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Georgia Power
the southern electric system

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ELV-05217
003035

Docket Nos. 50-424
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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

VOGTLE ELECTRIC GENERATING PLANT
ADDITIONAL INFORMATION TO SUPPORT POWER UPRATING

Gentlemen:

Georgia Power Company letter ELV-03375 dated February 28, 1992, requested a revision to the operating license for Vogtle Electric Generating Plant (VEGP) Units 1 and 2 that would allow operation at an uprated power level. This letter presents additional information supporting the requested license change and the analysis in ELV-03375.

The additional information concerning the effects of operating at uprated power level on steam generator tubes (SGT) is contained in attachment 1. The change in the SGT minimum acceptable wall thickness from 0.014 inch to 0.016 inch was a result of operating with a reduced steam pressure. The calculation of the revised minimum wall thickness used the same methodology as was previously used. Operation at the uprated condition will result in a slight increase in the number of steam generator tubes that may be susceptible to antivibration bar (AVB) wear (5-10 tubes over the life of the plant). However, no significant increase in the rate of AVB wear is projected. Attachment 4 contains the results of steam generator tube inspections for VEGP.

The additional information concerning the calculation of peak containment pressure is included as attachment 2. The peak containment pressure currently in the Final Safety Analysis Report was calculated at a power level equivalent to the uprated power level reported in ELV-03375. The reductions in the calculated peak containment pressures were due to the use of revised methods for calculating the mass and energy releases to the containment, more accurate accounting of heat sinks, and taking credit for the fan coolers required to be operable according to the current Technical Specifications. The methodology for calculating the mass and energy release and the containment pressures has been previously used for plants of similar design.

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The revised calculation of the turbine trip event with conservative assumptions to evaluate the overpressure protection design is described in section 15.2.3.3. of appendix A to enclosure 4 of letter ELV-02166 dated November 29, 1990. Additional information concerning the overpressure protection evaluation is contained in attachment 3. The relief capacity of the safety valves has been evaluated to demonstrate that it is sufficient for the design basis event if reactor scram is initiated on the second safety grade signal from the reactor protection system.

The original licensing basis, the Vantage 5 licensing submittal, and the uprating license submittal determined values for the overpower delta T(OPDT) and overtemperture delta T(OTDT) setpoints using the methodology described in WCAP-8745-P-A. The setpoints were calculated to support the uprated power level in conjunction with the transition to Vantage 5 fuel as documented in ELV-02166. Subsequent to the calculation of the OPDT and OTDT setpoints in support of the Vantage 5 licensing submittal, a more conservative approach was used in the generation of the $F\Delta I$ function of the OTDT setpoint. This resulted in the revised values for the OTDT setpoint presented in the uprating licensing submittal (ELV-03375).

The evaluations contained in our letter ELV-03375 included the effects of operating at a reduced temperature (T hot reduction). The low temperature overpressure protection system and its associated setpoints will not be affected by T hot reduction. The evaluations and analyses performed in support of the application for this license amendment, and presented in our letters ELV-03375 and ELV-02166 including the inadvertent opening of a steam generator relief or safety valve and steam system piping failure utilized methods that have previously been accepted by the NRC for use on the Vogtle Electric Generating Plant (VEGP) or accepted for use by the NRC since the initial licensing of VEGP.

The maximum sump temperature at the time of switchover to recirculation was calculated to be 244°F, which is about 8°F different from the current licensing basis calculation. This value is recorded on page 3-200 of enclosure 5 of letter ELV-03375. This number was used in the reverification of piping stress analyses. Based on this value, it was concluded that the piping stresses will remain within their original acceptance limits.

The above information and the additional information in attachments 1, 2, 3, and 4 is supplemental to the information previously transmitted to the NRC and does not represent any changes to the previously submitted material.

Sincerely,

C. K. McCoy

CKM/HWM/clr
xc: (See next page)

Georgia Power

Attachments:
1. Steam Generator Tube Effects of Rerating
2. VEGP Containment Analyses
3. Pressurizer Safety Valve Sizing
4. Steam Generator Tube Inspection Results

xc: Georgia Power Company
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ATTACHMENT 1
STEAM GENERATOR TUBE EFFECTS OF RERATING

1. The minimum acceptable tube wall thickness for VEGP steam generator tubes for the rerated conditions was determined to be 0.016 inch using Regulatory Guide 1.121 guidelines. This compares to a minimum acceptable wall thickness of 0.014 inch for the current Vogtle design conditions. This increase in the minimum acceptable tube wall thickness is due to the decreased steam pressure and resultant increased differential pressure across the tubes for the rerated conditions. The same Regulatory Guide 1.121 methodology was used for both calculations.

