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AUTH.NAME AUTHOR AFFILIATION
UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
REID,R.W. Operating Reactors Branch 4

SUBJECT: Responds to NRC 800317 ltr re Lessons Learned Task Force short-term requirements. Forwards info re valve position indication, instrumentation for inadequate core cooling, containment isolation & auxiliary feedwater flow indication.

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FLORIDA POWER & LIGHT COMPANY

April 3, 1980
L-80-113

Office of Nuclear Reactor Regulation
Attention: Mr. R. W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Reid:

Re: St. Lucie Unit 1
Docket No. 50-335
NUREG-0578 Short Term Requirements

The attached information is being submitted in response to your letter of March 27, 1980.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/DKJ/cph

Attachment

cc: Mr. James P. O'Reilly, Region II
Harold F. Reis, Esquire

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8004080386

ATTACHMENT 1

Re: St. Lucie Unit 1
Docket No. 50-335
NUREG-0578 Short Term Requirements

2.1.3.a Valve Position Indication

(1) Provide your schedule for qualification of the valve position indication circuits.

Response: Our vendor, Technology for Energy Corporation (TEC) has scheduled environmental testing and documentation to be complete by October, 1980.

2.1.3.b Instrumentation for Inadequate Core Cooling

(1) Provide a complete table of information regarding the subcooling meter as per Denton's October 30, 1979 letter.

Response: This information is provided as Appendix A to this Attachment.

(2) Discuss the backup methods for monitoring subcooling margin. Include in your discussion directions given to the operators by the procedures.

Response: Manual use of steam tables provide the main backup to the subcooling margin monitor (SMM). To eliminate the need for hand calculations, a nomograph has been mounted prominently on the Main Control Board. The nomograph is a standard pressure versus temperature graph color-coded to show both the saturation curve and the 50°F margin-to-saturation curve. Procedures are being modified to provide the operator with specific instructions to:

(1) With the SMM operating normally, use the nomograph in conjunction with the SMM to eliminate dependence on a single instrument, or

(2) With the SMM inoperable, use the nomograph utilizing control room indicators (T_H, Pressurizer pressure, etc.) and core exit thermocouples to determine margin to saturation. Margin can also be determined by subtracting hot leg temperature from pressurizer temperature (T_{sat} as indicated by TE-1101).

Additional training will be given to both operators and shift technical advisors relative to these procedure changes and the use of the nomograph. All procedure changes and training will be completed prior to the unit's return to power following the current outage.

(3) Attachment A lists the minimum criteria for the subcooling meters. Provide your commitment to meet these criteria and your schedule for doing so.

Response: St. Lucie Unit 1 will meet the criteria of your Attachment A by 1-1-81 or sooner subject to equipment availability. The presently installed meter represents FPL's best effort to meet the NUREG-0578 criteria within NRC time frames and we believe our efforts met the intent of the short-term requirements. To do so, however, required utilizing installed instrumentation although the need to upgrade the installed instrumentation was recognized and efforts to define and implement the upgrade were initiated.

Accomplishment of the upgrade requires and includes the installation of dual-element RTD's which will supply wide range hot leg temperature inputs to the Subcooled Margin Monitor (SMM). Delivery of these RTD's is the limiting scheduling factor for the SMM upgrade (26 week lead time). We have requested our NSSS vendor (Combustion Engineering) to expedite delivery of the dual-element RTD's and C-E has indicated that they will do so and pursue the possible diversion of RTD's from other nuclear plants currently under construction.

(4) Provide the results of your evaluation of the need for additional instrumentation for detecting inadequate core cooling. Include a statement of your intent regarding design and installation of a reactor vessel level instrument.

Response: The results of the subject evaluation were provided to the NRC in our response to I&E Bulletin 79-06C item 5. This submittal referenced C-E Report CEN-117, "Inadequate Core Cooling--A Response to NRC IE Bulletin 79-06C, item 5 for Combustion Engineering Nuclear Steam Supply Systems." This report concludes that sufficient instrumentation currently exists which is capable of detecting inadequate core cooling, and FPL concurs with that conclusion. Additionally, our plant engineering department has technically reviewed a number of current "state-of-the-art" designs for reactor vessel level indication and has concluded that none can clearly provide unambiguous indication of reactor vessel level. Subsequently, while FPL will continue to assess the need for additional instrumentation, as well as review new developments in this area, we do not intend to install a reactor vessel level instrument at this time.

2.1.4 Containment Isolation

(1) Provide a list of all essential and non-essential systems. Provide the basis for the classification of each essential system. Specific references to CEN-125, where applicable, are acceptable.

Response: A list of essential and non-essential system containment penetrations is provided in Appendix B to this Attachment. Essential penetrations (noted by an arrow in the margin) are defined as those containment penetrations for systems required to be operable to mitigate the consequences of an accident or to provide information to the operator necessary to follow the course of an accident.

(2) Verify that reopening of closed, automatic isolation valves is accomplished on a valve-by-valve or penetration-by-penetration basis as opposed to group reopening.

Response: Our review of the control systems of automatic isolation valves, as specified above, has concluded that reopening of these valves must be accomplished on a valve-by-valve basis. In particular, the St. Lucie Unit 1 design does not utilize "ganged" control switches for these valves, and thus each switch operates only one valve.

