Public Service
Electric and Gas
Company

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Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

SERVICE WATER SYSTEM PIPE REPLACEMENT
SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311

In response to NRC Inspection Open Item 311/86-26-03, Public Service Electric and Gas Company (PSE&G) provided information relative to the Service Water System (SWS) pipe replacement program that is underway at Salem Generating Station Units 1 and 2. The purpose of this letter is to apprise you of our progress to date and our projected schedule for completion of the program.

Based on the positive results of our tests on 6% Molybdenum Stainless Steel alloy materials and the fact that a similar material has been used successfully in SWS heat exchanger tubes at Salem for over 5 years, PSE&G has elected to undertake an extensive program to upgrade SWS piping and fittings with this material. The use of two such alloys (Avesta 254 SMO and Allegheny-Ludlum AL6XN) has recently been reviewed and approved by the American Society of Mechanical Engineers (ASME) for ASME Section III, Division 1, Class 2 and 3 construction. This approval is documented in Code Cases N-438, 439, 440, and 441 which are attached for your convenience. As these Code Cases deal with fabrication of materials and not relief from Code required testing or inspection, it is PSE&Gs understanding that specific Commission approval under 10 CFR 50.55a is not required.

Replacement of safety-related SWS piping will begin during Salem Unit No. 2 refueling outage which is presently scheduled for April 1988. Fabrication of material is underway and sufficient material will be available on-site in the near future to support any emergency replacements which may become necessary prior to the outage. Due to the extent of the replacements to be accomplished and the fact that the bulk of the work can only be accomplished during an extended outage condition, the replacement program is expected to continue through 1991, with major safety-related piping system replacements completed by the end of 1989.

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Should you desire any additional information relative to this program, please feel free to contact us.

Sincerely,

Attachments

C Mr. D. C. Fischer
USNRC Licensing Project Manager

Mr. T. J. Kenny
USNRC Senior Resident Inspector

Mr. W. T. Russell, Administrator
USNRC Region I

Mr. D. M. Scott
Bureau of Nuclear Engineering
Department of Environmental Protection
380 Scotch Road
Trenton, NJ 08628

Approval Date: February 23, 1987

See Numeric Index for expiration and any reaffirmation dates.

Case N-438
Fe-24.5Ni-21Cr-6.5Mo-0.2N (Alloy UNS N08367) Seamless and Welded Pipe, Tube, Plate, Bar, Fittings, and Forgings, Class 2 and 3 Construction
Section III, Division 1

Inquiry: May solution annealed Fe-24.5Ni-21Cr-6.5Mo-0.2N (Alloy UNS N08367) seamless and welded pipe, tube, plate, bar, fittings, and forgings with the chemical analysis shown in Table 1, the temper and minimum mechanical properties shown in Table 2, and otherwise conforming to SB-675, SB-676, SB-688, SB-690, SB-691, SB-366, SB-462, and SB-564 be used in Section III, Division 1, Class 2 and 3 construction?

Reply: It is the opinion of the Committee that solution annealed Fe-24.5Ni-21Cr-6.5Mo-0.2N (Alloy UNS N08367) seamless and welded pipe, tube, plate, bar, fittings, and forgings may be used in welded or unwelded construction under Section III, Division 1, Class 2 and 3 construction, provided the following requirements are met.

(*a*) They meet the chemical analysis and minimum tensile requirements detailed in the Inquiry and specifications.

(*b*) Heat treatment after forming is neither required nor prohibited. If heat treatment is used, the solution heat treatment shall consist of heating to a minimum of 2050°F and quenching in water or rapidly cooling by other means.

(*c*) The maximum allowable stresses shall be those shown in Table 3.

(*d*) Welding Procedure Qualifications and performance qualifications shall be conducted as prescribed in Section IX. The material shall be considered to be P-No. 45.

(*e*) For external pressure design, use Fig. VII-1106-1.

(*f*) All other requirements of Section III, Division 1, for Class 2 and 3 construction, as applicable shall be met.

(*g*) This Case number shall be identified in the certification for the material.

TABLE 1 CHEMICAL REQUIREMENTS

Element	Composition Limits, %	Product (Check) Analysis Variations, Under Minimum or Over Maximum of the Specified Limit of Element
Carbon	0.03 max.	0.01
Manganese	2.00 max.	0.04
Silicon	1.00 max.	0.05
Phosphorous	0.040 max.	0.005
Sulfur	0.030 max.	0.005
Chromium	20.00-22.00	0.25
Nickel	23.50-25.50	0.20
Molybdenum	6.00-7.00	0.10
Nitrogen	0.18-0.25	0.01
Iron [Note (1)]	Balance	

NOTE:
(1) Shall be determined arithmetically by difference.

Approval Date: February 23, 1987

See Numeric Index for expiration and any reaffirmation dates.

Case N-439
Use of 20Cr-18Ni-6Mo (Alloy UNS S31254) Forgings, Plate, Seamless and Welded Pipe, and Welded Tube, Class 2 and 3 Construction
Section III, Division 1

Inquiry: Under what rules may 20Cr-18Ni-6Mo (Alloy UNS S31254) forgings, plate, seamless and welded pipe, and welded tube be used for Section III, Division 1, Class 2 and 3 construction?

Reply: It is the opinion of the Committee that 20Cr-18Ni-6Mo (Alloy UNS S31254) may be used for Section III, Division 1, Class 2 and 3 construction, provided the requirements of (a) through (f) below are met.

