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C. K. McCoy
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Georgia Power
the southern electric system

April 14, 1994

LCV-0226-B

Docket Nos. 50-424
50-425

TAC Nos. M81760
M88385

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

Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
REQUEST FOR ADDITIONAL INFORMATION
ASME CLASS 1 BLOCK FORGED TEES

The issue concerning ASME Section III, Class 1 block forged tees was first reported by Georgia Power Company (GPC) pursuant to the requirements of 10 CFR 21 and 50.55(e), on December 15, 1988. During a conference call on February 18, 1994, the staff requested additional information concerning the January 14, 1994 GPC letter on this subject.

Enclosed are responses to the staff's request for additional information relating to clarification of the material requirements of the forged fittings, and control of ASME Class 2 and 3 fittings in the warehouse. The block forged fittings which are the subject of this evaluation have been found to meet ASME Code requirements as documented in our previous letter. Any block forged fittings used in the future will also meet the applicable ASME Code requirements.

Sincerely,

C.K. McCoy
C. K. McCoy

CKM/JAB/gmb

Enclosure

cc: (See next page)

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U. S. Nuclear Regulatory Commission

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cc: Georgia Power Company
Mr. J. B. Beasley, Jr.
Mr. M. Sheibani
NORMS

U. S. Nuclear Regulatory Commission
Mr. S. D. Ebnetter, Regional Administrator
Mr. D. S. Hood, Licensing Project Manager, NRR
Mr. B. R. Bonser, Senior Resident Inspector, Vogtle

LCV-0226-B

ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION REGARDING ASME CLASS 1 BLOCK FORGED TEES

1. Request:

As stated in ANSI B16.9, fittings covered by this standard shall be in accordance with ASTM Specifications A234, A403, A420 or the corresponding ASME Specification. The Georgia Power Company response states that the base material for the ASME Section III Class 1 large bore tees is SA-182. And, there are other small tees with a base material of SA-479 and SA-312; as indicated in letter BS: 7694 dated November 14, 1988. Please reconcile.

Response:

The base material for the ASME Class 1 large bore block forged tees is SA-182. Other small bore fittings were supplied with base material as stated above. The ASME materials SA-182, SA-479 and SA-312 are permissible raw materials for SA-403 as shown in Table 1 (Permissible Raw Materials) and paragraph 4¹ of the 1974 edition of the ASME Boiler and Pressure Vessel Code², Section II, SA-403 Material Specification. A copy of this table and paragraph is included. Consequently, the use of raw materials SA-182, SA-479 and SA-312 is permissible.

2. Request:

Describe the controls necessary for ASME Class 2 and 3 forged fittings which may be in the warehouse.

Response:

The ASME Section III Class 2 and 3 fittings in the warehouse, have previously been verified to meet the requirements of the ASME Code, including the ANSI B16.9 dimensional and proof test requirements, and the Vogtle purchase order specifications.

¹Material SA-479 Type 304L was used for several 2 inch tees, and it meets the requirements of this paragraph.

²The Vogtle Electric Generating Plant ASME Section III Design Specification Matrix for Components, Parts, Appurtenances, and Piping systems, Document X4P0005 Revision 12; references the 1974 Edition through the Summer 1975 Addenda for the design specification and fabrication of Nuclear Service Piping.

ENCLOSURE (CONTINUED)

REQUEST FOR ADDITIONAL INFORMATION REGARDING
ASME CLASS 1 BLOCK FORGED TEES

The ASME Code does not require thermal transient and fatigue analyses or special considerations for the use of forged fittings in Class 2 and 3 systems, as long as the fittings meet the Code requirements.

If the Class 1, 2, or 3 fittings meet ANSI B16.9 dimensional and proof testing requirements, then ANSI B16.9/ASME Section III stress indices or stress intensification factors may be used. Further, the use of forged tees instead of extruded tees does not affect the allowables used in the stress analyses.

The allowables used in the Vogtle stress analyses are those for the lowest allowable pipe material listed in the Vogtle Piping Materials Classification document, drawing AX4DR001, for a particular pipe class. The pipe material allowables are equal to or lower than those of the fittings. Thus the allowables utilized were conservative.

Since the Class 1 tees have been justified/qualified as documented in GPC's previous letter, then the Class 2 and 3 fittings are also qualified for the following reasons:

- a) The ASME Section III stress indices were acceptable for use in the Class 1 evaluations, and no special factors were developed or required,
- b) Allowable stress values used in the analyses are conservative,
- c) Class 1 analyses are comparatively more strenuous. The basis for determining allowable stresses can be found in Appendices 1 and 2 of ASME Section II, part D. The Class 1 analysis is more sophisticated and consequently the analysis considers the specific weight and wall thickness variations that may be affected by block forged tees.