2.1.7.b Auxiliary Feedwater Flow Indication

(1) Document that you meet the redundancy part of this requirement by use of steam generator level indication in addition to the auxiliary feedwater flow meters.

Response: Under both normal operating and transient conditions, steam generator (SG) level provides the operator the primary input for regulating auxiliary feedwater to each generator rather than auxiliary feedwater flow. The St. Lucie Unit 1 control room is equipped with four independent safety-grade level meters for each steam generator. These meters are located within view of the operator as he adjusts auxiliary feedwater flow to maintain SG level.

Regardless, additional positive instruction will be provided by procedure to the operator directing him to use SG level indication as well as flow indication to ensure that each steam generator is receiving auxiliary feedwater as appropriate. Procedure changes and training for operators and shift technical advisors will be completed prior to returning to power from the current outage.

2.1.8.b Increased Range of Radiation Monitors

(1) Incorporate in your procedures the method for sampling for radioiodines and particulates in gaseous effluents from the plant vent and fuel handling building exhausts following an accident. Provide the information requested in the October 30, 1979 Denton letter (pg. 35) for both release paths.

Response: Plant procedures have been modified as specified above. Specifically the procedures require measurement of background radiation prior to sampling, the use of Silver-Zeolite filters for sample collection, and additional precautions and limitations to

minimize personnel exposure. Back-up power supplies are also specified. Additional information requested by the October 30, 1979 Denton letter was provided to the NRC audit team March 24-25, 1980.

(2) Implement plant modifications and procedures for monitoring atmosphere steam dump valves and steam safety relief valves following an accident. Provide the information requested in the October 30, 1979 Denton letter (pgs. 33-34).

Response: Existing procedures have been modified to address plant modifications for monitoring the atmospheric steam dump valves and the steam generator relief valves. Continuous monitoring under accident conditions is accomplished by routing main steam to a single channel analyzer via a one inch blowdown line upstream of the main steam isolation valves and a sample cooler. Information requested in the Ocotber 30, 1979 Denton letter was provided to the NRC audit team March 24-25, 1980.

2.1.8.c Improved In-Plant Iodine Instrumentation

(1) Revise your procedures to assure that the control room and TSC will be monitored for radioiodine following an accident with the portable cart mounted samplers.

Response: An existing plant procedure will be modified by April 30, 1980 to require the transfer of an NMC portable monitor to the Technical Support Center (TSC) if and when the TSC is activated. As the TSC and control room are adjacent, this instrument can be used to monitor both areas.

2.2.1.a Shift Supervisor (SS) Responsibilities

(1) Provide a commitment to annually reissue the management directive that emphasizes the responsibility of the SS for the safe operation of the plant.

Response: Since the TMI accident, management directives as specified above have been issued. FPL will continue to issue these directives at intervals of one year or less.

(2) Describe typical accident situations when you believe the SS should be permitted to leave the control room. Modify your procedures to direct that the SS not leave the control room unless, in his opinion, it is necessary for plant safety.

Response: There are a number of accident conditions under which it may be necessary for the Nuclear Plant Supervisor (NPS) to leave the Control Room in order to make a personal evaluation of a given situation. An actual example of this occurred some time ago involving a hydrogen fire in the main generator. After verifying that the primary plant (NSSS) was shutdown and stable, the NPS left

the control room for the scene of the fire to ascertain the status of firefighting efforts and to determine the potential for and consequences of spreading of the fire. Similar scenarios can be visualized for hurricanes, flooding, and other like situations.

FPL does recognize, however, that there are other accident situations during which the NPS would be required to remain in the Control Room. To stress this point, plant procedures will be revised to emphasize the necessity for the NPS to remain in the Control Room under accident conditions unless, in his opinion, his personal evaluation of the situation is necessary to maintain plant safety. One additional point should be noted. Current NRC regulations require the scheduling of only one SRO per Control Room operating shift. It is and has been FPL practice to schedule two SRO's (Watch Engineer and NPS) per operating shift in the Control Room.

(3) Provide a commitment for an annual review of the SS's administrative duties. This review shall be performed by the senior person responsible for plant operations.

Response: Existing plant procedures will be modified to require an annual review of NPS administrative duties as specified above.

(4) Provide assurance that the SS will spend a minimum amount of time on routine administrative duties (Items 1-4 and 8, 3-13-80 memo).

Response: Routine administrative duties of the NPS will be defined such that a maximum of 30 minutes per shift is allocated to duties specified as items 1-4 and 8 (3-13-80 memo).

2.2.1.c Shift and Relief Turnover Procedures

(1) Provide a description of the method you have established to evaluate the effectiveness of the shift and relief turnover procedures.

Response: The St. Lucie Unit 1 QC Department has scheduled surveillance of Operations Department compliance to procedures. Shift relief and turnover will be surveilled on a periodic basis as part of this program to determine their effectiveness.

2.2.2.a Control Room Access

(1) Clarify procedure to indicate that line of succession for the Nuclear Plant Supervisor is limited only to personnel holding a Senior Reactor Operator's License.

Response: The Control Room Access procedure will be revised as necessary to specify that the NPS can be relieved by qualified personnel holding a valid Senior Reactor Operator's License.

