

# REGULATOR INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 FACIL: 50-261 H. B. Robinson Plant, Unit 2, Carolina Power & Light C 05000261  
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 RUBENSTEIN, L. S. PWR Project Directorate 2

SUBJECT: Forwards Rev 2 to 841231 submittal re compliance w/Reg Guide  
 1. 97, providing corrections & updates.

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 TITLE: OR/Licensing Submittal: Suppl 1 to NUREG-0737(Generic Ltr 82-33)

## NOTES:

RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
PWR-A ADTS	1 1	PWR-A EB	1 1
PWR-A EICSB	2 2	PWR-A FOB	1 1
PWR-A PD2 LA	1 1	PWR-A PD2 PD	7 7
REQUA, G	1 1	PWR-A PSB	1 1
PWR-A RSB	1 1		
INTERNAL: ADM/LFMB	1 0	IE/DEPER/EPB	3 3
NRR BWR ADTS	1 1	NRR PAULSON, W	1 1
NRR PWR-B ADTS	1 1	NRR/DSRO EMRIT	1 1
NRR/DSRO/EIB	1 1	NRR/DSRO/RSIB	1 1
<u>REG FILES</u>	1 1	RGN2	1 1
EXTERNAL: LPDR	1 1	NRC PDR	1 1
NSIC	1 1		



Carolina Power & Light Company

SERIAL: NLS-86-267

JUL 28 1986

Director of Nuclear Reactor Regulation  
Attention: Mr. Lester S. Rubenstein, Director  
PWR Project Directorate #2  
Division of PWR Licensing - A  
United States Nuclear Regulatory Commission  
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261/LICENSE NO. DPR-23  
REVISION NO. 2 TO REGULATORY GUIDE 1.97 SUBMITTAL

Dear Mr. Rubenstein:

Attached is Revision No. 2 to the H. B. Robinson, Unit No. 2 submittal dated December 31, 1984, regarding compliance with Regulatory Guide 1.97. The Revision provides corrections and updates the original, consistent with the current plans of Carolina Power & Light Company.

Questions regarding this matter may be referred to Mr. Jan Kozyra at (919) 836-7924.

Yours very truly,

A. B. Cutter - Vice President  
Nuclear Engineering & Licensing

ABC/JSK/vaw (4016JSK)

Attachment

cc: Dr. J. Nelson Grace (NRC-RII)  
Mr. G. Requa (NRC)  
Mr. H. Krug (NRC Resident Inspector - RNP)

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The classifications are not mutually exclusive as instrumentation may be included as more than one type of variable, as well as being used for normal operations. The Type A variables were selected based on an evaluation of the design basis events included in Chapter 15, "Accident analysis," of the H. B. Robinson Unit 2 FSAR, or events enveloped by the Chapter 15 analyses, and the H. B. Robinson operating procedures.

Events involving natural phenomena such as fires, floods, and non-mechanistic low energy line breaks were not included in this review. The Type B, C, D, and E variables listed in the compliance table represent adequate instrumentation to monitor and assess systems and variables following an accident at the H. B. Robinson Unit 2 plant.

#### DESIGN CRITERIA

Design and qualification categories are assigned in accordance with the regulatory guide based upon whether the variable is considered to be a key variable for system status indication or for backup or diagnosis. A key variable is that single variable (or minimum number of variables) that most directly indicates the accomplishment of a safety function (Types B and C), the operation of an individual safety system (Type D) or radioactive material release (Type E). Key Type A, B, or C variables are Category 1 and the backup variables are Category 3. For Type A, all variables are considered as key variables. For Types D and E, key variables are Category 2 while backup variables are Category 3. The CP&L classification adheres strictly to this policy, whereas, the Regulatory Guide (RG) 1.97 Table 3 categories may deviate from this general philosophy.

In describing existing instrumentation, some credit is taken for future Emergency Response Facility Information System (ERFIS) or Safety Parameter Display System (SPDS) indications in the Control Room, but no credit is taken for future TSC/EOF instrumentation/indication. However, the H. B. Robinson ERFIS will eventually include all channels of each of the variables listed in this submittal. Existing RG 1.97 instrumentation channels will be available on ERFIS once the original installation is complete. New channels of instrumentation added for RG 1.97 will be treated as modifications to ERFIS and added after ERFIS's original installation. All ERFIS channels will be available for call up and trending from the Control Room.

