

REGULATORY INFORMATION DISTRIBUTION SYS (RIDS)

ACCESSION NBR: 8212160317 DOC. DATE: 82/12/13 NOTARIZED: NO DOCKET #
 FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylv 05000387
 AUTH. NAME AUTHOR AFFILIATION
 CURTIS, N.W. Pennsylvania Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION
 SCHWENCER, A. Licensing Branch 2

SUBJECT: Provides justification for interim operation w/currently installed. Suppression pool temp monitoring sys (SPOTMOS) resistance temp detector device. Multiple sensor failures disabling SPOTMOS unlikely to occur during normal operation.

DISTRIBUTION CODE: A048S COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 3
 TITLE: OR/Licensing Submittal: Equipment Qualification

NOTES:

	RECIPIENT ID CODE/NAME		COPIES LTTR ENCL		RECIPIENT ID CODE/NAME		COPIES LTTR ENCL	
	NRR LB2 BC	12	1	0	PERCH, R.	01	1	1
INTERNAL:	ELD/HDS4	12	1	1	GC	13	1	1
	IE FILE	09	1	1	NRR CALVO, J		1	1
	NRR/DE/EQB	07	2	2	NRR/DL DIR	14	1	1
	NRR/DL/ORAB	06	1	1	NRR/DSI/AEB		1	1
	NRR/DST/GIB		1	1	<u>REG FILE</u>	04	1	1
	RGN1		1	1				
EXTERNAL:	ACRS	15	8	8	LPDR	03	2	2
	NRC PDR	02	1	1	NSIC	05	1	1
	NTIS	31	1	1				

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE BY THE DATE AND TIME INDICATED IN THE MARGINS OF THIS DOCUMENT. AUTHORITY: 50 CFR 17.102 (b) (2).

REVISIONS TO THIS DOCUMENT WILL BE INDICATED BY A CHANGE BAR IN THE MARGINS OF THIS DOCUMENT. THE DATE AND TIME OF EACH REVISION WILL BE INDICATED IN THE MARGINS OF THIS DOCUMENT.

THIS DOCUMENT IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE BY THE DATE AND TIME INDICATED IN THE MARGINS OF THIS DOCUMENT. AUTHORITY: 50 CFR 17.102 (b) (2).

LINE NO.	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
1	...	1	...	...	...
2	...	1	...	...	...
3	...	1	...	...	...
4	...	1	...	...	...
5	...	1	...	...	...
6	...	1	...	...	...
7	...	1	...	...	...
8	...	1	...	...	...
9	...	1	...	...	...
10	...	1	...	...	...
11	...	1	...	...	...
12	...	1	...	...	...
13	...	1	...	...	...
14	...	1	...	...	...
15	...	1	...	...	...
16	...	1	...	...	...
17	...	1	...	...	...
18	...	1	...	...	...
19	...	1	...	...	...
20	...	1	...	...	...
21	...	1	...	...	...
22	...	1	...	...	...
23	...	1	...	...	...
24	...	1	...	...	...
25	...	1	...	...	...
26	...	1	...	...	...
27	...	1	...	...	...
28	...	1	...	...	...
29	...	1	...	...	...
30	...	1	...	...	...
31	...	1	...	...	...
32	...	1	...	...	...
33	...	1	...	...	...
34	...	1	...	...	...
35	...	1	...	...	...
36	...	1	...	...	...
37	...	1	...	...	...
38	...	1	...	...	...
39	...	1	...	...	...
40	...	1	...	...	...
41	...	1	...	...	...
42	...	1	...	...	...
43	...	1	...	...	...
44	...	1	...	...	...
45	...	1	...	...	...
46	...	1	...	...	...
47	...	1	...	...	...
48	...	1	...	...	...
49	...	1	...	...	...
50	...	1	...	...	...
51	...	1	...	...	...
52	...	1	...	...	...
53	...	1	...	...	...
54	...	1	...	...	...
55	...	1	...	...	...
56	...	1	...	...	...
57	...	1	...	...	...
58	...	1	...	...	...
59	...	1	...	...	...
60	...	1	...	...	...
61	...	1	...	...	...
62	...	1	...	...	...
63	...	1	...	...	...
64	...	1	...	...	...
65	...	1	...	...	...
66	...	1	...	...	...
67	...	1	...	...	...
68	...	1	...	...	...
69	...	1	...	...	...
70	...	1	...	...	...
71	...	1	...	...	...
72	...	1	...	...	...
73	...	1	...	...	...
74	...	1	...	...	...
75	...	1	...	...	...
76	...	1	...	...	...
77	...	1	...	...	...
78	...	1	...	...	...
79	...	1	...	...	...
80	...	1	...	...	...
81	...	1	...	...	...
82	...	1	...	...	...
83	...	1	...	...	...
84	...	1	...	...	...
85	...	1	...	...	...
86	...	1	...	...	...
87	...	1	...	...	...
88	...	1	...	...	...
89	...	1	...	...	...
90	...	1	...	...	...
91	...	1	...	...	...
92	...	1	...	...	...
93	...	1	...	...	...
94	...	1	...	...	...
95	...	1	...	...	...
96	...	1	...	...	...
97	...	1	...	...	...
98	...	1	...	...	...
99	...	1	...	...	...
100	...	1	...	...	...



Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Norman W. Curtis
Vice President-Engineering & Construction-Nuclear
215 / 770-5381

DEC 13 1982

Mr. A. Schwencer, Chief
Licensing Branch No. 2
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
ENVIRONMENTAL QUALIFICATION - SPOTMOS RTD's
ER-100450 File 843
PLA-1433

Docket No. 50-387

Dear Mr. Schwencer:

This letter provides an updated justification for interim operation with the currently installed Suppression Pool Temperature Monitoring System (SPOTMOS) RTD configuration.

SPOTMOS is a divisionalized microprocessor based system consisting of 20 sensors with eight RTD's per division located just below the pool surface and four RTD's assigned to one division located near the bottom of the pool. There is one electronics package per division located in a control room back row panel, and 1 remote control station per division located in a control room inner ring panel.

Table 3.3.7.5-1 and Section 3.6.2.1 of the SSES Technical Specifications allow for continued operation of the plant down to six RTD's (1 per location) or 4 pairs of RTD's whichever is more limiting.

The currently installed SPOTMOS RTD configuration failed twice during the SRV fatigue testing portion of the NUREG-0588 Category I Environmental Qualification Testing. The failure during the first test occurred approximately 45 minutes into the vibration testing phase. The failure during the second test occurred after approximately two minutes into the vibration testing phase. In both instances the ceramic sheath around the leads to the RTD platinum element powdered, and the leads opened. It is conceivable that the failed leads could short.

The tests indicated that, despite the common cause of the failure, the failure due to SRV loads is not catastrophic in nature. Rather, the failure is the result of time dependent vibration induced action that proceeds at widely varying rates. Whether the failure is an open or a short, the system will detect it as a temperature indication that is more than 15 F from the average and also as either an upscale or downscale indication, all of which will result in SPOTMOS indicating an error.

A048

8212160317 821213
PDR ADDCK 05000387
P PDR

PROPERTY OF
THE
UNITED STATES GOVERNMENT

THE
NATIONAL BUREAU OF STANDARDS
WASHINGTON, D. C. 20541

ON

...

...

...

...

...

DEC 13 1982

During normal operation, the purpose of SPOTMOS is to ensure operator action prior to the pool exceeding specified temperature limits. Prior to failure of more than three averaging RTD's per division, SPOTMOS' averaging capability will satisfy this need. If more than three averaging RTD's in a division are out, the operator can determine an average by examination of the individual temperature indications.

The system is such that down to the technical specification minimum number of sensors, the operator is provided with sufficient pool temperature information to initiate actions required by the technical specification. The situation that is not addressed is a multiple failure with the resulting number of sensors remaining functional being less than technical specification minimums. While the testing indicates that, during normal operation, this kind of failure is not likely to occur, it is necessary to address this situation.

With there being less than the technical specification minimum number of sensors available, SPOTMOS will not determine a meaningful suppression pool bulk average temperature; however, the operator will be made aware of the degraded condition by the SPOTMOS electronics error alarm function. Then the operator can take appropriate corrective action.

SPOTMOS also serves as a post accident monitor. In this instance, the ability of the operator to determine a true bulk average temperature is not as critical as determining that steam suppression and reactor depressurization has taken place. In this situation, it is only necessary to keep the pool temperature below the point where boiling will take place in order not to affect ECCS pumps due to NPSH reductions. In this situation, a small number of SPOTMOS RTD's or the Non-Q RHR pump suction indication, if it is available, should be sufficient. If, however, pool temperature cannot be determined, action must be taken based on the assumption that pool temperature is approaching allowable limits. These actions must continue until a method of determining pool temperature is achieved.

