge and belief, the NPT Certificate Holder has constructed this piping in accordance with the applicable Subsections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the piping in this Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 10-29-82 By

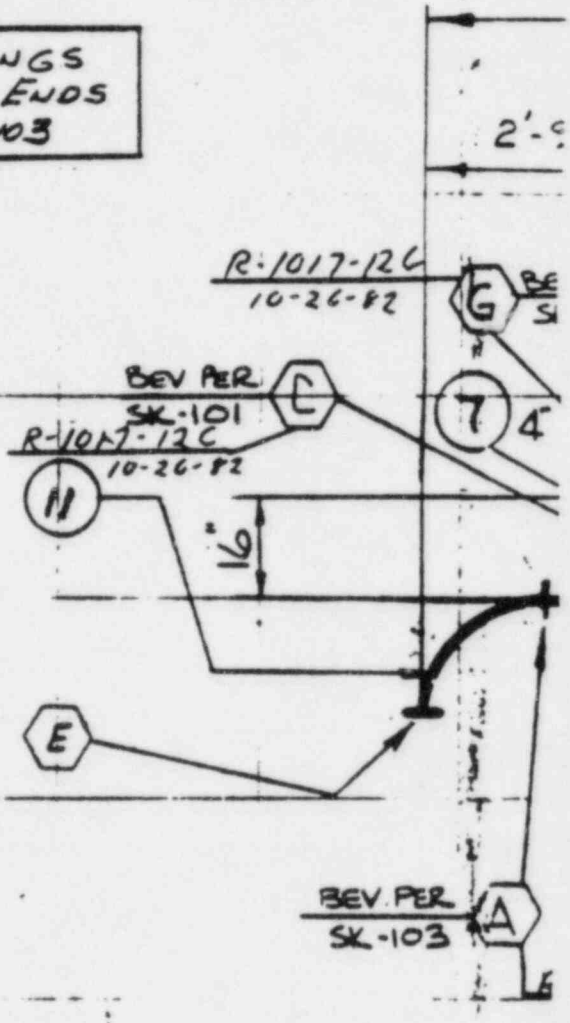
Commissions PA 2063

(National Board, State, Province, and No.)

*Supplemental sheets in form of lists, sketches, or drawings may be used provided (1) size is 8½ in. x 11 in., (2) information in items 1, 2, 3, 4, 5, 6, and 7 on this Data Report is included on each sheet, and (3) each sheet is numbered and number of sheets is recorded at top of this form.

SHOP SPEC.	SK-100
CUSTOMER INSPECTION REQUIRED	YES
END PREP	PIPE - (A) & (B) SK-103 (C) & (G) SK-101 FTGS - SK-101
MIN. WALL	16" - .738" 4" - .295"
BACKING RINGS	N/R
GTAW ROOT	YES
PREHEAT	ALL WELDS 200° F. MIN. PER N-1141-P-8
PWHT	N/R
RADIOGRAPH	BUTTWELDS & BUILD-UPS
LIQ. PENET.	TACKWELDS & W-O-L ATT.
MAG. PART.	
ULTRASONIC	N/R
CLEANING O.D.	N/R
CLEANING I.D.	SHOT BLAST WHITE
MATERIAL	N-1141-P-3
PAINTING	DEGREASE UNDER END BY SK-100
DR CODE	N/R
MARKING	SK-100
CAPPING	SK-100

WELD IDENT. MARKINGS REQ'D ON ALL PIPE ENDS BEVELED PER SK-103



INSTALL CORROSION INHIBITOR / N-1141-P-14

NO.	BY	DATE	DESCRIPTION
3	Jack	1-24-80 1-24-80	CORRECTED 16" MIN WALL
2	J.c.H.	1-31-80	ADDED MTRL & P.O. NO.
	[illegible]	1/31/80	ON SHT. 2 OF 3
1	Q.A.	1-7-80	RELOCATE 4" W-O-L ALSO REMOVE
	REVACKD	11-27-79	HOLD ACN P-140 PER E&DCR 2P-2886

REVISION

SYST
DESI
CHKD
REF.
CUST

QUALITY CONTROL

Rob 2/4/81

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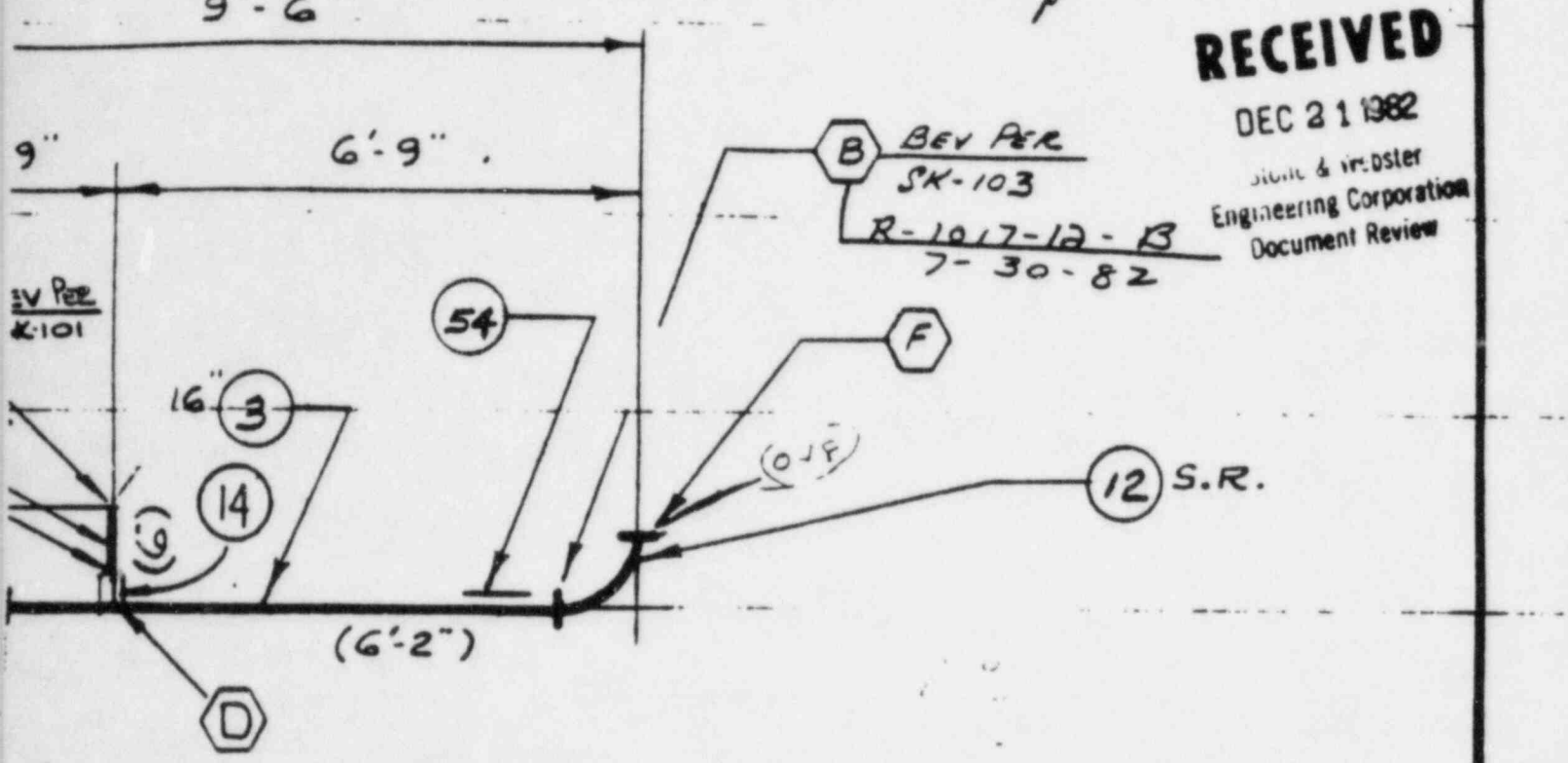
Stone & Webster
Engineering Corporation
Document Review



