Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

December 2, 2010
NOC-AE-10002619
File No.: G25
10 CFR 50.55a

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2746

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Amended Request for Relief from ASME Section XI Code Requirements for Steam Generator
Nozzle Non-Destructive Examination (RR-ENG-3-01) (TAC ME4766/ME4768)

Reference: Marco Ruvalcaba, STP Nuclear Operating Company, to NRC Document Control Desk, "Request for Relief from ASME Section XI Code Requirements for Steam Generator Nozzle Non-Destructive Examination," dated September 20, 2010 (NOC-AE-10002592) (ML102700174)

In accordance with the provisions of 10 CFR 50.55a(g)(6)(i), STP Nuclear Operating Company (STPNOC) requested relief from the ASME Section XI code nondestructive examination requirements applicable to the South Texas Project steam generator main steam nozzle inside-radius sections (referenced above). This amended request is in response to NRC reviewer questions. Amended and revised sections of the attached relief request are indicated in the margins. This submittal confirms that the subject Section XI volumetric examination is not intended for application to the STPNOC design configuration. Compliance with the Section XI examination requirement is impractical because the configuration of the nozzle precludes obtaining meaningful volumetric examination results.

There are no commitments in this correspondence.

STPNOC requests NRC review and approval of this relief request by March 1, 2011, to support implementation of the Unit 1 and Unit 2 Ten Year Inservice Inspection Plan for the third inspection interval.

If there are any questions, please contact either Mr. Philip Walker at 361-972-8392 or me at 361-972-7904.

Marco Ruvalcaba
Manager,
Test and Programs Engineering

PLW
Attachment: Amended Request for Relief from ASME Section XI Code Requirements for Steam Generator Nozzle Non-Destructive Examination (RR-ENG-3-01)

A047
NRR

STI: 32786355

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SOUTH TEXAS PROJECT
UNITS 1 AND 2
AMENDED REQUEST FOR RELIEF FROM ASME SECTION XI CODE REQUIREMENTS FOR STEAM GENERATOR NOZZLE NON-DESTRUCTIVE EXAMINATION
(RELIEF REQUEST RR-ENG-3-01)

A. Components Affected

(a) Component: Steam generator

(b) Description: Main steam nozzle, inside-radius section

(c) Class: ASME Code Class 2

Attached drawings 3 and 4 provide dimensional views of the steam generator nozzle configuration, including dimensions. There are no welds in the zone affected by this relief request. The steam generator head, including the main steam nozzle forging, is SA-508 Class 3A stainless steel, while the nozzle flow limiter insert providing the seven individual nozzles is forged from SB-564 stainless steel. Cladding on the inner boundary between the nozzle forging and the nozzles is 0.25-inch Type 304 stainless steel. An outlet nozzle is located at the top of each steam generator.

B. Applicable Code Requirement

The applicable code is ASME Section XI, 2004 Edition (no addenda).

ASME Section XI, Table IWC-2500-1, Code Category C-B, Item Number C2.22, requires that a volumetric examination of the inside-radius section of nozzles at terminal ends of piping runs be performed in accordance with Figure IWC-2500-4(a), (b), or (d) each inspection interval. The applicable nozzles include those welded to or integrally cast in vessels that connect to piping runs selected for examination under Examination Category C-F, excluding manways and handholes.

C. Basis for Relief from Code Requirements

In accordance with the provisions of 10CFR50.55a(g)(5)(iii), the STP Nuclear Operating Company (STPNOC) requests relief from the Section XI code requirement for a volumetric examination of the inside-radius section of the Unit 1 and 2 steam generator main steam outlet nozzles because compliance with the requirement is impractical. The configuration of the nozzle precludes obtaining meaningful volumetric examination results.

D. Alternative Examination:

No alternative examination is proposed in lieu of the volumetric examination for which relief is requested. Visual examination of the subject area is also precluded by the configuration.