2. Wear of the steam generator (SG) tubes at the antivibration bar (AVB) locations is principally dependent on the boundary conditions of the tube (i.e., whether the AVBs provide adequate support of the tubes), which is a statistical issue for the population of tubes affected by the AVBs. Operating experience has shown that a wide range of wear rates may exist among the tubes, and that only a small percentage of tubes will wear sufficiently to require plugging over the operating life of the SG. Although changes in operating conditions may affect the wear rate (change in through wall depth (TWD) on individual tubes), this effect is negligible compared to the variability in tube boundary conditions indicated by operating experience.

   Current projections for AVB wear are that no more than 0.6 percent of the tubes in the model F SG may require plugging over the operating life of the tubes. The operating experience of plants (including those which have uprated) with model F SGs is that plugging levels are below the plugging projection. The only exception is a foreign plant in which it was identified that the AVB/U-bend assembly was improperly assembled. Uprating is estimated to increase the number of tubes requiring plugging due to AVB wear by 10-16 percent; therefore, the upper limit of projected plugging for uprated conditions would be less than 0.7 percent of the tubes.

   For the operating model F SGs, in no case has progression of wear at the AVB intersections resulted in tube leakage. An individual tube has experienced a growth rate of approximately 40 percent between inspections over a 3-year time interval in a plant which was previously uprated. For the same plant, the average tube wear growth rate at the AVBs was 3.8 percent/year TWD over a 5-year interval. The structural limit (based on ASME Code criteria) for AVB wear is approximately 75 percent TWD. It is not expected that uprating will have significant effect on the wear growth rate on individual tubes or result in increased potential for through wall wear or primary to secondary leakage at the AVB intersections.

ATTACHMENT 2

VEGP CONTAINMENT ANALYSES

LOSS OF COOLANT ACCIDENT (LOCA)

Double Ended Hot Leg Guillotine (DEHLG)

The current licensing basis FSAR double ended hot leg guillotine break case resulted in a calculated containment peak pressure of 38.24 psig occurring at 18.3 seconds. The Vogtle rerating analysis provided a containment peak pressure of 36.54 psig occurring at 17.3 seconds. The essential differences between the two analyses are as follows:

1. The mass and energy release evaluation model used in performing the FSAR analysis of record is identified and documented in WCAP-8264-P-A. The evaluation model used in performing the VEGP rerate analyses is documented in WCAP-10325-P-A.

   a) Reactor coolant system temperature uncertainty 6°F versus 4°F (FSAR)
   b) RCS pressure 2250 + 50 psi versus 2250 + 30 psi (FSAR)

2. Revised containment structural heat sinks were modeled in completing the rerate analyses. These revised heat sinks were based upon a more accurate but conservative accounting which better reflects the current VEGP design as compared to the data available at the time when the FSAR analyses were being performed.

   a) Initial containment pressure assumption was 3.0 psig vs 0.3 psig (FSAR)

The duration of the transient (i.e., less than 30 seconds), the mass and energy release and amount of containment structural heat sinks strongly govern the calculated pressure profile.

Double ended Pump Suction Guillotine (DEPSG)

The current licensing basis FSAR double ended pump suction guillotine break case resulted in a calculated containment peak pressure of 35.62 psig occurring at 1108 seconds. The VEGP rerating analysis provided a containment peak pressure of 34.61 psig occurring at 17.6 seconds. The essential differences between the two analyses are as follows:

1. The mass and energy release evaluation model used in performing the FSAR analysis of record is identified and documented in WCAP-8264-P-A. The evaluation model used in performing the VEGP rerate analyses is documented in WCAP-10325-P-A.

   a) Reactor coolant system temperature uncertainty 6°F versus 4°F (FSAR)
   b) RCS pressure 2250 + 50 psi versus 2250 + 30 psi (FSAR)
   c) Steam/water mixing model
   d) 1979 ANS decay heat model

2. Revised containment structural heat sinks were modeled in completing the rerate analyses. These revised heat sinks were based upon a more accurate but conservative accounting which better reflects the current VEGP plant design as compared to the data available at the time when the FSAR analyses were being performed.

   a) Initial containment pressure assumption was 3.0 psig vs. 0.3 psig (FSAR)

3. Increased number of fan coolers available. The current FSAR analyses assumed two. The rerate analysis assumed four fan coolers available.

   Note that the calculated pressure profile has two peaks. The maximum calculated pressure for the rerated condition occurred at the first peak; it occurred at the second peak for the current licensing basis case.