GRIND O.D. OF B/W'S (A) & (B) PER SK-107

FLOW

R-1017-12-A
7-30-82

1, 6/29/82

ONE (1) REQUIRED

NUCLEAR CL. 2

S & W CLASS - 601

FAB. MARK ISO - 101704 /
FWS-17-2 /
1017/017/12

CODE SERIAL NO. N-1141 - 5312 | FAB'r WEIGHT 1591 #

ITEM STEAM GENERATOR FEEDWATER

DESIGN PRESS N/A PSIG. TEMP. N/A °F

CODE ASME SECT. III CL. 2 WINTER 72

DWG. No. M-17A REV. 6C | ISOMETRIC 101704

CUSTOMER DUQUESNE LIGHT COMPANY
BEAVER VALLEY - UNIT NO. 2
P.O. NO. 38V-68
J.O. NO. 12241

529 BEAVER AVENUE
PITTSBURGH, PA. 15233

SHOP FABRICATION SHEET

DWN. MCGRAIL
CHKD. LUPTAK
DATE OCT 11 1979
PROJ. ENG. JANASZEK

SYS. NO. 017 | AUTH. NO. N-1141

SHEET NO. 1017 | 017 | 12 | REV. 3

PAGE 1 OF 2

POWER PIPING CO. SHOP FABRICATI

NUCLEAR LL. 2

ITEM	QUAN.	DESCRIPTION	MRS.	P.O. NO.	UNIT	TOTAL	DISC.	NET TOTAL
					QUALITY ASSURANCE			
					LCN	MFR.	HEAT/IDENT.	QC INSP.
1		16" Sch 80 Smls C.S. Pipe						
2		SA-106 Gr-B						
3	1	Piece 6'-2" Lg. BBE/SK-103	P.6	19063	P-1576	— Dw Rev- 2		—
4								
5		4" X-Stg. Smls C.S. Pipe						
6		SA-106 Gr-B						
7	1	Piece 0'-6 3/4 Lg. BBE/SK-101	XP.4	15879	—	Dw Rev 2		—
8								
9		Sch 80 Smls C.S. B/W Ftgs.						
10		SA-234 WP-B Bev/SK-101						
11	1	16" L/R 90° Ell	P.2	3257	—	Dw Rev 2		—
12	1	16" S/R 90° Ell	〃	〃	—	Dw Rev 2		—
13								
14	1	4" on 16" X-Stg. F.S.W-O-L	P.5	19078	—	Dw Rev 2		—
15		SA-105 Bev/SK-101						
16								
17	15'-0"	Corrosion Inhibitor Pipe Strip	M-23	2-22-51				
18		PS-2 (6 Devices)						
19	#2	16" J-Bev End Prot'r w/Plywood Disc						
20	1	4" End Prot'r						
21	1	16" Pipe Cut						
22		16" Build-Up I.D. (2")						
23		16" Build-Up O.D. (2")						
24	2	16" Internal Mach. (1 3/4")						
25		16" Mach. O.D. (2")						
26	2	16" J-Bev						
27	2	16" Bev Deoxaluminate						
28		16" Build-Up Pre-Heat						

31		4" Build-Up I.D.						
32	1	4" Build-Up O.D.						
33	2	4" Internal Machn.						
34	–	4" Machn. O.D.						
35	2	4" J-Bev						
36	1	4" Deox/Aluminate Bev.						
37	2	4" Pre-Heat Build-Up						
38								
39	1	4" Tig Root / Argon Purge						
40	1	4" B/W						
41	1	4" Grind O.D. of B/W						
42	1	4" B/W Pre-Heat						
43								
44	2	16" Tig Root / Argon Purge						
45	2	16" B/W						
46	2	16" Grind O.D. of B/W (Flat Finish)						
47	2	16" Pre-Heat B/W						
48	1	Install Corrosion Inhibitor						
49		Pipe Strip						
50	2	Weld Ident. Markings						
51	[illegible]	Las. Shot Blast White Metal /						
52		N-1141-P-3						
53								
54	1	Code Name Plate						
55								

END PREPARATIONS

END IDENT.	A PIPE (3)		B PIPE (3)		C PIPE (7)	
SKF SKETCH NO.	103 R.	QC/DATE	103 R.	QC/DATE	101 R.	QC/DATE
MINIMUM WALL		ANI		ANI		ANI
COUNTERBORE		CI		CI		CI
MICROMETER NO.						
O.D. BUILDUP — WELD PROCEDURE NO.	R.	QC/DATE	R.	QC/DATE	R.	QC/DATE
WELDING PROCESS		ANI		ANI		ANI
MIN. PREHEAT / INTERPASS	°F		°F		°F	
WELDERS NO.		CI		CI		CI
FILLER METAL NO.						
I.D. BUILDUP — WELD PROCEDURE NO.	R.	QC/DATE	R.	QC/DATE	R.	QC/DATE
WELDING PROCESS		ANI		ANI		ANI
MIN. PREHEAT / INTERPASS	°F		°F		°F	
WELDERS NO.		CI		CI		CI
FILLER METAL NO.						
NDE — HOLD	ANI N/R ↓	CI —	ANI N/R ↓	CI —	ANI N/R ↓	CI —
PT/MT RPORT NO.		QC/DATE —		QC/DATE —		QC/DATE —
HOLD	ANI	CI	ANI	CI	ANI	CI
REPORT NO.	R-1017-12A	QC/DATE 8-4-82	R-1017-12B	QC/DATE 8-2-82	R-1017-12C	QC/DATE 10-20-82
PWHT — PROCEDURE NO.	N/R R. ↓	QC/DATE —	N/R R. ↓	QC/DATE —	N/R R. ↓	QC/DATE —
BEFORE/AFTER N.D.E.		ANI		ANI		ANI
TEMPERATURE (ACTUAL)	°F	—	°F	—	°F	—
HOLDING TIME (ACTUAL)		CI —		CI —		CI —
HEAT CHART NO.						
WELD IDENT. MARKINGS	Yes	QC/DATE 10-2-	Yes	QC/DATE 10-2-	N/R	QC/DATE —
NON-CONFORMANCE	NCDR909	QC/DATE 10/18/82	NCDR 909	QC/DATE 10/1/82	NCDR 909	QC/DATE 10/18/82