2.2.2.b Technical Support Center (TSC)

(1) Describe dedicated communications between the TSC and the control room, and the TSC and the Emergency Operations Facility.

Response: Sound powered phones will be installed to provide dedicated communications between the TSC and the Control Room. A dedicated commercial telephone link will be established between the TSC and the Emergency Operations Facility.

(2) Describe the manner in which the plant operating parameters will be transmitted to the TSC. Justify that the best effort was made to have a data display in the TSC.

Response: Efforts to establish a data display in the TSC have been and continue to be intensive. Initial short-term efforts revealed no simple method of transmitting control room data to the TSC without possibly compromising Control Room information. For example, the existing plant "computer" (DDPS) is of such limited capacity that it cannot be used to transmit data to the TSC. Additional efforts considered new systems ranging from television cameras to expensive and exotic computer systems. These efforts included site visits by vendors, presentations by vendors, and trips to vendor's facilities to observe systems in action. Due mainly to technical inadequacy and/or equipment lead times outside the NRC time frames, these systems were rejected in so far as short-term objectives were concerned.

Additionally, discussions with the NRC indicated that the need, in the short-term, for a TSC data display diminished with the distance between the TSC and the Control Room. (The TSC at St. Lucie is immediately adjacent to the Control Room and contains a viewing window). Consequently, it appeared reasonable, again for the short term, to perform this function, if required, by dispatching an individual from the TSC to the Control Room to transmit the data required.

Efforts were then concentrated on meeting the long-term (1-1-81) upgrade requirements. For reasons which include those discussed earlier, FPL decided to combine the function of the TSC data display with the computer planned for purchase to meet the NRC Appendix I requirements. Parameters to be included were selected (See Appendix C) and engineering begun to incorporate the added parameters into the overall design. Purchase of equipment, however, was held in abeyance pending formal NRC definition of Appendix I requirements, including Technical Specifications.

Subsequent discussions with the audit team on March 24-25, 1980 which resulted in this particular position of your March 27, 1980 request, have indicated a possible NRC concern that FPL has not conducted a "best effort" in this area. We state unequivocably that this is not so. As an indication of our recognition of NRC concerns relative to data display in the TSC, FPL has proceeded

with the purchase of the Appendix I computer. This system is currently scheduled to be installed and operational by October 1980.

INFORMATION REQUIRED ON THE SUBCOOLING METER

Display	
Information Displayed (T-Tsat, Tsat, Press, etc.)	Tmar = Tsat - Trc or Pmar = Prc - Psat
Display Type (Analog, Digital, CRT)	Digital
Continuous or on Demand	Continuous
Single or Redundant Display	Single
Location of Display	RTGB-103-Reactor Coolant System Portion
Alarms (include setpoints)	T-Tsat T-Tsat = 30°F
Overall Uncertainty (°F, PSI)	Normal Operation: ± 5°F, ± 35 psi *High Energy Pipe Break* *± 5°F, ± 250 psi* (See attached curves)
Range of Display	Tmar 0 to 200°F
Qualifications (seismic, environmental, IEEE323)	IEEE Std 344-1975 IEEE Std 323-1974 (less aging)
Calculator	
Type (process computer, dedicated digital or analog calc.)	Dedicated Micro-computer
If process computer is used specify availability. (% of time)	N/A
Single or redundant calculators	Single
Selection Logic (highest T., lowest press)	Highest T measured lowest P measured for Tsat
Qualifications (seismic, environmental, IEEE323)	IEEE Stds 323 & 344 (less aging)
Calculational Technique (Steam Tables, Functional Fit, ranges)	Steam Tables and Interpolation routines