Main Steam Line Break (MSLB) Containment Integrity

The current licensing basis limiting FSAR case for peak pressure was the 0.14 ft^2 split at hot shutdown case which resulted in a calculated containment peak pressure of 41.9 psig occurring at 1784 seconds. The VEGP rerating limiting case was the 0.22 ft^2 double ended rupture without entrainment at 30 percent power. This case produced a peak containment pressure of 32.7 psig occurring at 2177 seconds. The essential differences between the two analyses are as follows:

Containment Model Assumptions:

1. Revised containment structural heat sinks were modeled in completing the rerate analyses. These revised heat sinks were based upon a more accurate but conservative accounting which better reflects the current Vogtle plant design as compared to the data available at the time when the FSAR analyses were being performed.

2. Credit was taken for the operation of 4 of the 8 containment coolers since this is the number of coolers required to be operable by the Technical Specifications.

3. Initial containment pressure assumed was 3.0 psig vs. 0.3 psig (FSAR)

MSLB Mass and Energy Release Assumptions:

1. Main feedwater flow rate - The values used in the rerate analysis are in general greater than what was used in the FSAR analysis.

2. Auxiliary feedwater enthalpy - The current FSAR analysis used 429.5 Btu/lbm and the rerate analysis assumed 101 Btu/lbm.

VEGP CONTAINMENT ANALYSES

3. Decay Heat Model - The FSAR analysis used the 1971 model whereas the rerate analysis used the 1979 model.

In general, the containment model used to calculate the containment response following a MSLB inside containment was identical to that used for the LOCA containment integrity analyses. The lower calculated containment peak pressures for the rerate analysis were directly influenced by the increased number of containment fan coolers available (2 to 4) and improved structural heat sink modeling with respect to containment modeling.

ATTACHMENT 3

PRESSURIZER SAFETY VALVE SIZING

It is required that the pressurizer safety valves be designed with sufficient capacity to prevent the RCS pressure from exceeding 110 percent of design pressure following the worst reactor coolant system pressure transient. Justification for the overpressure protection (safety valve sizing) for Westinghouse PWRs is given by the generic analyses presented in WCAP-7769. These generic analyses addressed the full power load rejection resulting from a turbine trip with concurrent loss of main feedwater. The analyses assumed no credit is taken for operation of reactor coolant system relief valves, steam line relief valves, steam dump system, pressurizer level control system, pressurizer spray, or direct reactor trip on turbine trip. Reactor trip is initiated by the second safety-grade signal from the reactor protection system. The generic analyses were performed assuming a core power of 3411 MWt with a 2-percent power uncertainty.

With the recent VEGP uprating submittal, the NRC has questioned the applicability of WCAP-7769 due to the increased power level. Vogtle Electric Generating Plant specific analyses have been performed which demonstrate that the pressurizer safety valves are sufficiently sized at the uprated power (102 percent of 3579 MWt). The analyses demonstrated that when crediting the high pressurizer pressure reactor trip for the loss of load/turbine trip event, 73 percent of the total capacity of the pressurizer safety valves was required. For subsequent reactor trips (i.e., overtemperature ΔT, high pressurizer water level, and low-low steam generator water level), 81 percent of the total capacity of the pressurizer safety valves was required. With respect to the steam generator safety valves, the flow out of the valves did not exceed nominal plant steam flow at any time during the analyzed transients.