Instrumentation located in mild environments is considered to be environmentally qualified. To identify high radiation areas, anticipated post-accident radiation levels for zones within the Auxiliary Building are obtained from the General Arrangement Drawing of Reactor Auxiliary Building, Radiation Shielding Design Review. Other areas not shown on this General Arrangement Drawing including the Turbine Deck, Fuel Handling Building, Monitor Building on top of the Auxiliary Building, and the Yard are considered to be mild environments. The pipe alley inside the Auxiliary Building is identified as a harsh environment on the general arrangement drawing mentioned above as well as being a harsh environment for certain High Energy Line Break (HELB) events.

Paragraph 5.0 - Quality Assurance:

The quality assurance requirements invoked for the currently installed equipment were the Corporate Quality Assurance Program requirements in effect at the time of the purchase. As part of the implementation of this regulatory guide, H. B. Robinson will ensure that the equipment associated with Category 1 instrument channels are on the plant's Q-List such that the current H. B. Robinson Quality Assurance Program requirements will be invoked for future procurement, maintenance, and design change activities. Adherence to the requirements of the regulatory guides listed in this paragraph will be done if they are in the H. B. Robinson QA Program commitments.

Paragraph 6.0 - Display and Recording:

H. B. Robinson's specific position on each variable is given in the Compliance Tables.

Design and Qualification Criteria - Category 2

Paragraph 1.0 - Equipment Qualification

H. B. Robinson is an operating plant licensed prior to RG 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants." H. B. Robinson will commit to ensuring environmental qualification per our Equipment Qualification submittal of March 2, 1984. Additionally, H. B. Robinson will only qualify equipment located in a harsh environment to these requirements. Thus, equipment forming part of an instrumentation loop and which is located in a mild environment may not be qualified by testing.

R2

Paragraph 3.0 - Power Source:

H. B. Robinson's specific position on each variable is given in the Compliance Tables.

Paragraph 4.0 - Channel Availability:

H. B. Robinson agrees with the intent of this position.

Paragraph 5.0 - Quality Assurance:

H. B. Robinson's position on quality assurance requirements for Category 2 safety-related instruments is the same as stated for Category 1 equipment. For nonsafety-related Category 2 instruments, the need for quality assurance requirements will be evaluated on a case-by-case basis. In general, quality assurance program requirements will not be imposed on nonsafety-related Category 2 instruments.

Paragraph 6.0 - Display and Recording:

H. B. Robinson's specific position on each variable is given in the Compliance Tables.

the IEB 79-01B environmental qualification program. The capability to service, test, and calibrate the instruments during plant operation will be provided where necessary and feasible to do so.

The utilization of design features such as locked cabinets and seals to allow establishment of controlled access to equipment setpoint, calibration, and other adjustments is employed on a limited basis. For those cabinets not locked, H. B. Robinson relies on procedure controls and personnel training.

Periodic checking, testing, calibrations, and calibration verification for protection instrumentation is in accordance with IEEE-338-1971, "Trial - Use Criteria for the Periodic Testing of Nuclear Power Generating Stations Protective Systems."

Paragraph 11.0 - Human Factors:

This will be reviewed and considered as part of the Detailed Control Room Design Review.

Paragraph 12.0 - Direct Measurement:

H. B. Robinson's specific position on each variable is given in the Compliance Tables.

V. H. B. ROBINSON VARIABLE EXCEPTIONS

There are five variables specifically listed in RG 1.97, Revision 3 Table 3 which are not included in the H. B. Robinson variable list. The variables and the reasons for their omission are presented below:

1. Reactor Coolant Pump Status - RCS Loop Flow is used by CP&L in place of Reactor Coolant Pump Status due to its more definitive indication of how much flow is provided for each loop. | R2
2. Containment Sump Water Temperature - Sump temperature is not required for RHR operation or assurance that NPSH requirements are met as NPSH calculations conservatively assume the presence of saturated water. Numerous parameters in the reactor coolant system as well as containment parameters such as temperature and pressure are available to help determine plant conditions. Sump level indicates the quantity of water present and the above parameters indicate its source. However, containment sump water temperature measurement will be provided through use of the residual heat removal heat exchanger inlet temperature instrumentation and will be designated as Category 3. | R2
3. Radiation Exposure Rate - CP&L does not consider the function of this variable to be consistent with the purpose of a Type E variable (i.e., to determine the magnitude of an offsite release). Portable radiation monitoring equipment is provided for determining where access in the plant may or may not be allowed to service or operate equipment. | R2