In conclusion:

1. It is not likely that multiple sensor failures that would disable SPOTMOS will occur during normal operation.
2. If multiple failures were to occur the qualified SPOTMOS electronic controls will alert the operator and the following will take place:
 - a. If the number of sensors available is equal to or greater than the minimum allowed by the technical specification, the pool temperature can be determined and the plant operated safely using existing equipment and procedures.
 - b. If less than the minimum number of sensors allowed by technical specification are available with the reactor critical but in stable, steady state normal operation,



5-2
7

The following information was obtained from a review of the records of the
 Bureau of the Census, Department of Commerce, Bureau of Economic Analysis,
 Office of Business Economics, Washington, D. C., regarding the
 production of the following commodities during the period 1954 through
 1960:

Commodity	1954	1955	1956	1957	1958	1959	1960
Aluminum	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000	1,700,000	1,800,000
Steel	45,000,000	48,000,000	51,000,000	54,000,000	57,000,000	60,000,000	63,000,000
Iron	10,000,000	11,000,000	12,000,000	13,000,000	14,000,000	15,000,000	16,000,000
Copper	1,500,000	1,600,000	1,700,000	1,800,000	1,900,000	2,000,000	2,100,000
Lead	1,000,000	1,100,000	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000
Zinc	800,000	850,000	900,000	950,000	1,000,000	1,050,000	1,100,000
Nickel	500,000	550,000	600,000	650,000	700,000	750,000	800,000
Gold	1,000,000	1,100,000	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000
Silver	2,000,000	2,100,000	2,200,000	2,300,000	2,400,000	2,500,000	2,600,000
Platinum	100,000	110,000	120,000	130,000	140,000	150,000	160,000
Palladium	50,000	55,000	60,000	65,000	70,000	75,000	80,000
Rhodium	20,000	22,000	24,000	26,000	28,000	30,000	32,000
Mercury	10,000	11,000	12,000	13,000	14,000	15,000	16,000
Vanadium	5,000	5,500	6,000	6,500	7,000	7,500	8,000
Chromium	3,000	3,500	4,000	4,500	5,000	5,500	6,000
Manganese	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Titanium	1,000	1,100	1,200	1,300	1,400	1,500	1,600
Aluminum oxide	1,000,000	1,100,000	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000
Iron oxide	500,000	550,000	600,000	650,000	700,000	750,000	800,000
Steel mill gas	10,000,000	11,000,000	12,000,000	13,000,000	14,000,000	15,000,000	16,000,000
Aluminum mill gas	500,000	550,000	600,000	650,000	700,000	750,000	800,000
Copper mill gas	200,000	220,000	240,000	260,000	280,000	300,000	320,000
Lead mill gas	100,000	110,000	120,000	130,000	140,000	150,000	160,000
Zinc mill gas	80,000	85,000	90,000	95,000	1,000,000	1,050,000	1,100,000
Nickel mill gas	40,000	45,000	50,000	55,000	60,000	65,000	70,000
Gold mill gas	20,000	22,000	24,000	26,000	28,000	30,000	32,000
Silver mill gas	10,000	11,000	12,000	13,000	14,000	15,000	16,000
Platinum mill gas	5,000	5,500	6,000	6,500	7,000	7,500	8,000
Palladium mill gas	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Rhodium mill gas	1,000	1,100	1,200	1,300	1,400	1,500	1,600
Mercury mill gas	500	550	600	650	700	750	800
Vanadium mill gas	200	220	240	260	280	300	320
Chromium mill gas	100	110	120	130	140	150	160
Manganese mill gas	50	55	60	65	70	75	80
Titanium mill gas	20	22	24	26	28	30	32

DEC 13 1982

Page 3

without heat being added to the pool, plant safety is assured by compliance with the appropriate LCO action statement.

- c. If less than the minimum number of sensors allowed by the Technical Specifications are available with the reactor critical but with heat being added to the suppression pool, the plant will remain safe if the operator takes action to halt the operation of those systems adding heat to the pool, initiates suppression pool cooling, and proceeds to cold shutdown per the appropriate LCO action statement.

In the event of a stuck open relief valve, the plant will remain safe if the operator takes actions, based on existing procedures, to scram and depressurize reactor if the valve cannot be closed within two minutes.

A modified RTD configuration has undergone testing and has successfully completed the SRV fatigue testing phase of the environmental qualification testing program. The modified configuration has also successfully completed qualification testing for combined seismic, LOCA, and SRV dynamics. Additional testing continues for LOCA and post-LOCA environmental conditions. It is anticipated that qualified equipment will be in place by the end of the first refueling outage. It is our belief based on the above discussion that it is safe to operate the plant with the installed SPOTMOS RTD configuration until the end of the first refueling outage.

Very truly yours,



N. W. Curtis

Vice President - Engineering & Construction - Nuclear

cc: R. L. Perch
H. Garg



Handwritten marks and symbols in the top right corner, including a horizontal line and several small dots.