ATTACHMENT 4

STEAM GENERATOR TUBE

INSPECTION RESULTS

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 1 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	28	13											
28	13	5C+17.77	30	27	35								
**	24	14											
24	14	TSH+8.73	NI	15	NI								
**	28	18											
28	18	2H+1.42	NI	13	NI								
**	45	22											
45	22	AV2	NDD	14	17								
45	22	AV5	NDD	17	25								
**	47	24											
47	24	AV2	15	21	24								
47	24	AV4	15	21	27								
47	24	AV5	NF	13	18								
**	47	26											
47	26	AV2	NI	10	INR								
**	52	33											
52	33	AV2	NI	NDD	12								
52	33	AV3	NI	NDD	11								
**	54	35											
54	35	AV2	NI	18	20								
54	35	AV3	NI	NF	13								
54	35	AV4	NI	21	25								
54	35	AV5	NI	17	22								
54	35	AV6	NI	14	13								
**	40	44											
40	44	4H+18.90	16	INR	NI								
**	41	44											
41	44	AV2	NI	NF	15								
41	44	AV3	NI	18	21								
**	42	44											
42	44	6H+13.00	26	INR	NDD								
**	52	44											
52	44	AV4	NDD	15	19								
**	57	44											
57	44	AV5	NDD	17	23								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 1 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
57	44	AV6	NDD	11	11								
**	57	45											
57	45	AV3	NI	11	15								
57	45	AV5	NI	12	INR								
**	40	47											
40	47	AV3	NDD	13	15								
40	47	AV4	NDD	13	18								
**	34	49											
34	49	BPC+6.96	25	29	INR								
**	13	52											
13	52	3H+19.54	18	17	NI								
**	35	52											
35	52	BPC+10.30	22	22	MBM								
35	52	IC+31.90	MBM	23	MBM								
**	55	55											
55	55	AV2	NDD	20	29								
55	55	AV3	NDD	11	22								
55	55	AV4	NDD	18	29								
**	35	59											
35	59	BPC+18.20	11	INR	NI								
**	59	67											
59	67	7H+4.35	NI	UDS	NI								
**	55	73											
55	73	6H+32.48	NI	UDS	NI								
**	46	87											
46	87	AV1+20.93	NI	UDS	NI								
**	39	92											
39	92	3H+1.03	NI	34	UDS								
**	42	104											
42	104	AV6	NF	13	INR								
**	25	110											
25	110	AV5	NI	22	MBM								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 1 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	26	116											
26	116	AV6	NI	16	14								
**	24	117											
24	117	1C+15.31	NI	UDS	MBM								
24	117	2C+14.17	NI	26	INF								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 2 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	33	12											
33	12	2H+16.58	NI	UDS	NI								
**	17	19											
17	19	7C+0.00	NI	NI	UDS								
**	25	20											
25	20	AV5	NI	20	19								
**	17	27											
17	27	7C+0.00	NI	NI	UDS								
**	17	29											
17	29	7C+1.32	NI	UDS	NI								
17	29	7C-0.06	NI	UDS	NI								
**	14	33											
14	33	5H+14.05	NI	21	MBM								
**	41	33											
41	33	AV4	NI	15	20								
41	33	AV5	NI	17	19								
**	32	39											
32	39	1C+0.00	NI	UDS	NI								
**	29	41											
29	41	1C+5.21	NI	UDS	NI								
**	20	44											
20	44	3H+34.71	NI	15	NI								
**	05	45											
05	45	4C+6.11	NI	UDS	NI								
**	25	45											
25	45	1C+5.73	NI	UDS	NI								
**	25	46											
25	46	1C+5.44	NI	UDS	NI								
**	46	50											
46	50	AV1	NI	17	21								
46	50	AV2	NI	13	23								
46	50	AV4	NI	14	21								
46	50	AV5	NI	14	17								
46	50	AV6	NI	11	13								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 2 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	45	56											
45	56	AV2	NI	26	19								
**	32	60											
32	60	5C+6.26	NI	16	MBM								
**	08	61											
08	61	4H+4.36	NI	UDS	NI								
**	27	62											
27	62	6H+21.37	NI	21	MBM								
**	55	64											
55	64	AV5	NI	NDD	16								
**	49	69											
49	69	2C+17.73	NI	37	36								
**	53	83											
53	83	AV2	NI	19	21								
53	83	AV3	NI	12	14								
**	55	83											
55	83	AV5	NI	NDD	12								
**	54	85											
54	85	AV5	NI	28	24								
**	52	86											
52	86	AV2	NI	NF	10								
52	86	AV3	NI	NF	15								
52	86	AV4	NI	16	26								
52	86	AV5	NI	NF	12								
**	54	88											
54	88	AV5	NI	28	29								
**	43	90											
43	90	AV3	NI	22	26								
43	90	AV4	NI	23	28								
**	43	91											
43	91	AV2	NI	NDD	21								
43	91	AV3	NI	NDD	14								
43	91	AV5	NI	NDD	11								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 2 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
** 40	93												
40	93	AV2	NI	13	14								
** 50	94												
50	94	AV4	NI	NF	10								
50	94	AV5	NI	20	24								
** 47	99												
47	99	AV2	NI	11	10								
** 32	102												
32	102	6H+30.40	NI	34	UDS								
