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FACIL:50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylva 05000387
AUTH.NAME AUTHOR AFFILIATION
CURTIS,N.W. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Responds to NRC 830203 & 0330 questions re proposed SRP Amend 19.No need exists to orbitrarily increase initial power to account for uncertainty in power level,Errato sheet & transient summary of feedwater controller failure encl.

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Norman W. Curtis
Vice President-Engineering & Construction-Nuclear
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APR 28 1983

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
RESPONSE TO NRC QUESTIONS ON PROPOSED AMENDMENT 19
ER 100450 FILE 841-8
PLA-1640 Docket No. 50-387

References:
1. PLA-1506, N. W. Curtis to A. Schwencer, February 3, 1983
2. Telecon on March 30, 1983 between NRC, GE, and PP&L
3. General Electric Thermal Analysis Basis Data, Correlation and Design Application, NEDO-10958-A and NEDE-10958-P-A, January 1977
4. Process Computer Performance Evaluation Accuracy, NEDO-20340, June 1974, Amendment 1, December 1974, and Amendment 2, September 1975
5. General Electric Boiling Water Reactor Extended Load Line Limit Analysis for Susquehanna Steam Electric Station Unit 1, NEDO-22128, May 1982
6. Safety Evaluation for the General Electric Topical Report. Qualification of the One Dimensional Core Transient Model for Boiling Water Reactors, NEDO-24154 and NEDE-24154-P, Volumes I, II, III, NRC, June 1980

Dear Mr. Schwencer:

The following discussion is provided in order to answer NRC staff questions relating to proposed amendment 19 (References 1 and 2).

NUREG-0800 (The Standard Review Plan) recommends that transient analyses account for power level uncertainties and states that an initial power of 102% of rated is acceptable. General Electric has historically analyzed design basis transients at 105% steam flow (~104.5% power) because this is the design capability of the plant.

A001

These design basis calculational results have been used to conservatively support the licensing of GE plants at rated conditions. For analyses performed to improve plant operational flexibility (e.g., LLLA), GE has always performed the transient calculations at the nominal power level. During the NRC review of the SSES-1 LLLA, (Reference 5) S. Sun of the NRC staff questioned the use of nominal power levels, citing the design basis point and the SRP recommendations. As described in the following paragraph, an uncertainty allowance is included in all transient/GETAB analyses.

Over the years there has been a good deal of confusion regarding the GE design basis (105% steam flow) and many have concluded that its purpose is to account for uncertainties in the plant power level. This is not true. All uncertainties, including those affecting initial power, are taken into account in both the GETAB analysis (References 3 & 4) or the ODYN (Reference 6) analysis.

Specifically, all the parameters which affect the thermal power calculation are considered in the GETAB uncertainty analysis and are included in the determination of the MCPR safety limit. The ODYN uncertainty analysis also considers initial power level uncertainty in the determination of transient event ΔCPRs. Thus, there is no need to arbitrarily increase the initial power to account for uncertainty in power level.

Attached for your information is an errata sheet for Reference 5; the changes have no effect on proposed amendment 19.

If there are any further questions, please contact us.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

Attachment

cc: R. L. Perch - USNRC
S. Sun - USNRC

NUCLEAR ENERGY BUSINESS OPERATIONS • GENERAL ELECTRIC COMPANY
SAN JOSE, CALIFORNIA 95125

GENERAL ELECTRIC

APPLICABLE TO:
PUBLICATION NO. NEDO-22128
T. I. E. NO. 82NED051
TITLE GE BWR Extended Load Line Limit Analysis for Susquehanna Steam Electric Station Unit 1
ISSUE DATE May 1982

ERRATA And ADDENDA SHEET

NO. 1
DATE April 1983

NOTE: Correct all copies of the applicable publication as specified below.

ITEM	REFERENCES (SECTION, PAGE PARAGRAPH, LINE)	INSTRUCTIONS (CORRECTIONS AND ADDITIONS)
1.	Page 3-21	Replace with revised Page 3-21.