4. Component Cooling Water Flow to Engineered Safety Feature (ESF) System - The Component Cooling Water (CCW) Flow to ESF System components variable is being addressed by a combination of variable which are listed below:

CCW Header Flow	D2
CCW Surge Tank Level	D2
CCW to Residual Heat Removal (RHR) Pumps Low Flow Indication	D3
CCW to Safety Injection (SI) Pumps Low Flow Indication	D3
CCW to Containment Spray (CS) Pumps Low Flow Indication	D3
CCW Pump Status	D3

The CCW Header Flow indications is downstream of all three CCW pumps. This parameter provides an indication of the total flow going to all ESF components. The CCW Surge Tank Level provides indication that an adequate surge volume and suction head for the CCW pumps is available. The valves in the lines going to the RHR, SI, and CS pumps are manually operated and required by administrative controls to be open prior to plant startup. As backup to the header flow, the low flow indications on the CCW lines at the discharge from the RHR, SI, and CS pumps are used. One low flow indication exists for the three SI pumps and one low flow indication for both CS pumps exists. Each RHR pump has a low flow indication. Also, the CCW pumps status are backup variables.

TABLE A

Safety Function	Variable	Sensor	Cat	RG 1.97 or HBR	Range	EQ	SQ	Power	Redun- dant	Sensor Loca- tion	Display	Recorder	Comments
Reactivity Control	Neutron Flux (Source Range)	N31 N32	1	RG 1.97 HBR	Plant Specific 10 <sup>0</sup> - 10 <sup>6</sup> cps	Yes No	Yes No	Standby N31=DB N32=BB	Yes Yes	-- CV	Continuous RTGB	Yes Yes(2)	
Core Cooling	RCS Pressure (WR)	PT-402	1	RG 1.97 HBR	Plant Specific 0-3000 psi	Yes YES	Yes YES	Standby DB	Yes No	-- CV	Continuous RTGB	Yes Yes	Recorder has a DB power supply. R2
Core Cooling	Core Exit Temperature	T1 thru T51	1	RG 1.97 HBR	Plant Specific 100-700°F	Yes No	Yes No	Standby DB	Yes Yes(3)	-- CV	Continuous On Demand	Yes No	All T/Cs have same power supply.
Core Cooling	RCS Hot Leg Water Temperature	TE-413 TE-423 TE-433	1	RG 1.97 HBR	Plant Specific 50-650°F	Yes No	Yes No	Standby DB	Yes Yes	-- CV	Continuous RTGB	Yes Yes	One recorder provides only RTGB indication for all 3 channels, BB power supply.
Core Cooling	RCS Cold Leg Water Temperature	TE-410 TE-420 TE-430	1	RG 1.97 HBR	Plant Specific 50-650°F	Yes No	Yes No	Standby DB	Yes Yes	-- CV	Continuous RTGB	Yes Yes	One recorder provides only RTGB indication for all 3 channels, DB power supply.
Core Cooling	RWST Level	LT-948	1	RG 1.97 HBR	Plant Specific 0-100%	Yes (1)	Yes (1)	Standby BB	Yes No	-- Yard	Continuous RTGB	Yes No	
Core Cooling	CST Level	LT-1454A LT-1454B	1	RG 1.97 HBR	Plant Specific 0-100%	Yes Yes	Yes ORIG	Standby Ch.A=DB Ch.B=DB	Yes Yes	-- Yard	Continuous RTGB	Yes No	Mild environment

Variable:RCS Pressure (WR)

Category:A1, B1, B3, C1

Compliance: For the core cooling safety function of Type B variables, RCS pressure is shown as a Category 3 variable. RCS pressure provides an indication of subcooling margin and, thus, indirectly provides information as to the accomplishment of core cooling. Core exit temperature provides the most direct indication of core cooling and is given as Category 1 for this safety function while RCS serves as backup/verification indication and is a Category 3.