** 41	102												
41	102	AV5	NI	12	12								
** 42	102												
42	102	AV5	NI	10	19								
42	102	AV6	NI	NF	12								
** 43	102												
43	102	AV3	NI	28	33								
43	102	AV5	NI	15	22								
43	102	AV6	NI	NF	12								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 3 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	17	10											
17	10	7H+1.30	NI	37	MBM								
**	38	16											
38	16	AV2	NI	15	19								
38	16	AV5	NI	14	17								
38	16	AV6	NI	24	26								
**	39	17											
39	17	AV3	NI	16	19								
39	17	AV4	NI	NF	12								
39	17	AV6	NI	NF	11								
**	40	17											
40	17	AV3	NI	33	39								
40	17	AV4	NI	12	17								
40	17	AV5	NI	NF	15								
40	17	AV6	NI	NF	12								
**	37	18											
37	18	7H+1.07	NI	UDS	UDS								
**	42	27											
42	27	AV5	NI	NDD	15								
**	50	28											
50	28	AV4	NI	24	27								
50	28	AV5	NI	13	19								
50	28	AV6	NI	NF	13								
**	40	30											
40	30	AV5	NI	20	18								
**	39	35											
39	35	AV3	NI	13	INR								
**	40	35											
40	35	AV4	NI	NF	12								
**	45	40											
45	40	AV5	NI	20	14								
**	30	42											
30	42	AV6+16.94	NI	38	INR								
**	42	43											
42	43	AV5	NI	19	12								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 3 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	35	44											
35	44	AV6+17.57	NI	35	UDS								
**	42	50											
42	50	AV2	NI	NF	16								
42	50	AV3	NI	10	INF								
42	50	AV4	NI	22	24								
**	34	51											
34	51	TSH+5.23	NI	11	NI								
**	44	51											
44	51	7H+4.97	NI	31	34								
**	48	54											
48	54	AV6	NI	18	MBM								
**	45	58											
45	58	AV2	NI	NF	18								
45	58	AV3	NI	32	31								
45	58	AV4	NI	25	22								
45	58	AV6	NI	NF	17								
**	45	59											
45	59	AV2	NI	19	22								
45	59	AV3	NI	09	20								
45	59	AV4	NI	21	23								
45	59	AV5	NI	12	18								
**	21	62											
21	62	2C+8.29	NI	31	MBM								
**	45	62											
45	62	AV3	NI	10	15								
45	62	AV4	NI	15	23								
**	55	66											
55	66	7C+7.69	NI	UDS	NI								
55	66	7H+6.74	NI	UDS	NI								
**	59	66											
59	66	7H+7.54	NI	UDS	NI								
**	45	67											
45	67	2C+8.49	NI	28	MBM								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 3 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	55	67											
55	67	7C+7.33	NI	UDS	NI								
**	58	67											
58	67	7H+6.65	NI	UDS	NI								
**	55	68											
55	68	7C+7.29	NI	UDS	NI								
**	36	72											
36	72	7H+3.38	NI	UDS	NI								
**	49	72											
49	72	AV3	NI	25	24								
**	55	73											
55	73	7H+6.63	NI	UDS	NI								
**	55	82											
55	82	AV2	NI	11	19								
55	82	AV3	NI	17	29								
55	82	AV4	NI	NF	15								
55	82	AV5	NI	16	22								
**	55	83											
55	83	AV4	NI	26	30								
55	83	AV5	NI	19	27								
55	83	AV6	NI	16	17								
**	53	84											
53	84	AV3	NI	13	15								
53	84	AV4	NI	17	21								
**	21	85											
21	85	7C-1.15	NI	UDS	NDD								
**	50	85											
50	85	6H+25.15	NI	18	NI								
**	54	86											
54	86	AV6	NI	12	18								
**	53	88											
53	88	AV4	NI	23	30								
53	88	AV5	NI	NF	16								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 3 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	54	88											
54	88	AV1	NI	11									
**	45	92											
45	92	AV5	NI	12	INR								
**	49	94											
49	94	AV4	NI	17	25								
49	94	AV5	NI	14	21								
**	50	94											
50	94	AV3	NI	NF	15								
50	94	AV5	NI	11	18								
50	94	AV6	NI	NF	14								
**	47	97											
47	97	AV3	NI	NF	14								
47	97	AV4	NI	27	31								
**	48	97											
48	97	AV3	NI	23	30								
48	97	AV4	NI	19	24								
**	47	98											
47	98	AV3	NI	17	24								
47	98	AV4	NI	NF	19								
47	98	AV5	NI	14	25								
**	47	99											
47	99	AV4	NI	16	23								
47	99	AV5	NI	15	25								
**	31	101											
31	101	7C-0.67	NI	UDS	NI								
**	41	102											
41	102	AV2	NI	NF	12								
41	102	AV3	NI	20	24								
41	102	AV4	NI	11	16								
**	44	102											
44	102	AV4	NI	12	INR								
**	39	104											
39	104	AV5	NI	11	14								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 3 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	41	105											
41	105	AV1		NI	16	16							
41	105	AV2		NI	19	INR							
**	39	107											
39	107	AV2		NI	15	15							
**	36	110											
36	110	AV5		NI	13	14							
**	32	112											
32	112	AV1		NI	NDD	11							
32	112	AV5		NI	NDD	20							
32	112	AV6		NI	NDD	12							