Therefore, since the ASME Code requires no different factors or analyses for forged fittings that meet the Code requirements, no special controls are required for ASME Section III Class 2 and 3 fittings which may be in the warehouse.

ENCLOSURE (CONTINUED)

REQUEST FOR ADDITIONAL INFORMATION REGARDING ASME CLASS 1 BLOCK FORGED TEES³

SA-403

SECTION II, PART A MATERIAL SPECIFICATIONS

4. Material

4.1 The steel for fittings may consist of blooms, billets, slabs, forgings, forging quality bars, plates, seamless or welded pipe, or tubes that conform to the requirements for melting process and chemical composition and are capable of conforming to the mechanical property requirements of the ASTM specification for the particular grades referred to in Table 1.

TABLE 1 Permissible Raw Materials

Marking ^a	Type of Material	Permissible Raw Materials ^a			
		Pipe	Plate	Bar	Forging
WP 304	304 (18-8)	A 312, Grade TP 304	A 240, Type 304	A276 Type 304	A 182, Grade F 304
WP 304H	304H (18-8), carbon 0.04 to 0.10 percent	A 312, Grade TP 304H	A 240, Type 304 ^e	A276 Type 304	A 182, Grade F 304H
WP 304L	304L (18-8), carbon 0.035 percent, max	A 312, Grade TP 304L ^e	A 240, Type 304L ^e	A276 Type 304L ^d	A 182, Grade F 304L
WP 309		A 312, Grade TP 309	A 240, Type 309S	A276 Type 309S	*
WP 310		A 312, Grade TP 310	A 240, Type 310S	A276 Type 310S	A 182, Grade F 310
WP 347	347 (18-8 Cb plus Ta)	A 312, Grade TP 347	A 240, Type 347	A276 Type 347	A 182, Grade F 347
WP 316	316 (18-8, Mo)	A 312, Grade TP 316	A 240, Type 316	A276 Type 316	A 182, Grade F 316
WP 316H	316H (18-8, Mo), carbon 0.04 to 0.10 percent	A 312, Grade TP 316H	A 240, Type 316 ^e	A276 Type 316 ^f	A 182, Grade F 316H
WP 316L	316L (18-8, Mo), carbon 0.035 percent, max	A 312, Grade TP 316L ^e	A 240, Type 316L ^e	A276 Type 316L ^d	A 182, Grade F 316L
WP 317	317 (18-8, Mo)	A 312, Grade TP 317	A 240, Type 317	^g	*
WP 321	321 (18-8, Ti)	A 312, Grade TP 321	A 240, Type 321	A276 Type 321	A 182, Grade F 321
WP 321H	321H (18-8, Ti), carbon 0.04 to 0.10 percent	A 312, Grade TP 321H	A 240, Type 321 ^e	A276 Type 321 ^f	A 182, Grade F 321H
WP 347H	347H (18-8, Cb + Ta), carbon 0.04 to 0.10 percent	A 312, Grade TP 347H	A 240, Type 347 ^e	A276 Type 347 ^f	A 182, Grade F 347H
WP 348	348 (18-8, Cb)	A 312, Grade TP 348	A 240, Type 348	A276 Type 348	A 182, Grade F 348

^a When fittings are of welded construction, the symbol shown shall be supplemented by the letter "W."

^b See 2.1.

^c Materials in accordance with Specifications A 358, Class 1, or A 376 may be specified when required as alternates to Specification A 312.

^d Except that the minimum tensile strength shall be 65,000 psi (448 MPa) and the minimum yield strength shall be 25,000 psi (172 MPa).

^e On pierced tubing the nickel may be 11.00 to 16.00 percent provided that the chromium is adjusted to ensure fully austenitic structure.

^f Except that the carbon content shall be 0.04 to 0.10 percent.

^g Same as Specification A 276, Type 316, except molybdenum shall be 3.00 to 4.00 percent and chromium shall be 18.00 to 20.00 percent.

* No ASTM specification is available. The chemical and mechanical properties shall be the same as the corresponding bar values.

³From the 1974 Edition of the ASME SA-403 Specification for Wrought Austenitic Stainless Steel Pipe Fittings.

⁴The 2 inch tees with base material of SA-479 meet the chemical and mechanical property requirements of ASTM Material A 276 as allowed for in paragraph 4 of the SA-403 Material Specification and are therefore acceptable (Type 304L).