FIELD END PR

END IDENT.	E		F		GV	
SKETCH NO.	101 R.9	QC/DATE GH 8-6-82	101 R.9	QC/DATE GH 8-6-82	101 R.9	QC/DATE 9/1/82
MINIMUM WALL	.847 .910	ANI	.875 .960	ANI	.330 .358	ANI
COUNTERBORE	14.474 14.481	CI	14.477 14.479	CI	3.860 3.865	CI
MICROMETER NO.	P-2546 P-2539		P-2546 P-2539		P-2546 P-2017	
NON-CONFORMANCE		QC/DATE	N-1141-902	QC/DATE 9-3-82 QC	N-1141-902	QC/DATE 9-3-82 QC

LAND END G .064 - .065 GH. 9-2-81 ✓

L) END E .063 .065 GH. 8-6-82 ✓

LAND END F* .064 - .065 [illegible] 9/3/82 (P.O. NO. 1245) ✓

POWER PIPING CO. - IN-PROCESS C

S - POWER PIPING

QUALITY CONTR

1G PIPE (7)			
R. QC/DATE GH 9-2-81	R. QC/DATE	R. QC/DATE	R. QC/DATE
ANI	ANI	ANI	ANI
CI	CI	CI	CI
R. QC/DATE	R. QC/DATE	R. QC/DATE	R. QC/DATE
ANI	ANI	ANI	ANI
CI	CI	CI	CI
R. QC/DATE	R. QC/DATE	R. QC/DATE	R. QC/DATE
ANI	ANI	ANI	ANI
CI	CI	CI	CI
ANI N/R CI —	ANI CI	ANI CI	ANI CI
QC/DATE —	QC/DATE	QC/DATE	QC/DATE
ANI CI	ANI CI	ANI CI	ANI CI
17126 QC/DATE 10-28-82	QC/DATE	QC/DATE	QC/DATE
N/R R. QC/DATE —	R. QC/DATE	R. QC/DATE	R. QC/DATE
ANI —	ANI	ANI	ANI
CI —	CI	CI	CI
N/R QC/DATE —	QC/DATE	QC/DATE	QC/DATE
NCR 909 QC/DATE 11/10/82	QC/DATE	QC/DATE	QC/DATE

REPARATIONS

R. QC/DATE	R. QC/DATE	R. QC/DATE	R. QC/DATE
ANI	ANI	ANI	ANI
CI	CI	CI	CI
QC/DATE	QC/DATE	QC/DATE	QC/DATE

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POWER PIPING COMPANY

P O BOX 11

DONORA, PA. 15033

TELEPHONE
AREA 412
379-

CERTIFICATE OF COMPLIANCE
FOR
ASME SECTION III, DIVISION 1

DUQUESNE LIGHT COMPANY
BEAVER VALLEY UNIT NO. 2
PURCHASE ORDER 2BV-58
J. O. NO. 12241
POWER PIPING AUTHORIZATION NO. N-1141

This is to certify that the piping fabrication as identified below:

ISO. NO. 101933

MARK NO. SWC-459-1

SHOP SHEET NO. 1019-459-207 REV. NO. 0

SERIAL NO. N-1141-925

conforms to the material, fabrication, assembly and test requirements of Stone & Webster Specification Number 2BVS-58, Revision 2, Add. 2, dated June 16, 1980, for Class 3 piping and ASME Section III, Division 1 - 1971, and all addenda thereto including Winter 1972.

POWER PIPING COMPANY

BY: (illegible)

DATE: August 27 80

As Required by the Provisions of the ASME Code Rules Section III Div

Power Piping Company, Monroeville PA 15033 — N 1141

Beaver Valley Power Station Unit #2 — SB-58 J.O. No. 12247

Duquesne Light Company, Pittsburgh PA — Shippingport Boro, PA

RP- — Stone & Webster Engineering Corp

N/A — Boston, Massachusetts

1971 — Addenda date: Winter 1972 — Code No.: N/A

Remarks: Manufacturers' Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report:

By Field

Description of work covered:

- 3 Cont. Mt. Misc. Tank Supports, Cont. No. B, Item No. 2, Tanks = Refueling Water Storage Tank, Mt. No. 1-1 & 1-2; Item No. 4, Tanks = Boric Acid Tanks, Mt. No. 1-3 & 1-4; Item No. 5, Tanks = Spent Fuel Pit Tanks, Mt. No. 1-5 & 1-6.
- 3 Cont. Mt. Misc. Tank Supports, Cont. No. Mech, Item No. 12, Cont. No. Mech, Mt. No. 2-1 & 2-2; Item No. 13, Cont. No. Mech, Mt. No. 2-3 & 2-4; Item No. 14, Cont. No. Mech, Mt. No. 2-5 & 2-6.

The Welded Electric Tank Co., Inc., Erie, PA

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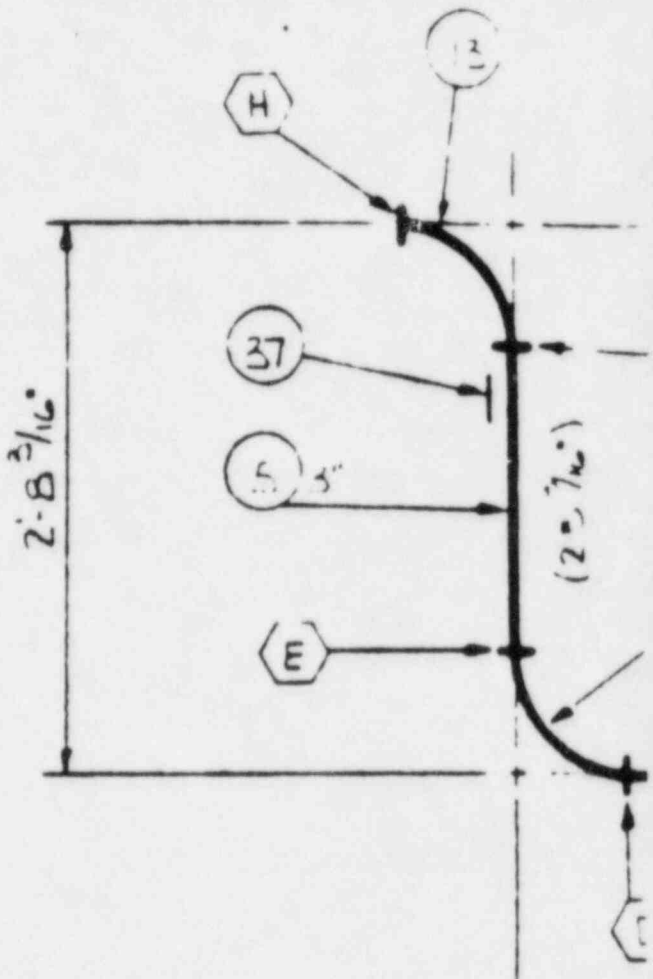
Power Piping Company — By: Bruce E. Brunner — N 1623