****
* GROWTH RATE *
* UNIT : STEAM GENERATOR NO. 4 *
****

ROW	CLMN	LOCATION	1R.	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	27	09											
27	09	AV5	NDD	14	14								
**	24	18											
24	18	3H+1.10	10	MBM	NI								
**	17	23											
17	23	7C+1.58	NI	UDS	NI								
**	17	24											
17	24	7C+1.70	NI	UDS	NI								
**	05	31											
05	31	3H+11.78	17	MBM	NI								
**	31	35											
31	35	5C+28.10	16	INR	NI								
**	37	35											
37	35	AV4+8.30	16	MBM	NI								
**	41	36											
41	36	3H+15.40	21	MBM	NDD								
**	44	39											
44	39	5H+1 .74	26	MBM	NDD								
**	50	40											
50	40	AV2	NI	NF	12								
50	40	AV3	NI	14	19								
50	40	AV4	NI	21	27								
50	40	AV5	NI	NF	11								
**	43	42											
43	42	5C+0.70	19	INF	NI								
**	20	43											
20	43	5H+16.65	NI	UDS	NI								
**	45	60											
45	60	4C+22.01	13	14	NI								
**	35	61											
35	61	1H+14.40	17	MBM	NI								
**	47	64											
47	64	7C+5.37	NI	UDS	NI								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 4 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	50	72											
50	72	5C+15.20	18	INF	NI								
**	57	75											
57	75	3H+14.06	NDD	26	MBM								
**	52	77											
52	77	5H+2.60	18	MBM	NI								
**	11	78											
11	78	TSC+39.60	15	INR	NI								
11	78	TSH+32.40	19	INR	NI								
**	40	87											
40	87	AV4	NDD	10	15								
40	87	AV5	NDD	11	16								
**	44	96											
44	96	AV3	NI	21	17								
44	96	AV4	NI	11	15								
44	96	AV6	NI	10	10								
**	37	101											
37	101	AV5+4.20	17	MBM	NI								
**	42	102											
42	102	AV3	18	17	19								
42	102	AV4	28	17	18								
**	43	102											
43	102	AV3	19	22	23								
43	102	AV4	NF	17	24								
**	44	102											
44	102	AV3	25	35	39								
44	102	AV4	NF	18	29								
44	102	AV5	16	28	29								
**	38	107											
38	107	AV3	NF	17	17								
38	107	AV4	NF	12	13								
38	107	AV5	16	18	21								
**	37	108											
37	108	AV3	NI	19	21								
37	108	AV5	NI	NF	15								

****
* GROWTH RATE *
* UNIT 1 STEAM GENERATOR NO. 4 *
****

ROW	CLMN	LOCATION	1R1	1R2	1R3	1R4	1R5	1R6	1R7	1R8	1R9	1R10	GRTHRTE
**	27	113											
27	113	6C+36.35	NI	24	NF								
**	21	117											
21	117	2C+25.90	17	INR	NI								
**	17	119											
17	119	5H+26.10	16	INR	NI								

****
* GROWTH RATE *
* UNIT 2 STEAM GENERATOR NO. 1 *
****

ROW	CLMN	LOCATION	2R1	2R2	2R3	2R4	2R5	2R6	2R7	2R8	2R9	2R10	GRTHRTE
**	30	10											
30	10	AV6	10	13									
**	31	12											
31	12	AV5	12	INR									
**	37	15											
37	15	BPH+10.60	18	NI									
**	36	17											
36	17	AV2	NF	14									
36	17	AV6	13	14									
**	42	20											
42	20	AV2	NDD	12									
**	34	25											
34	25	AV1	15	15									
**	25	26											
25	26	1C+0.00	DI	MBM									
**	48	26											
48	26	AV3	NF	12									
48	26	AV4	17	18									
**	48	28											
[illegible]	28	AV2	NDD	10									
**	50	28											
50	28	AV3	13	16									
50	28	AV4	NF	17									
50	28	AV6	NF	11									
**	53	33											
53	33	AV4	13	14									
**	54	41											
54	41	6C+26.26	27	23									
54	41	6C+27.24	31	29									
**	57	53											
57	53	AV6	NDD	11									
**	47	65											
47	65	7C-1.12	28	29									