E. Justification for Granting Relief

Each South Texas Project steam generator main steam nozzle is a one-piece forging with an insert that serves as a flow restrictor comprised of seven nozzles in parallel with the outlet

centerline. Due to their flow restrictor-type design, the South Texas Project steam generator main steam outlet nozzles do not contain a high-stress inside-radius section for which the Section XI volumetric examination is intended. As depicted in the attached drawings, the design configuration of the outlet nozzle does not correspond to Figures IWC-2500-4(a), (b), or (d) specified by Item Number C2.22, and does not have a "radius bend". Furthermore, the outlet nozzle configuration precludes a meaningful ultrasonic examination in the area of the inner radius. Because of this design configuration, a volumetric examination would not provide any meaningful results.

Figures 1 and 2 and the attached tables provide stress data for the steam generator outlet nozzle region. The exit ends of the nozzles are not part of this relief request.

These design considerations make the code-required inservice inspection impractical for application at the South Texas Project.

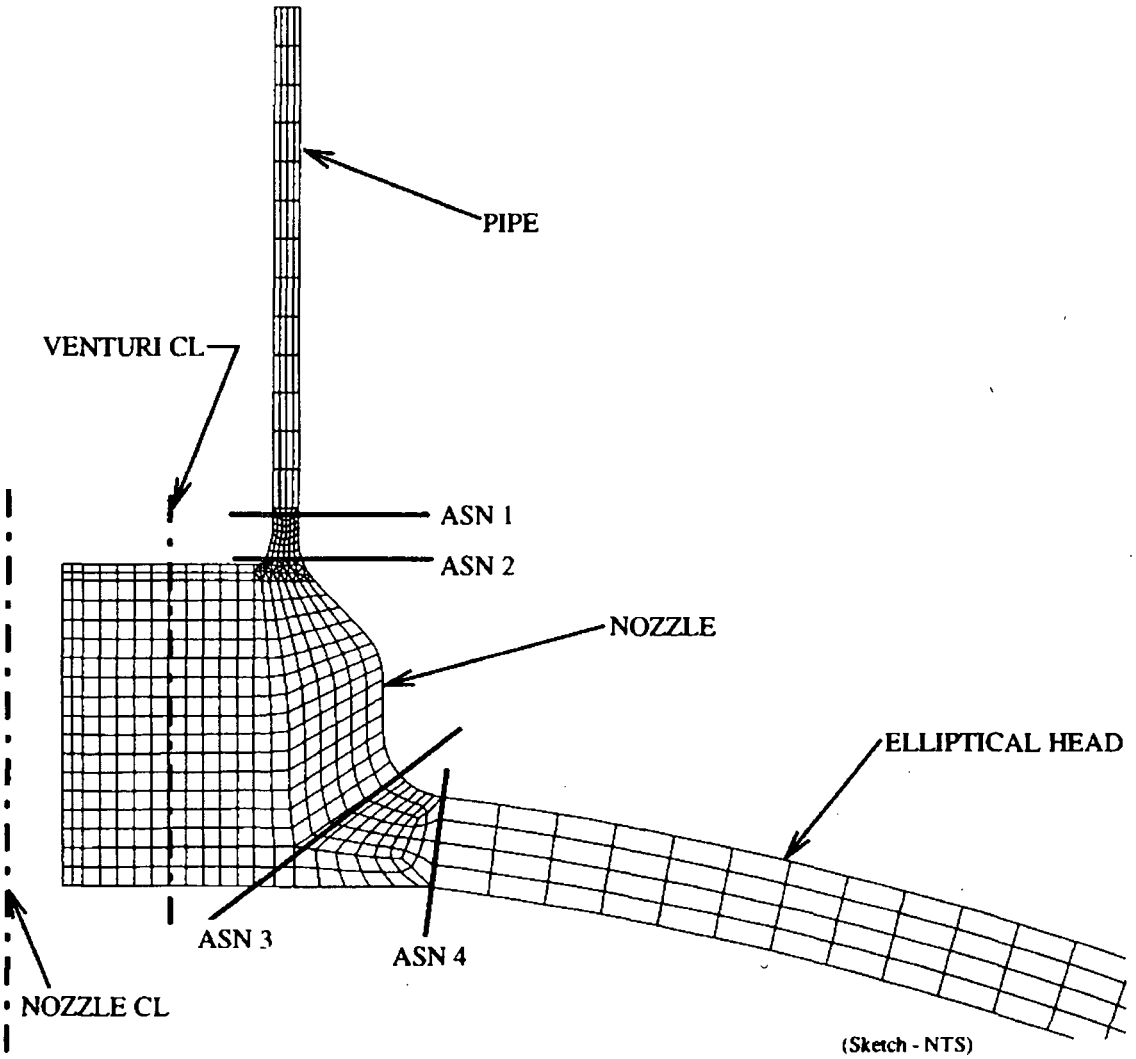
F. Implementation Schedule

STPNOC requests relief from ASME Section XI nondestructive examination requirements for the steam generator main steam nozzle inside radius sections for the duration of the third ten-year inservice inspection interval of Units 1 and 2. The third ten-year interval ends