CERTIFICATE OF SHOP INSPECTION — N 1141

Signed: 9/24/80 — Commissions: PA 2387

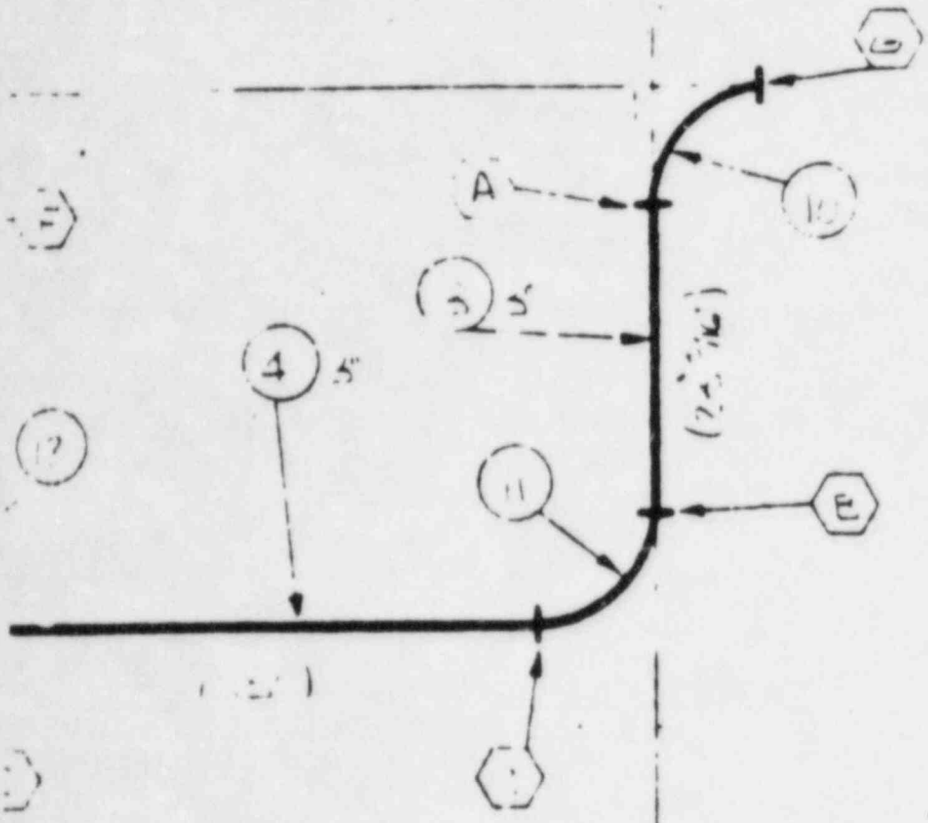
Inspector

SHOP SPEC	SK 100
CUSTOMER INSPECTION	YES
IPC REQUIRED	YES
END PREP	STD BEVEL
MIN. WALL	3"-0189"
BACKING RINGS	NR
GTAW ROOT	YES
PREHEAT	NR
PWHT	NR
NDE RADIOGRAPH	NR
NDE LIQ PENET	NR
NDE MAG PART	NR
NDE ULTRASONIC	NR
CLEANING O D	NR
CLEANING I D	STD CLEAN / SK-100
PAINTING	DEOXALUMINATE ENDS / SK-100
COLOR CODE	NR
MARKING	SK-100
CAPPING	SK-100



NO	BY	DATE	DESCRIPTION

REVISION



ONE (1) REQUIRED

NUCLEAR CL. 3

S & W CLASS - 151

FAB MARK	ISO - [illegible] • SWS-45-14 • 1019/45 • 1 •
CODE SERIAL NO	N-1141- • 5293
FAB WEIGHT	5'-1"

SERVICE WATER (SWS)

DESIGN PRESS [illegible] PSIG TEMP [illegible] °F

ASME SECT III CL 3 • WINTER 72

REF DWG: RP-E-REV 3

ISOMETRIC 1014-2

CUSTOMER: DUQUESNE LIGHT COMPANY
BEAVER VALLEY - UNIT NO 2
P O NO 28V-66
J O NO 12241

B&W
BEAVER AVENUE
PITTSBURGH, PA. 15233

SHOP FABRICATION SHEET

DWN	SHAFFER	SYS NO	AUTH NO.
CHKD	MCGRAIL	019	N-1141
DATE	7/22/79	SHEET NO	
PROJ ENG	JANASZEK	1019/45	
		PAGE 1 OF 2	

J.A.H 12/12/79

POWER PIPING CO. SHOP FABRI

1019-453-207

NUCLEAR CL. 3

ITEM	QUAN	DESCRIPTION	MTRS	P.O. NO	BILLING UNIT	BILLING TOTAL	BILLING DISC	BILLING NET TOTAL	QUALITY ASSURANCE LCN	QUALITY ASSURANCE MFR	QUALITY ASSURANCE HEAT/IDENT	QUALITY ASSURANCE QC INSP
1		3" STD. WALL SMLS CS PIPE										
2		SA-106 GR B*										
3	1	PIECE 11 5/16" LG BBE	Sht 3	15879					P-1590*	USS	N 94577*	SWC 6-11-80
4	1	PIECE 6" LG BBE	↓	↓					P-1590*	USS	N 94577*	SWC 6-11-80
5	1	PIECE 5 1/16" LG BBE	↓	↓					P-1590*	USS	N 94577*	SWC 6-11-80
6												
7												
8		STD WT. SMLS CS FTG.										
9		SA 234 WPB*										
10	1	3" 4K 90° ELL	19 P.17	22564					M-6620*	LADISH	BK6S*	SWC 8/5/80
11	1	3" 4K 90° ELL	↓	↓					M-6621*	LADISH	BG6T*	SWC 8/5/80
12	1	3" 4K 90° ELL	↓	↓					M-6622*	LADISH	BG6T*	SWC 8/5/80
13	1	3" 4K 90° ELL	↓	↓					M-6623*	LADISH	BK6S*	SWC 8/5/80
14												
15												
16	2	3" END ROTR.										
17												
18												
19												
20	3	3" PIPE CUT										
21	6	3" PIPE BEVEL										
22	6	3" TIG ROOT ARGON PURGE										
23	6	3" FILL										
24												
25												
26												
27												

28		
29		
30		
31		
32		
33		
34		
35	1	STEEL STAMP MARK NO
36	1	HARTFORD INSPECTION
37	1	CODE NAME PLATE
38	1	QA TRAVELER
39	43	DOCUMENTATION ELEMENTS
40	7	QC REPORTS (INCL WELD DATA)
41	7	MARKINGS FOR TRACEABILIT
42		
43		
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CODE SERIAL NO.	AUTH. NO.	SFS NO.	PAGE 2 OF 2
5283	N-1141	1019145-	