****
* GROWTH RATE *
* UNIT 2 STEAM GENERATOR NO. 1 *
****

ROW	CLMN	LOCATION	2R1	2R2	2R3	2R4	2R5	2R6	2R7	2R8	2R9	2R10	GRTHRTE
**	54	86											
54	86	1H+1.53	17	17									
**	42	104											
42	104	AV2	NDD	14									
**	27	105											
27	105	TSC+10.45	25	MBM									

****
* GROWTH RATE *
* UNIT 2 STEAM GENERATOR NO. 2 *
****

ROW	CLMN	LOCATION	2R1	2R2	2R3	2R4	2R5	2R6	2R7	2R8	2R9	2R10	GRTHRTE
**	34	12											
34	12	7H+3.51	RPC	UDS									
**	39	17											
39	17	7H+2.49	16	NDD									
**	42	19											
42	19	AV3	13	INR									
**	43	20											
43	20	AV2	NDD	13									
**	43	32											
43	32	7C+0.44	12	NI									
**	54	38											
54	38	AV4	14	13									
**	39	46											
39	46	6H+36.67	34	30									
**	30	47											
30	47	6H+23.22	14	NI									
**	59	55											
59	55	AV1	15	11									
59	55	AV4	14	11									
**	43	64											
43	64	AV1	20	17									
**	47	65											
47	65	AV4	16	12									
**	07	66											
07	66	6H+17.84	16	NI									
**	59	66											
59	66	AV1	15	INF									
**	50	67											
50	67	AV2	16	24									
50	67	AV4	NF	16									
**	58	69											
58	69	AV4	MBM	14									

****
* GROWTH RATE *
* UNIT 2 STEAM GENERATOR NO. 2 *
****

ROW	CLMN	LOCATION	2R1	2R2	2R3	2R4	2R5	2R6	2R7	2R8	2R9	2R10	GRTHRTE
**	57	71											
57	71	6H+22.05	18	INR									
**	53	86											
53	86	AV3	NF	12									
53	86	AV4	NF	12									
53	86	AV5	25	29									
**	41	91											
41	91	6H+10.11	13	NI									
**	25	97											
25	97	6H-4.02	10	NI									
**	48	98											
48	98	AV3	NF	21									
48	98	AV4	33	33									

****
* GROWTH RATE *
* UNIT 2 STEAM GENERATOR NO. 3 *
****

ROW	CLMN	LOCATION	2R1	2R2	2R3	2R4	2R5	2R6	2R7	2R8	2R9	2R10	GRTHRTE
**	34	13											
34	13	AV5	13	11									
**	32	15											
32	15	AV2	NDD	15									
**	32	16											
32	16	AV2	14	INR									
**	34	17											
34	17	6C+35.03	29	28									
**	44	21											
44	21	AV2	14	12									
44	21	AV4	17	14									
**	32	22											
32	22	6C+18.14	20	19									
32	22	6C+19.28	14	12									
**	45	22											
45	22	AV3	15	14									
**	47	24											
47	24	AV2	13	15									
47	24	AV4	11	11									
**	47	25											
47	25	AV2	14	16									
**	49	39											
49	39	6H+33.97	32	30									
**	31	61											
31	61	2C+23.19	10	NI									
**	38	62											
38	62	AV6+4.73	20	ANR									
**	49	65											
49	65	6H+10.67	12	NI									
**	47	66											
47	66	6H+11.51	23	UDS									
**	41	72											
41	72	6H+14.77	10	NI									

```
          ****************************************
          *              GROWTH RATE             *
          *   UNIT 2 STEAM GENERATOR NO. 3       *
          ****************************************

ROW CLMN LOCATION  2R1 2R2 2R3 2R4 2R5 2R6 2R7 2R8 2R9 2R10 GRTHRTE
*** **** ********  *** *** *** *** *** *** *** *** *** **** ********


**  41   80
 41   80  6H+38.70   14  NI
```