September 24, 2020, for Unit 1, and October 18, 2020, for Unit 2. The Nuclear Regulatory Commission is requested to review and approve this relief request by March 1, 2011, to support implementation of the Unit 1 and Unit 2 Ten Year Inservice Inspection Plan for the third interval.

G. Precedent

Relief from this examination requirement was previously approved by the NRC for the South Texas Project second 10-year interval inservice inspection program by safety evaluation dated December 15, 1999 (ML993570106) for Relief Request RR-ENG-2-2.

FIGURE 1: LIMITING STRESS LOCATIONS IN THE STEAM OUTLET NOZZLE, ELLIPTICAL HEAD AND UPPER SHELL



Stress Analysis Summary for the Steam Outlet Nozzle [1]

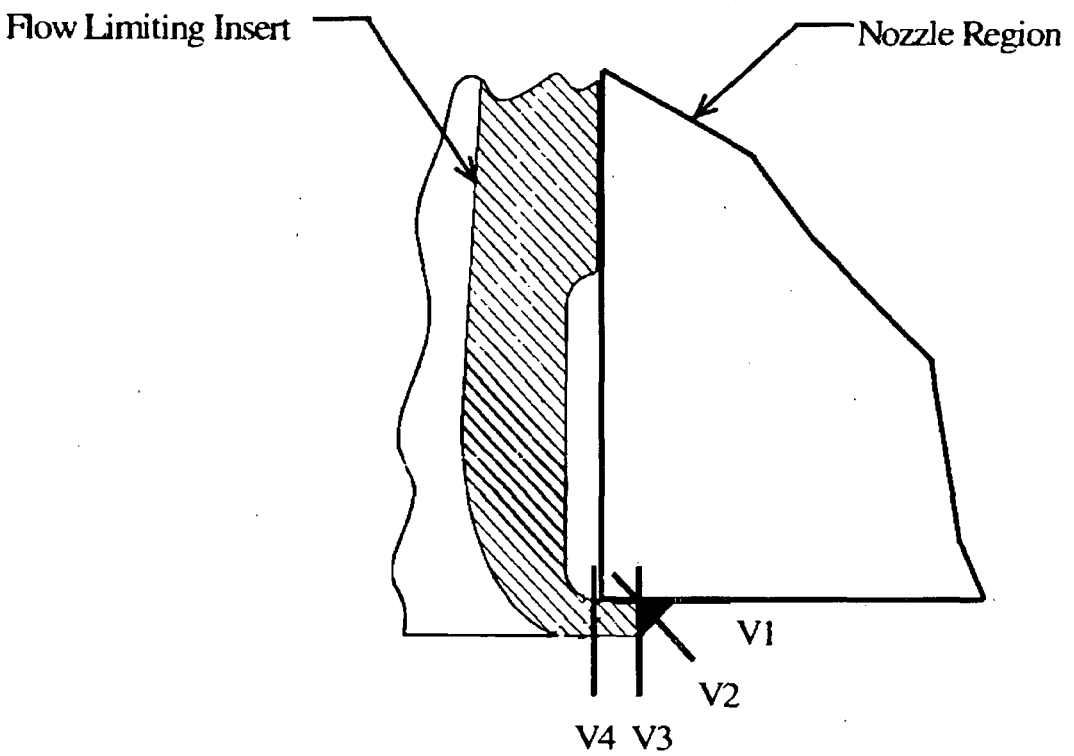
		ASN 1[2]			ASN 2[2]		
Loading Condition	**Stress Category**	**Stress (ksi)**	**Allow (ksi)**	**Ratio**	**Stress (ksi)**	**Allow (ksi)**	**Ratio**
Design	P_m	21.66	30.00	0.722	15.42	30.00	0.514
	P_L	-	-	-	-	-	-
	$P_m + P_b$	32.46	39.71	0.817	24.20	40.30	0.600
	Triaxial σ	23.10	120.0	0.193	15.79	120.0	0.132
Normal and Upset[3]	P_m	22.11	33.00	0.670	15.71	33.00	0.476
	P_L	-	-	-	-	-	-
	$P_m + P_b$	42.64	43.68	0.976	31.65	44.33	0.714
	$P_L + P_b + Q$	68.54	90.00	0.762	71.71	90.00	0.797
	Fatigue Usage	-	-	0.049	-	-	0.146
Faulted	P_m	37.82	63.00	0.600	27.13	63.00	0.431
	P_L	-	-	-	-	-	-
	$P_m + P_b$	67.57	83.38	0.810	50.78	84.64	0.573
Test	P_m	19.84	51.74	0.383	14.03	51.74	0.271
	P_L	-	-	-	-	-	-
	$P_m + P_b$	19.85	77.61	0.256	14.04	77.61	0.181
	Triaxial σ	27.52	120.0	0.229	18.77	120.0	0.156