As a Type C variable, RCS pressure is not shown for the containment safety function. RCS pressure provides indication of a potential breach of the RCPB which then infers a potential breach of containment. However, since RCS pressure is already shown as the primary variable for potential breach of the RCPB, containment pressure is shown as the primary indication for a potential breach of containment. Thus, for the containment safety function, containment pressure is assigned as Category 1 and RCS pressure is not considered necessary.

The existing design of this variable does meet the requirements of RG 1.97 Category 1 in the areas of seismic qualification.

R2

CP&L Position: An RTGB indicator will be installed for one of the existing extended range pressurizer pressure channels (PT-500 or PT-501) to satisfy redundancy requirements.

TABLE B

Safety Function	Variable	Sensor	Cat	RG 1.97 or HBR	Range	EQ	SQ	Power	Redun- dant	Sensor Loca- tion	Display	Recorder	Comments
Core Cooling	Reactor Vessel Water Level	LT-511AA	3	RG 1.97	Bottom of hot leg to top of vessel	NR	NR	NR	NR	--	On Demand	NR	System is being installed.
		LT-511AB		HBR	Bottom to top of vessel	NR	NR	BB	Yes	AB	RTGB	Yes	
		LT-511BA											
		LT-511BB											
		LT-511BC											
LT-511AC													
Core Cooling	RCS Subcooling Margin	CCM-520	3	RG 1.97	200°F sub-cooling to 35°F superheat	NR	NR	NR	NR	--	On Demand	NR	PT-456=Ch.1 PT-457=Ch.2
		CCM-521		HBR	200°F sub-cooling to 2250° F superheat	NR	NR	Ch.1=BB Ch.2=DB	Yes	CV	RTGB	NR	
RCS Integrity	RCS Pressure (WR)	PT-402	1	RG 1.97 HBR	0-3000 psig 0-3000 psi	Yes YES	Yes YES	Standby DB	Yes No	-- CV	Continuous RTGB	Yes Yes	Recorder has DB power supply.
RCS Integrity	SG Blowdown Radiation Level	R-19	1	RG 1.97 HBR	NR $4 \times 10^{-5}$ - $3.5 \times 10^{-2}$ $\mu$ Ci/cc	Yes Yes	Yes No	Standby BB	Yes No	-- AB	Continuous RTGB	Yes Yes(4)	Mild environment.
RCS Integrity	Containment Area Radiation (HI Range)	R-32A R-32B	1	RG 1.97 HBR	NR 1-10 <sup>7</sup> R/hr	Yes (1)	Yes (1)	Standby R-32A=DB R-32B=BB	Yes Yes	-- CV	Continuous RTGB	Yes Yes	
RCS Integrity	Containment Pressure	PT-956	3	RG 1.97	0-design pressure	NR	NR	NR	NR	--	On Demand	NR	Design pressure = 42 psig
		PT-957		HBR	0-120 psig	NR	NR	PT956=DB PT957=BB	Yes	AB	RTGB	Yes	

Variable: Containment Area Radiation (Hi-Range)

Category: B3, C3, E2

Compliance: For the Type E variables, the containment area radiation (hi-range) variable provides primary indication of the containment radiation safety function. Thus, per the guidelines of RG 1.97 which states that key variables for Type E be assigned as Category 2, the containment area radiation (hi-range) variable is a Category 2.

The existing design of this variable does not meet the requirements of RG 1.97 Category 2 in the area of environmental qualification. Environmental qualification may be determined to be acceptable following a comparison of the instrument's test results to HBR specific profiles.

CP&L Position: These monitors were purchased and installed as environmentally qualified to meet the "TMI Lessons Learned" program at HBR. Their test report will be evaluated against the HBR profiles to establish qualification. Additionally, the detector connector installation will be verified to assure it is installed per test report requirements to assure qualification.

R2

Variable: Condenser Air Ejector Radiation Level

Category: B3, C3, E3,

Compliance: This instrument provides backup indication of breach of the RCPB to the secondary side and meets the RG 1.97 requirements for Category 3 variables.

CP&L Position: No modifications are required.

|R2

Variable: Containment Particulate/Noble Gas Radiation Level

Category: B3, C3, E3

Compliance: These radiation monitors indicate the plant vent and containment radiation levels and act as backup indication of a breach of the RCPB to containment. The containment radiation level (hi-range) and the plant vent and particulate monitors are shown as the key variables, as they provide extended range capability. The existing monitors do not meet the RG 1.97 range requirements for Category 3 instruments. However, since R-12 is a backup variable and its key variables meet their range requirements then R-12 will not be modified. For particulate activity, HBR has the capability for onsite analysis of particulate activity over the required range. Therefore, R-11 will not be modified.