END PREPARATI

END IDENT	A PIPE 3		C PIPE		D PIPE 4	
SKETCH NO	NA R	QC DATE	NA R	QC DATE	NA R	QC DATE
MINIMUM WALL		ANI		ANI		ANI
COUNTERBORE	NA	CI	NA	CI	NA	CI
MICROMETER NO						
O.D. BUILDUP — WELD PROCEDURE NO	NA R	QC/DATE	NA R	QC/DATE	NA R	QC DATE
O.D. BUILDUP — WELDING PROCESS		ANI		ANI		ANI
O.D. BUILDUP — MIN PREHEAT / MAX INTERPASS	°F		°F		°F	
O.D. BUILDUP — WELDERS NO		CI		CI		CI
O.D. BUILDUP — FILLER METAL NO						
I.D. BUILDUP — WELD PROCEDURE NO	R	QC/DATE	R	QC/DATE	R	QC DATE
I.D. BUILDUP — WELDING PROCESS		ANI		ANI		ANI
I.D. BUILDUP — MIN PREHEAT / MAX INTERPASS	°F		°F		°F	
I.D. BUILDUP — WELDERS NO		CI		CI		CI
I.D. BUILDUP — FILLER METAL NO						
NDE — HOLD	ANI	CI	ANI	CI	ANI	CI
NDE — PT/MT REPORT NO		QC/DATE		QC/DATE		QC/DATE
NDE — HOLD	ANI	CI	ANI	CI	ANI	CI
NDE — RT REPORT NO		QC/DATE		QC/DATE		QC DATE
PWHT — PROCEDURE NO	R	QC/DATE	R	QC/DATE	R	QC DATE
PWHT — BEFORE AFTER N.D.E.						
PWHT — TEMPERATURE (ACTUAL)	°F	ANI	°F	ANI	°F	ANI
PWHT — HOLDING TIME (ACTUAL)		CI		CI		CI
PWHT — HEAT CHART NO						
		QC/DATE		QC/DATE		QC DATE
NON-CONFORMANCE		QC/DATE		QC/DATE		QC DATE

FIELD EN

END IDENT	G	H	
SKETCH NO	NA R	QC DATE	NA R	QC/DATE	R	QC DATE
MINIMUM WALL		ANI		ANI		ANI
COUNTERBORE	NA	CI	NA	CI		CI
MICROMETER NO						
NON-CONFORMANCE		QC DATE		QC DATE		QC DATE

END PREPARATIONS

SS CONTROL SHEET

CODE SERIAL	AUTH NO	IPC NO	PAGE
SC53	N-1141	0.9 | 15-1 | 207	2 OF

ATTACHMENT G

CALCULATION SHEET

▲ 5010.65

CALCULATION IDENTIFICATION NUMBER				
J.O. OR W.O. NO.	DIVISION & GROUP	CALCULATION NO.	OPTIONAL TASK CODE	PAGE 1 of 3
12241	POWER	15 (-)	—	

OBJECTIVE:

To determine if the wall thickness of the piping can withstand external design pressure.

METHOD:

ASME III, 1971 Edition thru Winter 1972 Addenda, Paragraph NC-3641.2

GIVEN:

1) Piping - 42" O.D. x ½" Wall SA 155, Gr. C 55 Pipe (ASME III, Class 2)
2) Mfgr. Min. Wall (t_m) - 0.490"
3) External Design Pressure - 45 psi
4) Length (L) - 10'-0" or 120"
5) Outside Diameter (D_o) - 42.0" 6) Temperature (T) = 275°F

CALCULATION:

Paragraph NC-3641.2 address straight pipe under external pressure and indicates that the rules of Paragraph NB-3133 may be used. Paragraph NB-3133.3 (a) addresses the minimum thickness of tubular products under external pressure.

Paragraph NB-3133.3 (a) -

step 1: $L/D_o = 120"/42" = 2.85$

$D_o/t_m = 42.0"/0.490" = 85.714$

Steps 2 thru 6 involve the use of Figure VII-1100(2.1), attached, and determination of Factor B = 7,000. Therefore

$$P = \frac{4B}{3\,D_o/t_m} = \frac{(4)(7,000)}{(3)(42.0)/0.490} = 109.37$$

P = 109 psi

CALCULATION SHEET

▲ 5010.68

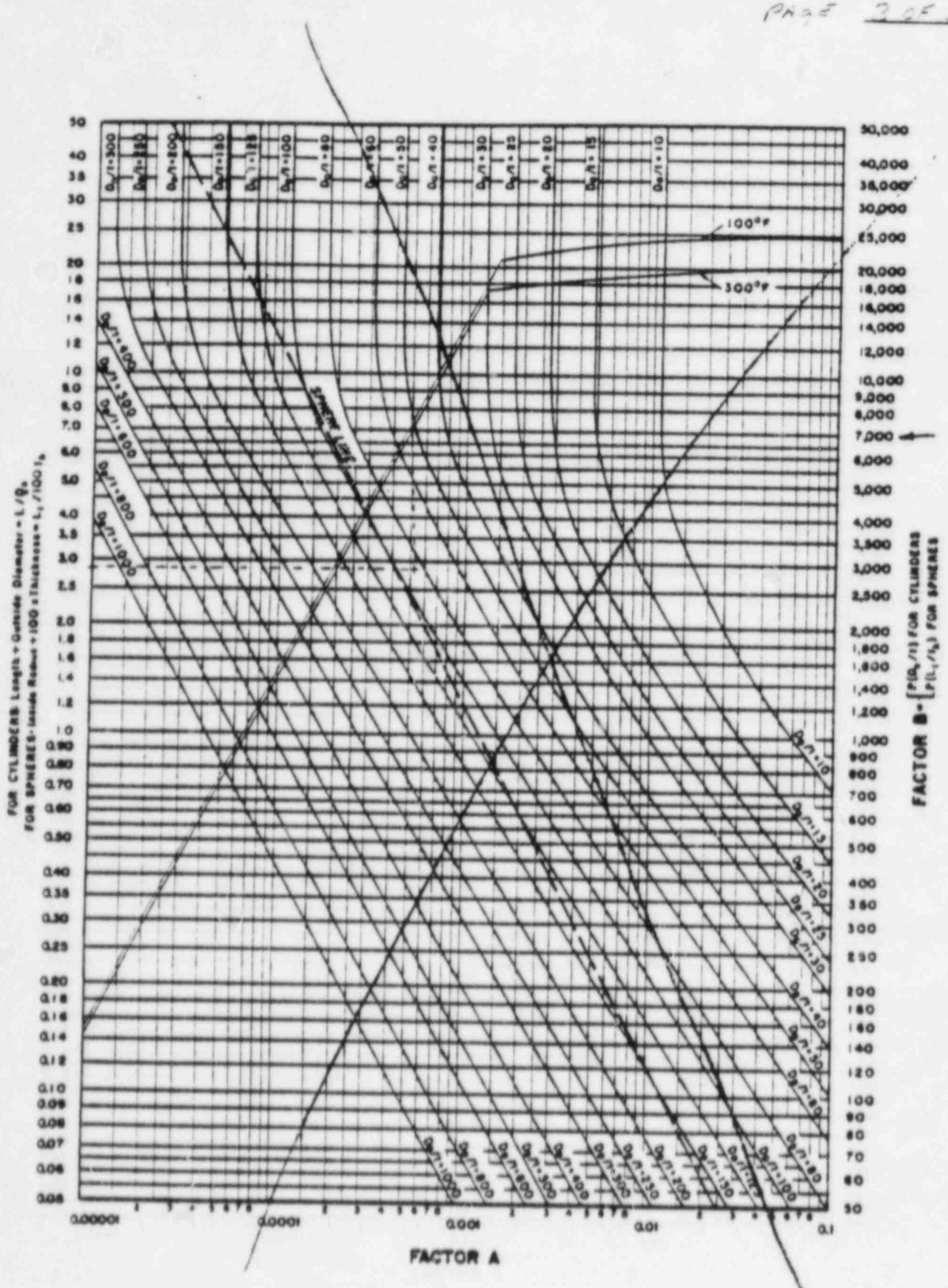
CALCULATION IDENTIFICATION NUMBER				
J.O. OR W.O. NO.	DIVISION & GROUP	CALCULATION NO.	OPTIONAL TASK CODE	PAGE 2 of 3
12241	POWER	15(c)	—	