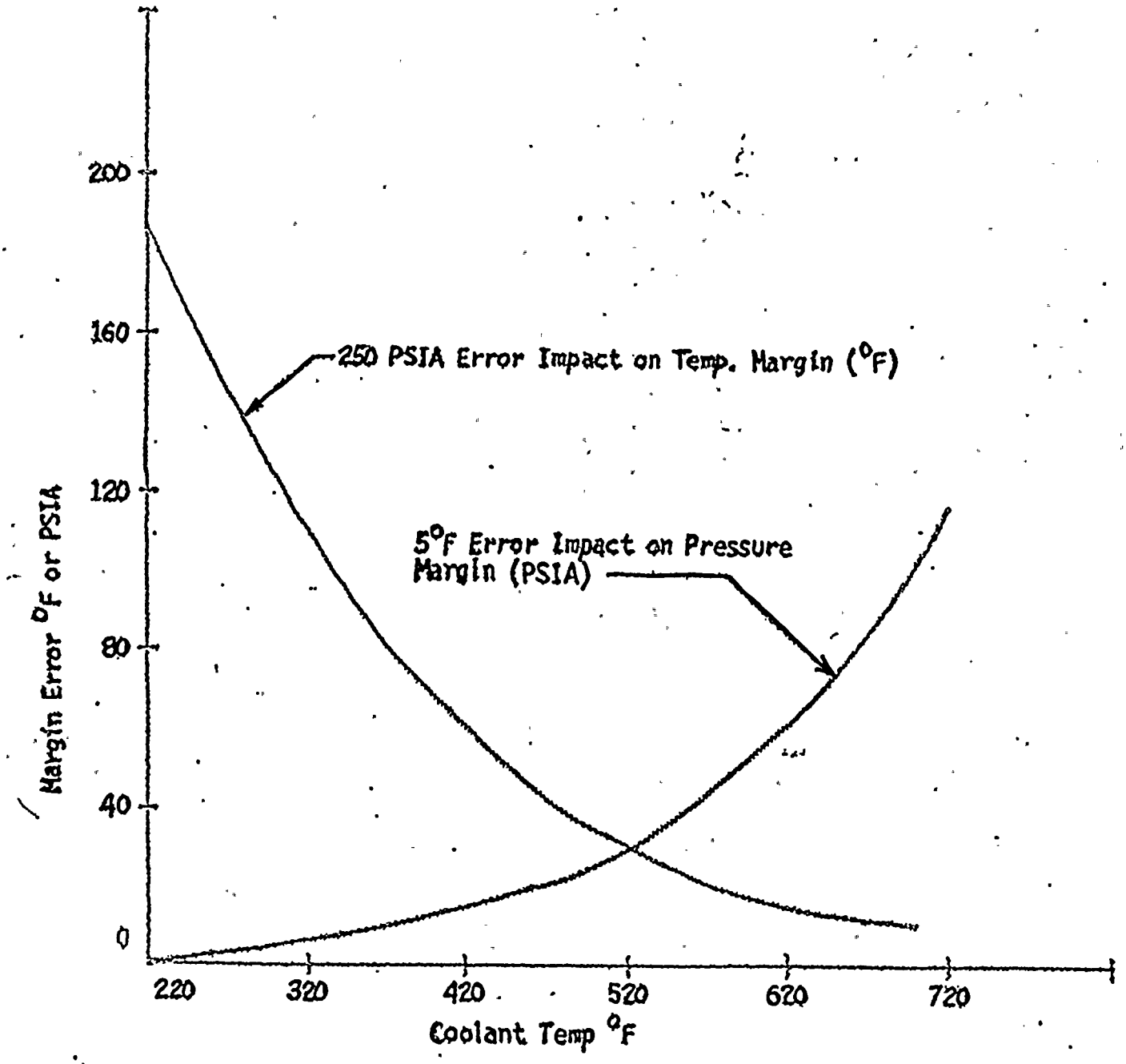
Input

Temperature (RTD's or T/C's)	RTD's
Temperature (number of sensors and locations)	6 sensors 4 Cold Leg 2 hot leg)
Range of temperature sensors	465 - 615°F Cold Leg 515 - 665°F Hot Leg
Uncertainty of temperature sensors (°F at 1)	+2°F
Qualifications (seismic, environmental, IEEE323)	See 79-01B response
Pressure (specify instrument used)	Pressure transmitters
Pressure (number of sensors and locations)	2 (split range), Pressurizer
Range of Pressure sensors	0-1600 psia 1500-2500 psia
Uncertainty of pressure sensors (PSI at 1)	+ 27.4 psi
Qualifications (seismic, environmental, IEEE323)	See 79-01B response