		ASN 3[2]			ASN 4		
Loading Condition	**Stress Category**	**Stress (ksi)**	**Allow (ksi)**	**Ratio**	**Stress (ksi)**	**Allow (ksi)**	**Ratio**
Design	P_m	-	-	-	-	-	-
	P_L	33.72	45.00	0.749	32.82	45.00	0.729
	$P_m + P_b$	-	-	-	-	-	-
	Triaxial σ	48.60	120.0	0.405	62.53	120.0	0.521
Normal and Upset[3]	P_m	-	-	-	-	-	-
	P_L	38.65	49.50	0.781	38.32	49.50	0.774
	$P_m + P_b$	-	-	-	-	-	-
	$P_L + P_b + Q$	63.02	90.00	0.700	91.97[4]	90.00	1.022[4]
	Fatigue Usage	-	-	0.254	-	-	0.176
Faulted	P_m	-	-	-	-	-	-
	P_L	36.19	94.50	0.383	57.82	94.50	0.612
	$P_m + P_b$	-	-	-	-	-	-
Test	P_m	-	-	-	-	-	-
	P_L	39.97	77.61	0.515	36.84	77.61	0.475
	$P_m + P_b$	-	-	-	-	-	-
	Triaxial σ	53.51	120.0	0.446	67.52	120.0	0.563

Notes:

(1) The Emergency Conditions are bounded by the Test Conditions.
(2) Faulted 3 condition loads were applied for the primary stresses at these ASN locations.
(3) The primary stresses were evaluated for the Loss of Load "Upset" Transient at 1461 psig as required by NB-3223(a) of Reference [1].
(4) These stresses at acceptable based on paragraphs (a)-(f) of NB-3228.5 of Reference [1]. A K_c of 1.044 and 1.099 for ASN 4 and ASN 9, respectively was calculated and used in the fatigue evaluation.