****
* GROWTH RATE *
* UNIT 2 STEAM GENERATOR NO. 4 *
****

ROW	CLMN	LOCATION	2R1	2R2	2R3	2R4	2R5	2R6	2R7	2R8	2R9	2R10	GRTHRTE
**	07	05											
07	05	5H+30.33	07	NI									
**	13	15											
13	15	5H+20.15	24	23									
**	44	21											
44	21	AV2	NF	12									
44	21	AV3	17	18									
44	21	AV5	NF	12									
44	21	AV6	NF	11									
**	01	23											
01	23	TSC+5.63	23	MBM									
**	48	25											
48	25	AV3	NDD	16									
48	25	AV4	NDD	12									
48	25	AV5	NDD	19									
**	52	33											
52	33	AV5	20	20									
**	54	35											
54	35	AV5	NDD	21									
54	35	AV6	NDD	13									
**	54	37											
54	37	AV6	NDD	12									
**	35	38											
35	38	6H+37.78	29	32									
**	53	43											
53	43	AV3	18	21									
53	43	AV5	NF	13									
**	52	50											
52	50	TSH+11.96	23	MBM									
**	50	55											
50	55	AV3	NF	12									
**	44	59											
44	59	AV3	NDD	11									

****
* GROWTH RATE *
* UNIT 2 STEAM GENERATOR NO. 4 *
****

ROW	CLMN	LOCATION	2R1	2R2	2R3	2R4	2R5	2R6	2R7	2R8	2R9	2R10	GRTHRTE
**	39	64											
39	64	AV3	16	20									
**	53	66											
53	66	5C+1.36	16	NI									
**	50	67											
50	67	AV4	NDD	18									
**	59	67											
59	67	AV3	17	16									
**	51	73											
51	73	AV2	21	28									
51	73	AV3	14	25									
51	73	AV4	15	22									
51	73	AV5	14	24									
51	73	AV6	NF	13									
**	31	83											
31	83	4H+32.55	23	MBM									
**	43	83											
43	83	AV3	NF	19									
43	83	AV4	16	24									
**	49	83											
49	83	AV6+1.47	15	NI									
**	44	85											
44	85	AV3	NDD	10									
**	45	91											
45	91	7H+4.57	RPC	UDS									
**	30	94											
30	94	6H+37.00	10	NI									
**	22	105											
22	105	7H+1.98	RPC	UDS									
**	21	115											
21	115	7C+0.71	UDS	UDS									
**	10	121											
10	121	5C+34.67	UDS	UDS									

01/07/93

****
PLUGGED TUBES
****

U	SG	#	ROW	CLM	OTG	DATE	SPT	INCHS	%	HEAT NUMBER	REMARKS
**	UNIT 1 SG 1										
1	1		28	37	1	10-88	4C	38.00	39	NX2387	I-600
1	1		28	37	1	10-88	5H	07.00	39	NX2387	I-600
1	1		28	37	3	09-91				NX6977HK	I-690,REPLACED I-600
**	UNIT 1 SG 2										
1	2		54	87	2	03-90	5AV	00.00	45	NX6441HK	I-690
1	2		53	90	2	03-90	3AV	00.00	38	NX6441HK	I-690
1	2		50	95	2	03-90	5AV	00.00	39	NX6441HK	I-690
1	2		40	106	2	03-90	3AV	00.00	39	NX6441HK	I-690
**	UNIT 1 SG 3										
1	3		3	33	0					UNKNOWN	AT W SHOP
1	3		23	108	0					UNKNOWN	AT W SHOP
**	UNIT 1 SG 4										
1	4		2	23	0					UNKNOWN	AT W SHOP
1	4		32	67	0					UNKNOWN	AT W SHOP
1	4		32	77	0					UNKNOWN	AT W SHOP
1	4		32	82	0					UNKNOWN	AT W SHOP
**	UNIT 2 SG 1										
2	1		1	1	P	08-88	TEC	04.37	89	NX2387	I-600
2	1		1	1	P	08-88	TEC	05.41	51	NX2387	I-600
2	1		27	42	P	08-88	TSH	00.00	SM	NX2387	I-600
2	1		27	42	P	08-88	TSH	00.35	TH	NX2387	I-600
**	UNIT 2 SG 2										
2	2		51	32	0					UNKNOWN	AT W SHOP
2	2		2	48	0					UNKNOWN	AT W SHOP
2	2		5	48	0					UNKNOWN	AT W SHOP
2	2		16	103	0					UNKNOWN	AT W SHOP
**	UNIT 2 SG 3										
2	3		25	102	0					UNKNOWN	AT W SHOP
**	UNIT 2 SG 4										
2	4		3	35	0					UNKNOWN	AT W SHOP
2	4		12	36	0					UNKNOWN	AT W SHOP
2	4		8	56	0					UNKNOWN	AT W SHOP
2	4		16	57	0					UNKNOWN	AT W SHOP
2	4		48	64	0					UNKNOWN	AT W SHOP
2	4		23	67	0					UNKNOWN	AT W SHOP
2	4		22	90	0					UNKNOWN	AT W SHOP
2	4		24	93	0					UNKNOWN	AT W SHOP