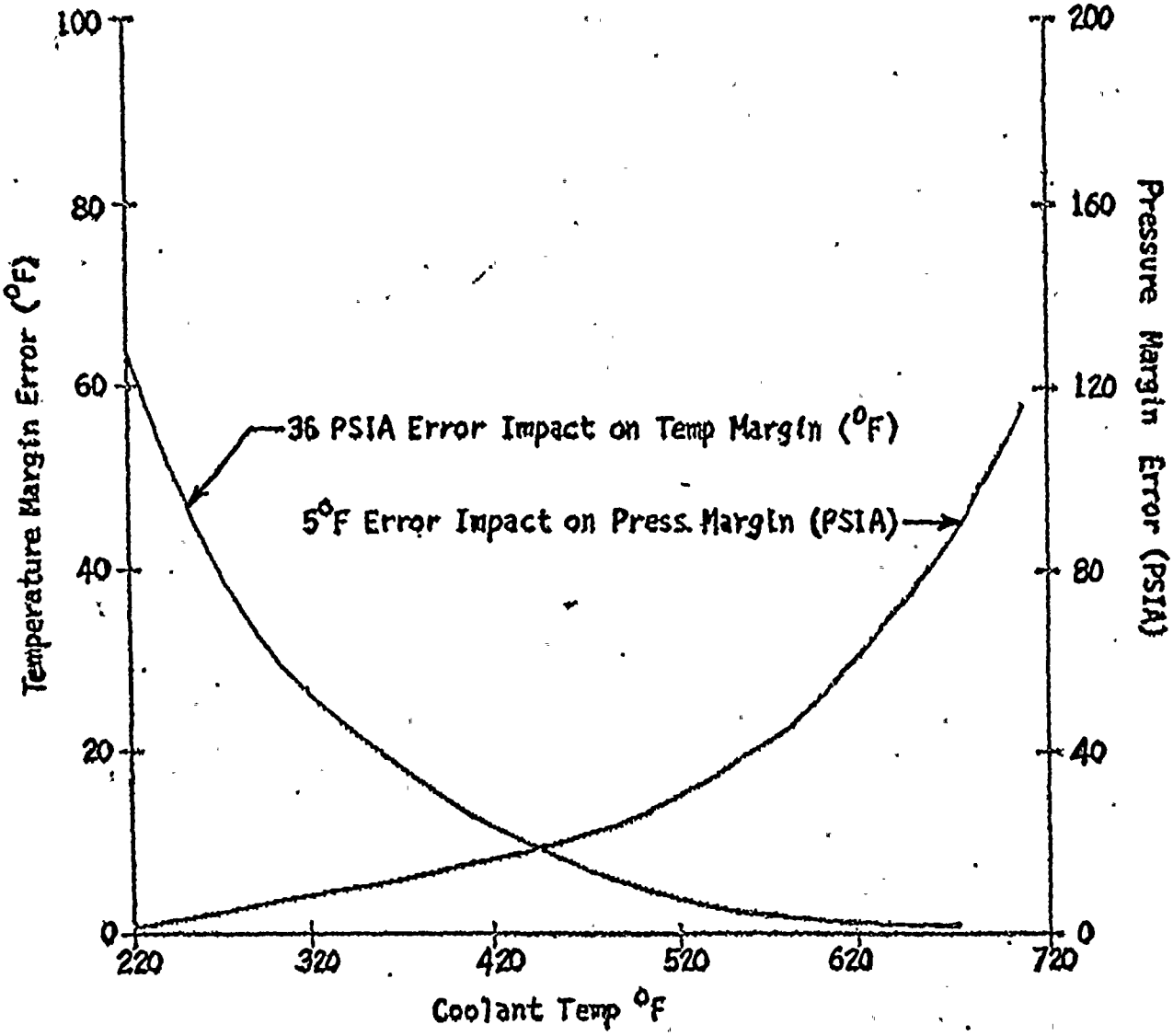
Backup Capability

Availability of Temp & Press	TIA-1111, TIA-1121 } Hot Leg PI-1102B, PIC-1104 } Pressurizer
Availability of Steam Tables etc.	Nomograph on RTGB
Training of operators	Operators have been initially trained *
Procedures	Procedures are being revised

*Additional training, as described in our response to 2.1.3.b(2) will be conducted



TYPICAL SUBCOOLED MARGIN MONITOR INSTRUMENT SYSTEM UNCERTAINTIES DURING HIGH ENERGY PIPE BREAKS



TYPICAL SUBCOOLED MARGIN MONITOR UNCERTAINTIES
DURING NORMAL OPERATION

CONTAINMENT PENETRATION AND ISOLATION VALVE INFORMATION

Penetration Number	Service	System	Penetration Type	Isolation Class	Flow Direction	Location Reference to Containment Vessel	Valve Type and Tag Number	Pipe Size	Primary Method of Closure	CIS Actuation Channel	Secondary Method of Closure	Maximum Closure Time (Sec)	Normal Valve Position	Valve Position With Power Failure	Post-Accident Position
1 & 2	Main Steam	Main Steam	I	C	Out	Outside	Stop (I-HCV-08-1A,B)	34"	MSIS	-	Air Accumulator	6	Open	Closed	Closed
3 & 4	Feedwater	Feedwater	I	C	In	Outside	Gate (I-MV-09-7,8)	20"	SIAS or MSIS	-	Handwheel	60	Open	As Is	Closed
					In	Outside	Gate (I-MV-09-1,2)	20"	SIAS or MSIS	-	Handwheel	60	Open	As Is	Closed
						Outside	Check (I-V-09-258)		Automatic	-	Handwheel	-	-	-	-
	Auxiliary Feedwater	Auxiliary Feedwater			In	Outside	Check (I-V-09-350)	4"	Automatic	-	-	-	-	-	-
					In	Outside	Check (I-V-09-350)	4"	Automatic	-	-	-	-	-	-
					In	Outside	Check (I-V-09-350)	4"	Automatic	-	-	-	-	-	-
					In	Outside	Check (I-V-09-350)	4"	Automatic	-	-	-	-	-	-
5 & 6	Steam Generator Blowdown	Blowdown	III	C	Out	Outside	Globe (I-FCV-23-3,5)	2"	CIS	A	-	10	Open	Closed	Closed
7	Primary Makeup Water	Makeup Water	II	A1	In	Outside	Check (I-V-15-1347)	2"	Automatic	-	-	-	-	-	-
						Inside	Check (I-V-15-1347)		Automatic	-	-	-	-	-	-
							Gate (I-MV-15-1)		CIS				(a)	As Is	Closed
8	Station Air Supply	Station Air	II	A2	In	Outside	Globe (I-V-18-947)	2"	Manual	-	-	-	Locked Closed	-	Closed
						Outside	Globe (I-V-18-947)		Manual	-	-	-	Locked Closed	-	Closed
						Outside	Check (I-V-18-957)	2"	Automatic						
9	Instrument Air Supply	Instrument Air	II	A1	In	Outside	Gate (I-MV-18-1)		CIS	A	Handwheel	30	Closed	Closed	Closed
						Inside	Check (I-V-18-957)		Automatic	-	-	-	-	-	-
10	Containment Purge Air Exhaust	Heating & Ventilating	II	A1	Out	Outside	Butterfly (I-FCV-25-6)		CIS	A	Handwheel	5	Closed	Closed	Closed
						Outside	Butterfly (I-FCV-25-5)	48"	CIS	A	Handwheel	5	Closed	Closed	Closed
						Inside	Butterfly (I-FCV-25-4)		CIS	B	Handwheel	5	Closed	Closed	Closed
11	Containment Purge Supply	Heating & Ventilating	II	A1	In	Outside	Butterfly (I-FCV-25-1)		CIS	A	Handwheel	5	Closed	Closed	Closed
						Outside	Butterfly (I-FCV-25-2)	48"	CIS	B	Handwheel	5	Closed	Closed	Closed
						Inside	Butterfly (I-FCV-25-3)		CIS	A	Handwheel	5	Closed	Closed	Closed
12, 13	Spare														
14	Nitrogen Supply to Safety Injection Tanks	Waste Management	II	A1	In	Outside	Globe (V-6741)	1"	CIS	B	-	5	Open	Closed	Closed
						Outside	Check (V-6779)		Automatic	-	-	-	-	-	-
15, 17	Containment Fan Coolers	Component	II	C	Out	Outside	Butterfly	8"	Remote -	-	Handwheel	-	Open	Open	Open
19, 21	Cooling Water Return	Cooling					(I-SB-14-5) Typ		Manual	-					
16, 18	Containment Fan Coolers	Component	II	C	In	Outside	Butterfly	8"	Remote -	-	Handwheel	-	Open	Open	Open
20, 22	Cooling Water Supply	Cooling					(I-SB-14-5)Typ		Manual						
23	Reactor Coolant Pump Cooling Water Supply	Component Cooling	II	A1	In	Outside	Butterfly (I-HCV-14-7)	8"	SIAS	B	Handwheel	5	Open	Closed	Closed
						Outside	Butterfly (I-HCV-14-1)		SIAS	A	Handwheel	5	Open	Closed	Closed
24	Reactor Coolant Pump Cooling Water Return	Component Cooling	II	A1	Out	Outside	Butterfly (I-HCV-14-6)	8"	SIAS	B	Handwheel	5	Open	Closed	Closed
						Outside	Butterfly (I-HCV-14-2)		SIAS	A	Handwheel	5	Open	Closed	Closed