FIGURE 2: LIMITING STRESS LOCATIONS IN THE STEAM OUTLET NOZZLE, FLOW LIMITING INSERT WELD REGION

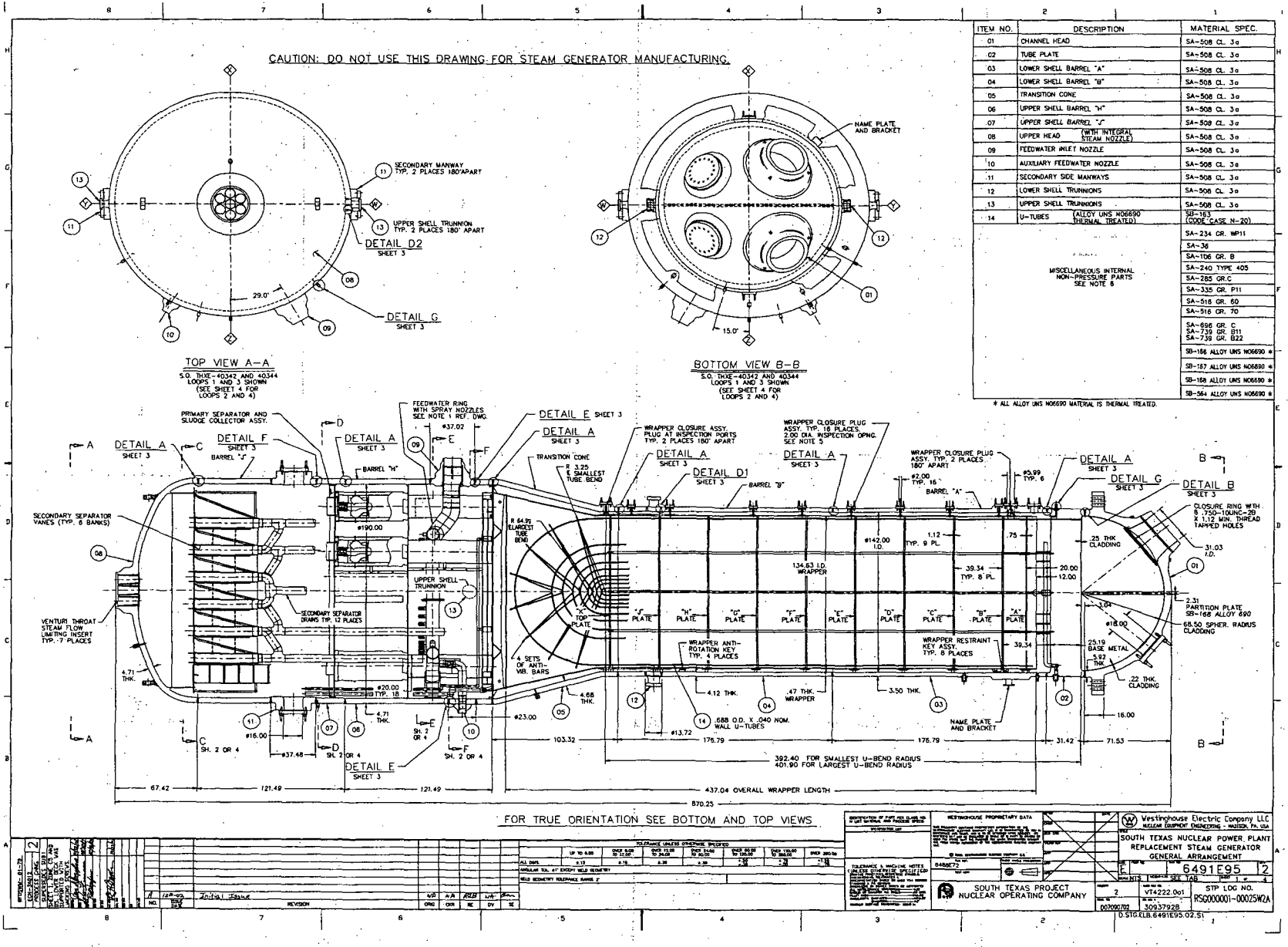


Stress Analysis Summary for the Steam Outlet Nozzle Flow Limiter Insert and Weld

		ASN V1			ASN V2		
Loading Condition	**Stress Category**	**Stress (ksi)**	**Allow (ksi)**	**Ratio**	**Stress (ksi)**	**Allow (ksi)**	**Ratio**
Design	P_m	-	-	-	-	-	-
	P_L	-	-	-	-	-	-
	$P_m + P_b$	-	-	-	-	-	-
	Triaxial σ	-	-	-	-	-	-
Normal and Upset	$P_L + P_b + Q$	53.62	78.00	0.687	61.97	78.00	0.794
	Fatigue Usage	-	-	0.353	-	-	0.353
Faulted	P_m	-	-	-	-	-	-
	P_L	-	-	-	-	-	-
	$P_m + P_b$	-	-	-	-	-	-
Test	P_m	-	-	-	-	-	-
	P_L	-	-	-	-	-	-
	$P_m + P_b$	-	-	-	-	-	-
	Triaxial σ	-	-	-	-	-	-

		ASN V3			ASN V4		
Loading Condition	**Stress Category**	**Stress (ksi)**	**Allow (ksi)**	**Ratio**	**Stress (ksi)**	**Allow (ksi)**	**Ratio**
Design	P_m	-	-	-	-	-	-
	P_L	-	-	-	-	-	-
	$P_m + P_b$	-	-	-	-	-	-
	Triaxial σ	-	-	-	-	-	-
Normal and Upset	$P_L + P_b + Q$	59.38	78.00	0.761	-	-	-
	Fatigue Usage	-	-	0.353	-	-	-
Faulted	P_m	-	-	-	18.73	55.92	0.335
	P_L	-	-	-	-	-	-
	$P_m + P_b$	-	-	-	-	-	-