Table 3-8

TRANSIENT SUMMARY--FEEDWATER CONTROLLER FAILURE

Plant	Analysis	Initial Power (% NBR)	Initial Flow (% NBR)	$\hat{\phi}$ (% initial)	$\hat{Q}/A$ (% initial)	$\hat{P}_{sl}$ (psig)	$\hat{P}_v$ (psig)	ΔCPR 7x7	8x8	8x8R	P8x8R
A	R	104	100	243	114	1152	1200	0.18	0.25	0.25	--
A	R	100	94	241	115	1150	1193	0.19	0.26	0.26	--
A	R	85	61	184	111	1138	1160	0.13	0.17	0.17	--
B	R	104	100	144	106	1153	1187	--	0.09	0.09	--
B	R	100	94	134	107	1148	1179	--	0.09	0.10	--
B	R	85	61	136	109	1137	1156	--	0.13	0.13	--
C	R	104	100	109	105	1028	1076	0.05	0.06	0.06	--
C	R	100	94	112	110	1022	1067	0.06	0.07	0.08	--
C	R	85	61	117	111	996	1021	0.09	0.10	0.11	--
D	R	104	100	185	111	1147	1193	0.11	0.16	0.16	--
D	R	100	91	174	115	1142	1181	0.09	0.13	0.13	--
D	R	85	61	176	116	1127	1149	0.10	0.12	0.12	--
E	R	104	100	211	111	1146	--	0.14	0.21	--	--
E	R	100	92	188	106	1142	--	0.11	0.17	--	--
E	R	85	61	133	109	1127	--	0.09	0.11	--	--
F	Ø	100	100	214	105	1031	1062	--	--	--	--
F	Ø	100	111	181	104	1021	1062	--	--	--	--
F[a]	Ø	100	111	180	105	1021	1063	--	--	--	--
G	Ø	104	100	293[b]	114	1151	1182	--	--	0.15	0.16
G	Ø	100	94	274[b]	114	1139	1172	--	--	0.15	0.17
G	Ø	91	75	256[b]	114	1133	1160	--	--	0.15	0.16
G	Ø	85	61	207[b]	113	1128	1145	--	--	0.13	0.14
G	Ø	104	105	286[b]	114	1143	1177	--	--	0.16	0.17
G[a]	Ø	105	100	317[b]	119	1148	1177	--	--	0.17	0.18
G[a]	Ø	105	105	125[b]	112	1111	1134	--	--	0.08	0.08
G[a]	Ø	95	105	311[b]	121	1129	1158	--	--	0.21	0.23
H	Ø	100	100	518[b]	124	1169	1201	--	0.33	0.34	0.37
H	Ø	100	92	488[b]	123	1169	1197	--	0.30	0.30	0.33
H	Ø	100	87	465[b]	122	1170	1194	--	0.29	0.30	0.32
H	Ø	92	75	345[b]	118	1166	1184	--	0.23	0.24	0.26
H	Ø	85	61	230[b]	116	1147	1170	--	0.17	0.19	0.21
K	Ø	104	100	314[b]	114	1135	1172	0.09	0.13	0.14	0.16
K	Ø	100	94	282[b]	116	1131	1165	0.10	0.14	0.14	0.15
L	Ø	104	100	147[b]	108	1137	1161	0.08	--	0.11	0.11
L	Ø	100	94	191[b]	110	1128	1158	0.07	--	0.11	0.12
L	Ø	91	75	188[b]	110	1124	1144	0.07	--	0.11	0.12
L	Ø	85	61	146[b]	109	1119	1138	0.06	--	--	--
L	Ø	104	105	198[b]	110	1136	1166	0.07	--	0.11	0.12
L[a]	Ø	105	105	234[b]	115	1131	1163	0.11	--	0.15	0.16
L[a]	Ø	105	100	126[b]	111	1107	1128	0.06	--	0.08	0.08
M	Ø	104	100	362*	118	1173	1216	--	0.17	0.17	0.19
M	Ø	100	94	332*	118	1170	1210	--	0.16	0.17	0.18
SSES-1	Ø	105	100	264	115	1159	1188	--	--	--	0.16
SSES-1	Ø	100	87	266	115	1152	1172	--	--	--	0.16

[a]Feedwater temperature reduction

[b]% nominal rated

Table 3-9

TRANSIENT SUMMARY--HIGH PRESSURE COOLANT INJECTION

Plant	Analysis	Initial Power (% NBR)	Initial Flow (% NBR)	$\hat{\phi}$ (% initial)	$\hat{Q}/A$ (% initial)	$\hat{P}_{sl}$ (psig)	$\hat{P}_v$ (psig)	ΔCPR 7x7	ΔCPR 8x8	ΔCPR 8x8R	ΔCPR P8x8R
A	R	104	100	120	113	1017	1068	0.10	0.12	0.12	--
A	R	100	94	123	114	1012	1058	0.11	0.14	0.14	--
A	R	85	61	119	118	995	1021	0.10	0.12	0.12	--
B	R	104	100	113	109	1007	1063	--	0.10	0.10	--
B	R	100	94	115	111	1002	1053	--	0.09	0.09	--
B	R	85	61	117	115	987	1018	--	0.13	0.13	--
C	R	104	100	122	113	1018	1068	0.11	0.14	0.14	--
C	R	100	94	123	117	1012	1057	0.12	0.15	0.15	--
C	R	85	61	120	111	993	1018	0.14	0.16	0.16	--
D	R	104	100	115	111	1010	1065	0.10	0.12	0.12	--
D	R	100	91	115	111	1003	1052	0.09	0.09	0.10	--
D	R	85	61	117	120	987	1019	0.12	0.13	0.13	--
E	R	104	100	--	--	--	--	0.12	0.14	--	--
E	R	100	92	--	--	--	--	0.12	0.14	--	--
E	R	85	61	--	--	--	--	0.16	0.18	--	--

Table 3-9

TRANSIENT SUMMARY--HIGH PRESSURE COOLANT INJECTION

Plant	Analysis	Initial Power (% NBR)	Initial Flow (% NBR)	$\hat{\phi}$ (% initial)	$\hat{Q}/A$ (% initial)	$\hat{P}_{sl}$ (psig)	$\hat{P}_v$ (psig)	ΔCPR 7x7	ΔCPR 8x8	ΔCPR 8x8R	ΔCPR P8x8R
A	R	104	100	120	113	1017	1068	0.10	0.12	0.12	--
A	R	100	94	123	114	1012	1058	0.11	0.14	0.14	--
A	R	85	61	119	118	995	1021	0.10	0.12	0.12	--
B	R	104	100	113	109	1007	1063	--	0.10	0.10	--
B	R	100	94	115	111	1002	1053	--	0.09	0.09	--
B	R	85	61	117	115	987	1018	--	0.13	0.13	--
C	R	104	100	122	113	1018	1068	0.11	0.14	0.14	--
C	R	100	94	123	117	1012	1057	0.12	0.15	0.15	--
C	R	85	61	120	111	993	1018	0.14	0.16	0.16	--
D	R	104	100	115	111	1010	1065	0.10	0.12	0.12	--
D	R	100	91	115	111	1003	1052	0.09	0.09	0.10	--
D	R	85	61	117	120	987	1019	0.12	0.13	0.13	--
E	R	104	100	--	--	--	--	0.12	0.14	--	--
E	R	100	92	--	--	--	--	0.12	0.14	--	--
E	R	85	61	--	--	--	--	0.16	0.18	--	--