(a) Positioned as required

Penetration Number	Service	System	Penetration Type	Isolation Class	Flow Direction	Location Reference to Containment Vessel	Valve Type and Tag Number	Pipe Size	Primary Method of Closure	CIS Actuation Channel	Secondary Method of Closure	Maximum Closure Time (Sec)	Normal Valve Position	Valve Position With Power Failure	Post-Accident Position
25+	Fuel Transfer Tube	Fuel Handling	V	-	In/Out	Inside	Double Gasketed Flange	36"	-	-	-	-	Closed	-	Closed
26	Letdown Line	Chemical & Volume Control	III	B1	Out	Inside	Globe (V-2515)	2"	CIS, SIAS	B	-	5	Open	Closed	Closed
						Inside	Globe (V-2516)		CIS, SIAS	A	-	5	Open	Closed	Closed
						Outside	Globe		CIS	A	-	5	Open	Closed	Closed
27	Charging Line	Chemical & Volume Control	III	E	In	Outside	Check (V-2403)	2"	Automatic	-	-	-	-	-	-
28	Reactor Coolant Sample	Sampling	III	B1	Out	Outside	Globe (V-5200)	3/8"	CIS	A	-	5	Closed	Closed	Closed
						Outside	Globe (V-5203)	3/8"	CIS	B	-	5	Closed	Closed	Closed
29	Pressurizer Surge Line Sample	Sampling	III	B1	Out	Outside	Globe (V-5201)	3/8"	CIS	A	-	5	Closed	Closed	Closed
						Outside	Globe (V-5204)		CIS	B	-	5	Closed	Closed	Closed
	Pressurizer Steam Space Sample	Sampling	III	B1	Out	Outside	Globe (V-5202)	3/8"	CIS	A	-	5	Closed	Closed	Closed
						Outside	Globe (V-5205)		CIS	B	-	5	Closed	Closed	Closed
30 & 49	Steam Generator Blowdown Sample	Sampling	III	C	Out	Outside	Globe (I-FCV-23-7)	1/2"	CIS	A	-	10	Open	Closed	Closed
						Outside	Globe (I-FCV-23-9)		CIS	B	-	10	Open	Closed	Closed
31	Containment Vent Header	Waste Management	II	A1*	Out	Outside	Gate (V-6554)	1"	CIS	A	-	5	Open	Closed	Closed
						Outside	Gate (V-6555)		CIS	B	-	5	Open	Closed	Closed
32 & 33	Containment Sump suction	Emergency Core Cooling	IV	E	Out	Outside	Butterfly (I-MV-07-2A,B)	24"	Remote-Manual	-	-	-	Closed	As Is	Open on RAS
34 & 35	Containment Spray	Containment Heat Removal	II	E	In	Outside	Globe (I-FCV-07-1A,B)	12"	Remote-Manual	-	-	-	Closed	Open	Open on CSAS
						Outside	Gate (I-V-07-1514)	-	Manual	-	-	-	Locked Open	-	Open
						Inside	Check (I-V-07-1553)	10"	Automatic	-	-	-	-	-	-
36 & 39	Safety Injection	Emergency Core Cooling	III	E	In	Outside	Globe (HCV-3615,16,17, 25,26,27,35,36,37,45,56,47)	6"	Remote-Manual	-	-	-	Closed	As Is	Open on SIAS
						Outside	Check (V-3114,13,24,23,34, 33,44,43)		Automatic	-	-	-	-	-	-
40 & 64	Shutdown Cooling	Emergency Core Cooling	III	B2	Out	Inside	Gate (V-3651,V-3481)	10"	Remote-Manual	-	-	-	Locked Closed	As Is	Closed
						Inside	Gate (V-3652,V-3480)		Remote-Manual	-	-	-	Locked Closed	As Is	Closed
41	Safety Injection Tank Test Line	Emergency Core Cooling	III	B2	Out	Outside	Gate (V-3463)	2"	Manual	-	-	-	Locked Closed	-	Closed
						Outside	Gate (I-V-03-1307)		Manual	-	-	-	Locked Closed	-	Closed
42	Reactor Cavity Sump Pump Discharge	Waste Management	II	A1	Out	Outside	Globe (I-LCV-07-11A)	3"	CIS, SIAS	A	-	10	Closed	Closed	Closed
						Outside	Globe (I-LCV-07-11B)		CIS, SIAS	B	-	10	Closed	Closed	Closed
43	Reactor Drain Tank Pump Suction	Waste Management	IV	A1*	Out	Outside	Globe (V-6301)	3"	CIS	A	-	10	Open	Closed	Closed
						Outside	Gate (V-6302)		CIS	B	-	10	Open	Closed	Closed
44	Reactor Coolant Pump Controlled Bleedoff	Chemical & Volume Control	III	B1	Out	Outside	Gate (V-2505)	3/4"	CIS	A	-	5	Open	Closed	Closed
						Inside	Solenoid (I-SE-01-1)		CIS	-	-	5	Open	Closed	Closed
28a	SIT Sample	Safety Injection	III	B2	Out		Globe (FCV-63-1E)	3/8"	CIS	A	-		Closed	Closed	Closed
			III	B2	Out		Globe (FCV-63-1F)	3/8"	CIS	B	-		Closed	Closed	Closed