Test	P_m	-	-	-	-	-	-
	P_L	-	-	-	-	-	-
	$P_m + P_b$	-	-	-	-	-	-
	Triaxial σ	-	-	-	-	-	-

FIGURE 3: STEAM GENERATOR CONFIGURATION



ITEM NO.	DESCRIPTION	MATERIAL SPEC.
01	CHANNEL HEAD	SA-508 CL. 3a
02	TUBE PLATE	SA-508 CL. 3a
03	LOWER SHELL BARREL "A"	SA-508 CL. 3a
04	LOWER SHELL BARREL "B"	SA-508 CL. 3a
05	TRANSITION CONE	SA-508 CL. 3a
06	UPPER SHELL BARREL "H"	SA-508 CL. 3a
07	UPPER SHELL BARREL "J"	SA-508 CL. 3a
08	UPPER HEAD (WITH INTEGRAL STEAM NOZZLE)	SA-508 CL. 3a
09	FEEDWATER INLET NOZZLE	SA-508 CL. 3a
10	AUXILIARY FEEDWATER NOZZLE	SA-508 CL. 3a
11	SECONDARY SIDE MANWAYS	SA-508 CL. 3a
12	LOWER SHELL TRUNNIONS	SA-508 CL. 3a
13	UPPER SHELL TRUNNIONS	SA-508 CL. 3a
14	U-TUBES (ALLOY UNS N06690 THERMAL TREATED)	SB-163 (CODE CASE N-20)
	MISCELLANEOUS INTERNAL NON-PRESSURE PARTS SEE NOTE 6	SA-234 GR. WP11
		SA-36
		SA-106 GR. B
		SA-240 TYPE 405
		SA-285 GR.C
		SA-335 GR. P11
		SA-516 GR. 60
		SA-516 GR. 70
		SA-696 GR. C SA-739 GR. B11 SA-739 GR. B22
		SB-166 ALLOY UNS N06690 *
		SB-167 ALLOY UNS N06690 *
		SB-168 ALLOY UNS N06690 *
		SB-564 ALLOY UNS N06690 *

* ALL ALLOY UNS N06690 MATERIAL IS THERMAL TREATED.