CONCLUSION:

This 42" O.D. x ½" Wall SA155, Gr. C55 pipe can withstand the external design pressure of 45 psi.

By: R F Blake 9/17/85

Ckd. By: M. D. Engel 9/20/85



This figure is not applicable for temperatures in excess of 300°F.

Figure VII-1100(2.1) Chart for Determining Shell Thickness of Cylindrical and Spherical Vessels Under External Pressure.

422 11.1.2 1.172

221

ATTACHMENT H

Heat Code: D-7112
** Revised 4/14/80

CUSTOM ALLOY CORPORATION

ROUTE 513, CALIFON, N. J. 07830

PRODUCT DESCRIPTION		CUSTOMER DATA	
Item	Straight Tee *	Name	Capitol Pipe & Steel Products
Size	10" NPS	P.O. No.	D-13333-OON
Wall	Sch 80 (594)	Tag No.	23679-N-1141
Grade	WP-304 Seamless	Job No.	PN-13309-2

Specifications: ** ASME SA-403 WP-304 Seamless Section III Class 2, 1971 Editon thr Winter 1972 Addenda and Power Piping Spec. N-1141-01 Rev. 4

* Runs beveled per SK-79-P-37A Branch beveled per SK-79-P-37C

CHEMICAL ANALYSIS

	C	Mn	P	S	Si	Cr	Ni	Mo	Cb			
Ladle	.06	.93	.023	.005	.70	18.36	8.45					
Check												

MECHANICAL PROPERTIES

Yield Point PSI	Tensile Strength PSI	Elong. in 2" %	Red of Area %		Starting Material Control No.	Starting Material conforms to the chemical and tensile requirements of
37,624	81,832	63.0	73.3		CAC 10256	ASME SA-182

MILL HEAT NO: 30224 - Carpenter Technology Corporation

REMARKS: (A) Heat Treatment: 1950 ± 50°F 1/hour per inch (15 minutes minimum Solution annealed unsensitized and water quenche to below 800°F in less than 3 minutes.

(B) We certify that these fittings were manufactured under a Quality [illegible]m meeting the requirementsof ASME Section III Par. NCA-3800.

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[illegible]ering Corporation
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JANET P. SHERWIN
NOTARY PUCLIC OF NEW JERSEY
My Commission Expires May 13, 1982

State of New Jersey
County of Hunterdon

Sworn and subscribed before me this 1st day of April, 1980

Janet P. Sherwin
NOTARY PUBLIC OF NEW JERSEY

CUSTOMER Powa-Pyang
P.O. NO. 23679-N-1141
S.O. NO. RN-1164-HO
ITEM NO. 1
CHARGE NO. NA

CAPITOL PIPE
QUALITY
ASSURANCE
4
ACCEPTED
APR 21 1980

DUQ. LIGHT CO. BEAVER VALLEY NO. 2
P.O. NO. 2 BV-58, J.O. NO. 12241, PIPE FAB.

Acceptance and Approval by Customer Representative/Inspector

I certify the above product has been manufactured accordance with all applicable parts of the abo orders and specifications

4/1/80

2F-032280-1

ATTACHMENT J

MECHANICAL TEST PROCEDURE

Title: PRESSURE TEST REQUIREMENTS FOR ASME SECTION III, ANSI B31.1, NFPA AND NATIONAL STANDARD PLUMBING CODE PIPING AND TUBING SYSTEMS AND COMPONENTS	**Number:** 2MTP-4
	Revision: 7
	Date: 09/06/84
	Prepared by: R.I. SAMSON
Applicability: BEAVER VALLEY POWER STATION-UNIT NO. 2 DUQUESNE LIGHT COMPANY	**Supersedes:** 2MTP-4, Rev. 6; 2MTP-1, Rev. 0; 2MTP-2, Rev. 0; 2MTP-3, Rev. 8; 2MTP-6, Rev. 3; 2MTP-7, Rev. 0; 2MTP-8, Rev. 3

Reviewed:	James W Allen Lead Test/Advisory Engineer	**Date:** 8/28/84
Reviewed:	[signature] AOD Supervisor Mechanical Systems	**Date:** 8/29/84
Reviewed:	[signature] Chief Engineer, QSD	**Date:** 8/31/84
Reviewed:	N/A Vendor	**Date:**
Approved:	[signature] Project Engineer	**Date:** 9-6-84

STONE & WEBSTER
ENGINEERING CORPORATION

TABLE OF CONTENTS 1.10

attached shall not exceed 6 square inches at the surface of the pressure boundary material; (3) welds shall be restricted to fillet welds not exceeding 3/8 inch throat thickness, and to full penetration welds attaching materials not exceeding 1/2 inch in thickness; and (4) welds shall be examined as required by ASME III NX-5000. 10.17 10.18 10.19

7.12.2 Temporary or minor permanent attachment welds to NSPC piping systems will not require retesting provided that the criteria of this MTP, paragraph (7.12.1) are met. 10.20 10.21

8.0 PROCEDURE 10.24

8.1 For all pressure tests, the test parameters shall be as indicated on the Pressure Test Boundary Drawings. 10.27

8.1.1 For a pneumatic test, a preliminary test for leakage shall be conducted by pressurizing the system or subsystem to not more than 25 psig and isolating the pressure source. If pressure drops more than 5 psig in 5 min, then an inspection shall be conducted to locate the leakage source. Leaks detected shall be repaired before proceeding further as determined by the Test Supervisor. 10.30 10.31 10.33 10.34 10.35

8.1.2 Following completion of the preliminary test, pneumatic pressure shall be increased to not more than one-half of the test pressure, after which pressure shall be slowly increased in steps of approximately one-tenth of the test pressure until the required test pressure has been reached, within the allowable tolerance. 10.36 10.37 10.38 10.39

8.1.3 For a hydrostatic test on an ANSI B31.1 system, the preliminary test using the same grade of water as specified on the Pressure Test Boundary Drawing to 100+0/-10 psig or design pressure whichever is less is optional. For a Hydrostatic Test on an ASME III system the preliminary test using air or nitrogen is optional in accordance with Section 8.1.1. 10.40 10.41 10.42 10.43 A

8.1.4 Following completion of the preliminary test if one is conducted, hydrostatic pressure should be raised to test pressure if it is 500 psig or less. If the test pressure is 10.44 10.45 10.46 10.47

greater than 500 psig, the pressure should be raised in increments of approximately 500 psig until the test pressure is reached.