+ Not a penetration as defined by ASME B & PV Code, Section III, Class MC, Item NE-1132, Footnote 2 (Summer 1972 Addenda).

Penetration Number	Service	System	Penetration Type	Isolation Class	Flow Direction	Location Reference to Containment Vessel	Valve Type and Tag Number	Pipe Size	Primary Method of Closure	CIS Actuation Channel	Secondary Method of Closure	Maximum Closure Time (Sec)	Normal Valve Position	Valve Position With Power Failure	Post-Accident Position
45 & 53	Fluid Instrument Sensing Line for Vacuum Relief	Heating & Ventilation	II	D	In/Out	Outside	Excess Flow Check	3/8"	Automatic	-	-	-	-	-	-
46	Refueling Cavity Purification Flow Inlet	Fuel Pool Cleanup	II	A2	In	Outside	Gate (I-V-07-1609)	3"	Manual	-	-	-	Locked Closed	-	Closed
						Inside	Gate (I-V-07-1609)		Manual	-	-	-	Locked Closed	-	Closed
47	Refueling Cavity Purification Flow Outlet	Fuel Pool Cleanup	II	A2	Out	Outside	Gate (I-V-07-1609)	3"	Manual	-	-	-	Locked Closed	-	Closed
						Inside	Gate (I-V-07-1609)		Manual	-	-	-	Locked Closed	-	Closed
48	Hydrogen Sampling Lines - Sample	Containment Hydrogen Sampling	III	A2**	Out	Inside	Solenoid (I-FSE-27-1, 2,3,4)	3/8"	Remote-Manual	-	-	5	Closed	Closed	Closed/Open
						Outside	Solenoid (I-FSE-27-8)		Remote-Manual	-	-	5	Closed	Closed	Closed/Open
	Hydrogen Sampling Lines - Sample return	Containment Hydrogen Sampling	III	A2**	In	Inside	Check (I-V-27-1341)	3/8"	Automatic	-	-	-	-	-	-
						Outside	Solenoid (I-FSE-27-10)	3/8"	Remote-Manual	-	-	5	Closed	Closed	Closed/Open
49	Refer to Penetration No. 30														
50	Spare														
51	Hydrogen Sampling Lines - Sample	Containment Hydrogen Sampling	III	A2**	Out	Inside	Solenoid (I-FSE-27-5, 6,7)	3/8"	Remote-Manual	-	-	5	Closed	Closed	Closed/Open
						Outside	Solenoid (I-FSE-27-9)	3/8"	Remote-Manual	-	-	5	Closed	Closed	Closed/Open
	Hydrogen Sampling Lines - Sample return	Containment Hydrogen Sampling	III	A2**	In	Inside	Check (I-V-27-1342)	3/8"	Automatic	-	-	-	-	-	-
						Outside	Solenoid (I-FSE-27-11)	3/8"	Remote-Manual	-	-	5	Closed	Closed	Closed/Open
52A	Containment Atmosphere Radiation Monitoring System	Radiation Monitoring	II	A1	Out	Inside	Globe (I-FCV-26-1)	1"	CIS	A	Handwheel	10 Sec	Open	Closed	Closed
						Outside	Globe (I-FCV-26-2)			B	Handwheel	10 Sec	Open	Closed	Closed
52B	Containment Atmosphere Radiation Monitoring System	Radiation Monitoring	II	A1	Out	Inside	Globe (I-FCV-26-3)	1"	CIS	A	Handwheel	10 Sec	Open	Closed	Closed
						Outside	Globe (I-FCV-26-4)			B	Handwheel	10 Sec	Open	Closed	Closed
52C	Containment Atmosphere Radiation Monitoring System	Radiation Monitoring	II	A1	In	Inside	Globe (I-FCV-26-5)	1"	CIS	A	Handwheel	10 Sec	Open	Closed	Closed
						Outside	Globe (I-FCV-26-6)			B	Handwheel	10 Sec	Open	Closed	Closed
52D	ILRT Controlled Leakage Line	Integrated Leak Rate Test	II	A2	Out	Inside	Globe (I-V-00-1325)	1"	Manual	-	-	-	Locked Closed	Closed	Closed
						Outside	Globe (I-V-00-1325)	1"	Manual	-	-	-	Locked Closed	Closed	Closed
52E	ILRT Pressure Sensing Line	Integrated Leak Rate Test	II	A2	Out	Inside	Globe (I-V-00-1322)	3/8"	Manual	-	-	-	Locked Closed	Closed	Closed
						Outside	Globe (I-V-00-1322)	3/8"	Manual	-	-	-	Locked Closed	Closed	Closed
53	Refer to Penetration No. 45														