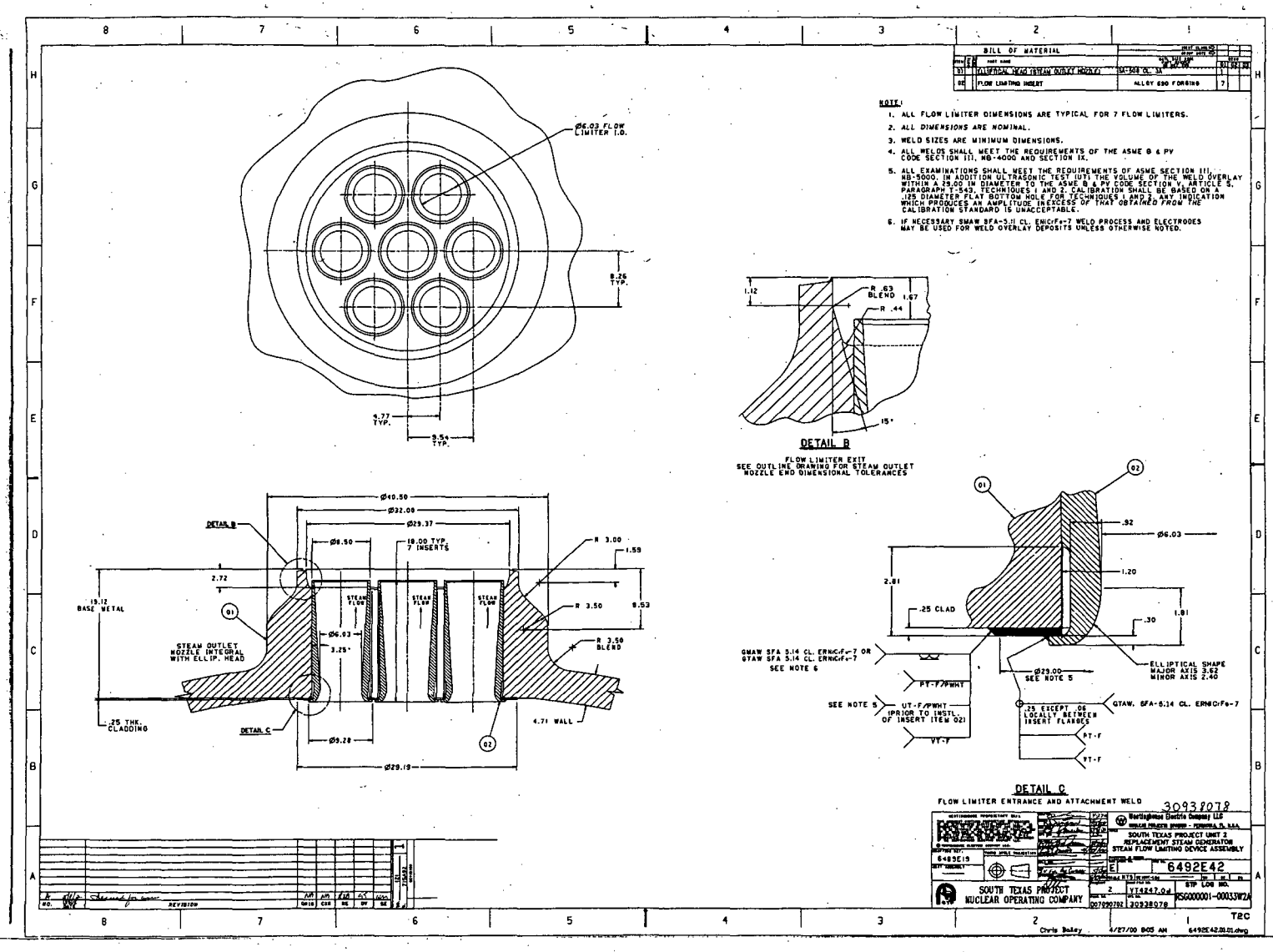



FIGURE 4: STEAM GENERATOR OUTLET NOZZLE CONFIGURATION