(*a*) Material shall conform to the requirements of the applicable product specification listed in Table 2.

(*b*) This material shall be treated as P-No. 8, Group No. 4.

(*c*) The maximum allowable stress values shall be those shown in Table 1 of this Case.

(*d*) For external pressure design, use Fig. VII-1102-6 of Section III, Division 1.

(*e*) All other requirements of Section III, Division 1, for Class 2 or 3 construction, as applicable, shall be met.

(*f*) This Case number and revision applied shall be identified on the Material Manufacturer's certification for the material.

TABLE 1 MAXIMUM ALLOWABLE STRESS VALUES

For Metal Temperature Not Exceeding, °F	Maximum Allowable Stress, ksi	
	Note (1)	Notes (1) & (2)
100	23.5	23.5
200	23.5	23.5
300	21.4	22.4
400	19.9	21.3
500	18.5	20.5
600	17.9	20.1
650	17.7	19.9
700	17.5	19.9
750	17.3	19.8

NOTES:
(1) For welded pipe and tube, a factor of 0.85 shall be applied.
(2) At temperatures above 100°F, the allowable stress values may exceed 62½% (62⅔% for High Nickel Alloys) and may also reach 90% yield strength (0.2% offset) at temperature. This may result in a permanent strain of as much as 0.1%. When this amount of deformation is not acceptable, the designer should reduce the design stress to obtain an acceptable deformation.

TABLE 2 PRODUCT SPECIFICATIONS

Forgings	SA-182
Plate	SA-240
Welded Tube	SA-249
Seamless & Welded Pipe	SA-312
Welded Pipe	SA-358

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See Numeric Index for expiration and any reaffirmation dates.

Case N-440
Use of 20Cr-18Ni-6Mo (Alloy UNS J93254) Castings, Class 2 and 3 Construction
Section III, Division 1

Inquiry: Under what rules may 20Cr-18Ni-6Mo (Alloy UNS J93254) castings be used in Section III, Division 1, Class 2 and 3 construction?

Reply: It is the opinion of the Committee that 20Cr-18Ni-6Mo (Alloy UNS J93254) may be used for Section III, Division 1, Class 2 and 3 construction provided the requirements of (a) through (f) below are met.

(*a*) Chemistry and mechanical properties shall conform to the requirements of Tables 1 and 2 of this Case. All other requirements of SA-351 shall be met.

(*b*) This material shall be treated as P-No. 8, Group No. 4.

(*c*) The maximum allowable stress values shall be those shown in Table 3 of this Case.

(*d*) For external pressure design, use Fig. VII-1102-6 of Section III, Division 1.

(*e*) All other requirements of Section III, Division 1, for Class 2 and 3 construction, as applicable, shall be met.

(*f*) This Case number shall be identified on the Material Manufacturer's certification for the material.

TABLE 1 CHEMICAL COMPOSITION, %

C = 0.025 max.	Cr = 19.50 – 20.50
Mn = 1.20 max.	Ni = 17.50 – 19.50
Si = 1.00 max.	Mo = 6.00 – 7.00
P = 0.045 max.	Cu = 0.50 – 1.00
S = 0.010 max.	N = 0.180 – 0.240

TABLE 2 MECHANICAL PROPERTIES

Tensile strength	80 ksi
Yield strength	38 ksi
Elongation	35%
Red. of area	35%

Approval Date: February 23, 1987

See Numeric Index for expiration and any reaffirmation dates.

Case N-441
Use of 20Cr-18Ni-6Mo (Alloy UNS S31254) Fittings, Class 2 and 3 Construction
Section III, Division 1

Inquiry: Under what rules may 20Cr-18Ni-6Mo (Alloy UNS S31254) fittings with chemistry as listed in SA-290 be used in Section III, Division 1, Class 2 and 3 construction?

Reply: It is the opinion of the Committee that 20Cr-18Ni-6Mo (Alloy UNS S31254) may be used for Section III, Division 1, Class 2 and 3 construction provided the requirements of (a) through (f) below are met.

(*a*) Chemistry and mechanical properties shall conform to the requirements of Alloy S31254 in SA-240. All other requirements of SA-403 shall be met.

(*b*) This material shall be treated as P-No. 8, Group No. 4.

(*c*) The maximum allowable stress values shall be those shown in Table 1 of this Case.

(*d*) For external pressure design, use Fig. VII-1102-6 of Section III, Division 1.

(*e*) All other requirements of Section III, Division 1, for Class 2 and 3 construction, as applicable, shall be met.

(*f*) This Case number and revision shall be identified on the Material Manufacturer's certification for the material.

TABLE 1 MAXIMUM ALLOWABLE STRESS VALUES

For Metal Temperature Not Exceeding, °F	Maximum Allowable Stress, ksi	
	Note (1)	Notes (1) and (2)
100	20.0	20.0
200	20.0	20.0
300	18.5	19.0
400	17.1	18.1
500	16.0	17.5
600	15.5	17.1
650	15.3	17.0
700	15.1	16.9
750	14.9	16.9

NOTES:
(1) For weld fittings, a factor of 0.85 shall be qualified.
(2) At temperatures above 100°F, the allowable stress values may exceed 62½% and may also reach 90% yield strength (0.2% offset) at temperature. This may result in a permanent strain of as much as 0.1%. When this amount of deformation is not acceptable, the designer should reduce the design stress to obtain an acceptable deformation.