Penetration Number	Service	System	Penetration Type	Isolation Class	Flow Direction	Location Reference to Containment Vessel	Valve Type and Tag Number	Pipe Size	Primary Method of Closure	CIS Actuation Channel	Secondary Method of Closure	Maximum Closure Time (Sec)	Normal Valve Position	Valve Position With Power Failure	Post-Accident Position
54	ILRT Pressurizing and Depressurizing Line	Integrated Leak Rate Test	II	A2	In/Out	Inside Outside	Flange Gate (I-V-00401)	8" 8"	- Manual	- -	- -	- -	Closed Locked Closed	Closed Closed	Closed Closed
55	Spare														
56	Hydrogen Purge Outside Air Makeup	Containment Hydrogen Purge (H&V)	II	A2	In	Outside Outside	Gate (I-V-25-11) Gate (I-V-25-12)	3" 3"	Manual Manual	- -	- -	- -	Locked Closed Locked Closed	- -	Closed Closed
57 & 58	Hydrogen Purge Exhaust	Containment Hydrogen Purge (H&V)	II	A2	Out	Outside Outside	Gate (I-V-25-13,15) Gate (I-V-25-14,16)	3" 3"	Manual Manual	- -	- -	- -	Locked Closed Locked Closed	- -	Closed Closed
59 & 60	Do Not Penetrate Containment Vessel														
61 To 63	Do Not Penetrate Containment Vessel														
64	Refer to Penetration No. 40														
65 & 66	Do Not Penetrate Containment Vessel														
67 & 68	Containment Vacuum Relief		II	A1	In	Inside Outside	Check (I-V-25-20,21) Butterfly (I-FCV-25-7&8)	24" 24"	Automatic -	- -	- -	- 5	- Closed	- Closed	- Closed

* Although this is a class A1 penetration, the piping is seismic Class I on both sides of containment.

** Although this is a class A2 penetration, the piping forms a closed seismic Class I system outside containment.

Parameter	Quanity	Class IE	Where Available	Sample Rate	Type Signal	Comments
RC System						
Hot leg temperature	2	No	On DDPS	10 sec	Analog	1 per RCS Hot Leg
Cold leg temperature	4	No	On DDPS	10 sec	Analog	1 per RCS Cold Leg
Pressurizer Level (WR)	1	No	Instr Cab	10 sec	Analog	
Pressurizer Pressure	1	No	Instr Cab	10 sec	Analog	
PORV & Safety Valve Indication	5	No	Instr Cab	1 min	Contact	Alarm
Steam System						
Steam Generator Pressure	2		On DDPS	10 sec	Analog	
Steam Generator Level	2		Instr Cab	10 sec	Analog	
Aux FW Flow	2	Yes	Instr Cab	10 sec	Analog	
ECCS						
H. Head Safety Injection Flow	4	Yes	Instr Cab	10 sec	Analog	
Containment						
Containment Pressure	1	Yes	Instr Cab	1 min	Analog	
Containment Sump Level	1		New	1 min	Analog	
Air Ejector Radiation	1		App. I Comp.	1 min	Analog	
Containment Radiation	1		App. I Comp.	1 min	Analog	

Parameter	Quanity	Class IE	Where Available	Sample Rate	Type Signal	Comments
Noble Gas Activity	1		App. I Comp.	1 min	Analog	Vent Stack
Particulate Activity	1		App. I Comp.	1 min	Analog	Vent Stack
Radioiodine			App. I Comp.	1 min	Analog	Vent Stack
Meteorological						
Wind Speed	1	No	App. I. Comp.	1 min	Analog	
Wind Direction	1	No	App. I. Comp.	1 min	Analog	