8.2 The test pressure shall be maintained for a minimum of 10 min for ASME III, ANSI B31.1 (except insulated initial service leak tested or pressure tested joints), and NFPA (Carbon Dioxide type) piping. For NFPA water type piping the pressure shall be maintained for a minimum of 2 hours.

8.2.1 The test pressure for ANSI B31.1 piping that is to be initial service leak tested or pressure tested and has been insulated prior to any previous test being performed shall be held for a period of 4 hours.

8.3 For ASME III piping (Safety Class 1, 2, and 3), at the completion of Step 8.2, the pressure shall be reduced to a value equal to the greater of the design pressure or 0.75 times the test pressure (+5/-0 percent). A visual inspection of all welds, welded joints, and connections shall then be conducted by SQC and witnessed by the Authorized Nuclear Inspector. Instrument sensing lines equipped with braided hose shall also have the hose and braid inspected to see if any water will leak, seep or flow thru the previous braid cover if a leak occurs. The test shall be witnessed by the DLC Startup Group. The reduced pressure shall be maintained for such additional time as may be necessary to complete the inspection. Portions of the drain and vent connections, although non-nuclear safety related, should also be inspected at this time.

8.4 For ANSI B31.1 piping (Safety Class 4), at the completion of Step 8.2, a visual inspection of all welds, welded joints, and connections shall be conducted by SQC. Instrument sensing lines equipped with braided hose shall also have the hose and braid inspected to see if any water will leak, seep or flow thru the previous braid cover if a leak occurs. The test shall be witnessed by the DLC Startup Group. The pressure shall be maintained for such additional time as may be necessary to complete the inspection.

8.5 For NFPA piping, ten minutes into the pressure maintenance period specified in paragraph 8.2, a visual inspection of all joints and connections shall be conducted by SQC and witnessed by the authority

having jurisdiction. The test shall be witnessed by the DLC Startup Group. The authority having jurisdiction may at his option waive the requirements for witnessing the test. The pressure shall be maintained for such additional time as may be necessary to complete the inspection. In no case shall the test pressure be held for less than 2 hours. 11.20 11.22 11.23 11.24 ⚠

8.6 For National Standard Plumbing Code piping (except water supply systems), the test shall be accomplished by temporarily closing all openings to the system, except the highest opening, and filling the system with water to the point of overflow. For nonwelded pipe the test pressures shall normally not exceed 40 ft of water. When the stacks are higher, they shall be tested in sections of 40 ft maximum heights. On cast iron lines, cleanouts (Zurn Z-1445, Tosam 58510, JR Smith 4510 or 4515 Series, Wade Div. W8560-A,B,D,E) shall be used for purposes of damming at 40 ft stack intervals. No section shall be tested with less than a 10 ft head of water. For welded pipe the piping shall be tested with a maximum of 404 ft head of water and a minimum of 10 ft. A pneumatic test may be substituted using a maximum of 15 psig and a minimum of 5 psig. The test pressure shall be maintained for a minimum of 15 minutes (30 minutes in potentially radioactive areas). Then a visual inspection of all joints and connections shall be conducted by SQC. The test shall be witnessed by the DLC Startup Group. 11.25 11.26 11.27 11.29 11.30 11.31 11.33 11.34 11.35 11.36 11.37 11.38 11.39 11.40 ⚠

8.7 For National Standard Plumbing Code water supply piping, a hydrostatic test shall be performed on the system. The test pressure shall be maintained for 15 minutes. Then a visual inspection of all joints and connections shall be conducted by SQC. The test shall be witnessed by the DLC Startup Group. 11.41 11.42 11.43 11.44 11.45 11.46 ⚠

8.8 When a static head test is required by the Pressure Test Boundary Drawing, the test shall be accomplished by isolating or plugging the system from the lowest points to the highest points in elevation during filling to ensure elimination of entrapped air. The highest point in elevation shall be vented to the atmosphere. The head of water shall be maintained as specified on the Pressure Test Boundary Drawing, after which time, SQC shall conduct a visual inspection of all welds, welded joints, and connections. The level maintained during the Static Head Test should be recorded in the 11.47 11.48 11.49 11.50 11.51 11.52 11.53 11.54

Remarks/Evaluations section of the Pressure Test Report (see enclosure of Reference 2.11). 11.55

8.9 When an initial service leak test is required by the Pressure Test Boundary Drawing, the system shall be brought up to normal operating pressure during system initial operation. A visual inspection of all welds, welded joints and connections shall be conducted by the DLC Startup Group if they are exposed. If the piping is insulated at the time of the test then the insulation shall be inspected for leakage. When an initial service leak test is required for NFPA piping, the inspection shall be performed by SQC. The initial service leak test shall be performed using DLC/SUG approved procedures. 11.56 11.57 11.58 12.1 12.2 12.3 △1

8.10 When a drop test is required by the Pressure Test Boundary Drawing, the system shall be pressurized to the specified test pressure. The system shall then be isolated from the pressure source and held for the specified time period. Pressure and temperature shall be monitored at 10 minute intervals for the duration of the test and shall be recorded in the Remarks/Evaluations section of the Pressure Test Report (see enclosure of Reference 2.11). 12.4 12.5 12.6 12.7 12.8 12.9

8.11 When a pneumatic test is performed, the system shall be pressurized to the specified test pressure. To facilitate inspecting the system, a bubble formation inspection shall be performed on all welds and welded joints. 12.10 To 12.12

8.12 The Test Supervisor or his designee shall also hi-lite the applicable flow diagrams, RM/RB and isometrics to indicate piping tested, including boundaries such as weld joints, flanged joints, valves, etc. 12.13 12.14 △1

12.17

9.0 POST TESTING REQUIREMENTS

9.1 Following system inspection, pressure shall slowly (to avoid pressure surges) be reduced to atmospheric pressure. If a gas other than air has been used as the test medium, the gas shall be conducted to the outside atmosphere via ventilation exhaust ducts or other acceptable means. Ensure that lines upstream and downstream of check valves are depressurized. 12.19 12.20 12.22 12.23 12.24

9.2 If systems and/or components are to be drained either for freeze protection or lay-up requirements, proper venting shall be employed to prevent the possibility 12.25 12.26

STONE & WEBSTER ENGINEERING CORPORATION

FIELD CONSTRUCTION PROCEDURE

FOR

CONTROL LEVEL 1

E5850419000 2

HYDROSTATIC TESTING

BEAVER VALLEY POWER STATION - 2

J.O. NO. 12241 FCP- 216 Date 2/12/81, Page 1 of 20

Prepared by E. Mullins/J. Whitlatch Organization SWEC/SPC

Change Number 1 / 2 / 3 / 4 / 5 / 6 /

Date 10/6/82 / 2/7/83 / 4/6/83 / 8/24/83 / 4/11/84 / 11/5/84 /

Change Number 7 / 8 /

Date 12/20/84 / 4/18/85 /

Overall Responsibility for Coordination Duquesne Light Company

APPROVED FOR USE

Organization	Signature	Date
SWEC - Construction	[signature]	4-16-85
SWEC - Engineering	[signature]	3/21/85
DLC - Const. Department Nuclear	[signature]	4/18/85
DLC - Site Quality Control	[signature]	3/29/85
Site Contractors		
Schneider Power Corporation	[signature]	4/16/85

NOTICE

There shall be NO deviations to the instructions contained in this procedure. Modification, deletion, addition or any other change to these instructions shall only be implemented when authorized by distribution of an approved change to the procedure.

3. Equipment/Component Removal Record.

4.0 RESPONSIBILITIES

4.1 The Contractor has the overall responsibility for assigning qualified test personnel in accordance with FCP-17.1 (Reference 2.2). He is also responsible for ensuring that testing is conducted in accordance with this procedure and the Engineering requirements (Reference 2.1).

4.2 The Contractors Pressure Test Supervisor is responsible for performance of pressure testing installed piping and preparation of the required documentation in accordance with this procedure and the Engineering Requirements. He is also responsible for establishing test boundaries, as identifed by DLC/SUG, obtaining water samples, when required, and ensuring that test requirements are satisfactorily performed to protect personnel and equipment. He is responsible to ensure the presence of the SWEC Engineering, SQC, DLC/SUG, and the ANI, as applicable. CN-216-8

4.3 Site Quality Control shall prepare inspection plans to verify compliance with this procedure and the Engineering requirements.

4.4 The Contractors Pressure Test Supervisor shall assure that cleanness is maintained on verified clean systems during preparation, restoration and pressure testing as required.

4.5 DLC/SUG shall be responsible for identifying test boundaries, scheduled time, posting safety clearances, witnessing pressure tests and verifying that cleanness has been maintained during pressure testing.

CN-216-8 4.6 SWEC Engineering shall witness all ASME III System pressure testing.

5.0 PREREQUISITES AND PRECAUTIONS

5.1 Installed permanent plant equipment/components which are removed to facilitate pressure testing shall be controlled by FCP-302 (Reference 2.8) and FCP-208 (Reference 2.13) and, in addition, shall be itemized on the Equipment/Component Removal Record (Attachment 3.7).

5.2 The Contractors Pressure Test Supervisor shall conduct a task orientation to ensure that all testing personnel are familiar with the requirements of this procedure and the Engineering requirements.

5.3 Temporary equipment required shall be in accordance with FCP-14 (Reference 2.5).

5.4 The Contractors Pressure Testing Supervisor shall ensure that the test gages are calibrated before and after the test in accordance with FCP-501 (Reference 2.6).

5.5 When any gas other than air is used as the test medium, the following precautions apply:

5.5.1 Occupied areas are ventilated.

5.5.2 Test personnel are acquainted with the hazards involved.

5.5.3 Entrance to confined or enclosed spaces shall be in accordance with FCP-12 (Reference 2.7).

6. The Contractors Pressure Test Supervisor signs his name and enters the date in the applicable space indicating that the test gages and relief valves have been calibrated.

7. Entries in this section may be made by a representative of any organization specified in 9. Entries shall be signed and dated by the individual marking the entry.

8. Enter a check mark beside the applicable item. This entry signifies that the test was/was not satisfactory or Engineering evaluation or results is required. Entries other than satisfactory require explanation in remarks.

9. The Contractors Pressure Test Supervisor will sign and date appropriate block indicating the pressure test has been performed to the required procedures and results are as stated on Pressure Test Results Form.

9.1 Site Quality Control will sign and date the appropriate block indicating that all joints within the inspection boundaries have been inspected and results are as stated on Pressure Test Results Form.

9.2 The Authorized Nuclear Inspector (ANI) will sign and date appropriate block indicating code requirements have been met as stated on Pressure Test Results Form.

9.3 DLC/SUG will sign and date the applicable block to signify that the test results are as stated on Pressure Test Results Form.

CN-216-8

9.4 The SWEC Engineer shall sign all ASME III system pressure test reports indicating concurrence with results.

9.5 It will be the Pressure Test Supervisor's responsibility to obtain the signatures of SQC, DLC Start-up Group and the ANI, when applicable, in the "Test Results Concurrence" block 9 on Part B of the Pressure Test Report Form.

SQC enters a check mark beside the applicable block, signs his name and enters the date in the applicable block after the test gage has been recalibrated. This recalibration shall be noted on the same Pressure Test Issue and use form (Para. 6.1.2). The test report shall be signed by all parties at the time of testing.

10. The Contractors Pressure Test Supervisor enters a check mark in the applicable space to indicate whether or not a Mechanical Leakage Record Sheet is required.

Part C 1. Site Quality Control enters signature and date verifying (when applicable) Cleanness has been maintained in accordance with FCP-201.

PART B — PRESSURE TEST REPORT TEST RESULTS

(1) WATER SAMPLE REPORT: NUMBER _____

INITIAL CONDITIONS & PREREQUISITES COMPLETE: TEST SUPERVISOR _____ DATE _____

(3) TESTING:
- DATE PERFORMED _____
- TIME STARTED _____
- TIME ENDED _____
- ACTUAL DURATION _____

(4) TEST PRESSURE:
- PRIMARY ACTUAL _____ CORRECTED _____
- SECONDARY ACTUAL _____ CORRECTED _____

(5) INSPECTION PRESSURE:
- PRIMARY ACTUAL _____ CORRECTED _____
- SECONDARY ACTUAL _____ CORRECTED _____

(6) TEST GAGES AND RELIEF VALVES CALIBRATED: TEST SUPERVISOR _____ DATE _____

(7) REMARKS/EVALUATION: _____

(8) ACCEPTANCE CRITERIA DURING TEST:
- ___ SATISFACTORY
- ___ UNSATISFACTORY
- ___ NEEDS ENGINEERING EVALUATION

(9) TEST RESULTS CONCURRENCE:
- TEST SUPERVISOR _____ DATE _____
- (9.1) SQC _____ DATE _____
- (9.2) ANI _____ DATE _____
- (9.3) DLC/SUG _____ DATE _____

GAGE RECALIBRATION AFTER TEST
___ ACCEPT ___ REJECT
- SQC _____ DATE _____
- (9.5) SWEC ENGINEERING _____ DATE _____

(2) MECHANICAL LEAKAGE CN-216-8 ___ YES ___ NO

IF YES, REFER TO MECHANICAL LEAKAGE RECORD SHEET _____

PART C — POST HYDRO

(1) CLEANNESS MAINTAINED: SQC _____ DATE _____

(2) SYSTEM LAYED-UP AS DIRECTED BY DLC/SUG:

REMARKS: _____

(3)

TEST SUPERVISOR _____ DATE _____

DLC/SUG _____ DATE _____

TEST DOCUMENTATION COMPLETE:
___ YES ___ NO REMARKS: _____

SQC _____ DATE _____

ATTACHMENT K