R2

CP&L Position: No modifications are required.

Variable: Incore Instrumentation Area Radiation Level

Category: B3, C3, E3

Compliance: The incore instrumentation radiation monitor provides backup indication of a breach of the RCPB to containment and satisfies all RG 1.97 requirements for Category 3 instruments. The containment area radiation level (hi-range) monitors provide extended range coverage and are assigned as Category 2.

| R2

CP&L Position: No modifications are required.

TABLE C

Safety Function	Variable	Sensor	Cat	RG 1.97 or HBR	Range	EQ	SQ	Power	Redun- dant	Sensor Loca- tion	Display	Recorder	Comments
Fuel Cladding Integrity	Core Exit Temperature	T1 thru T51	1	RG 1.97	200-2300°F	Yes	Yes	Standby	Yes	--	Continuous	Yes	Diverse indication provided by the 51 channels - all T/Cs have same power supply.
				HBR	100-700°F	No	No	DB	Yes(3)	CV	On Demand	No	
Fuel Cladding Integrity	RCS Activity & Coolant Analysis		3	RG 1.97	Activity: 1/2-100 X Tech Spec Analysis: 10 $\mu$ Ci/ml- 10 Ci/ml or TID-14844 source term in coolant volume	NR	NR	NR	NR	--	On Demand	NR	Provided by PASS or other samples.
				HBR	Activity: 1/2- 100 X Tech Spec Analysis: 1 $\mu$ Ci/ml- 10 Ci/ml	NR	NR	NR	NR	AB	None	NR	
Fuel Cladding Integrity	Letdown Radiation Level	R-9	3	RG 1.97	NR	NR	NR	NR	NR	--	On Demand	NR	
				HBR	0-100K mr/hr	NR	NR	DB	NR	AB	RTGB	NR	
RCS Integrity	RCS Pressure (WR)	PT-402	1	RG 1.97	0-3000 psig	Yes	Yes	Standby	Yes	--	Continuous	Yes	
				HBR	0-3000 psi	YES	YES	DB	No	CV	RTGB	Yes	
RCS Integrity	Containment Area Radiation (H1 Range)	R-32A R-32B	1	RG 1.97	1-10 <sup>4</sup> R/hr	Yes	Yes	Standby	Yes	--	Continuous	Yes	
				HBR	1-10 <sup>7</sup> R/hr	(1)	(1)	R-32A=DB R-32B=BB	Yes	CV	RTGB	Yes	

Variable: Primary PORV Position and Primary Safety Valve Position

Category: C3, D3

Compliance: This variable has been included as a C3 variable to provide additional backup indication of a breach of the RCPB. This indication is only valid for transients involving higher than normal operating pressure. RCS pressure provides the primary indication of a breach of the RCPB. The variable is included as a D2 as it provides primary information regarding the operation of the PORVs and pressurizer safeties which have specific safety functions for the RCS.

The existing instrumentation meets the requirements for Category 3 variables in RG 1.97, but does not meet the Category 2 requirements for environmental qualification. The primary safety valves' position indicating equipment may be shown to be qualified as a result of the testing currently in progress.

CP&L Position: The position indicating equipment for the primary safety valves will be modified or relocated in accordance with the final recommendations from the test report to provide a qualified installation.

Primary PORV position indication will be replaced by qualified position switches.

| R2

Variable: Containment Effluent Radioactivity:  
Main Steamline Radiation Level

Category: C3, E2

R2

Compliance: The installed instruments provide the required range as a Type E2 variable and accomplish the desired function of monitoring radiation levels resulting from main steamline PORV and safety valve actuations following a SGTR.

As a Type C variable, the main steamline monitors have an upper range that extends significantly beyond that required by RG 1.97. The steam generator blowdown monitor (R-19) is assigned as Type C Category 3 for the RCPB breach safety function and has a range of  $4.5 \times 10^{-5} - 3.5 \times 10^{-2}$   $\mu$  Ci/cc. This range is considered adequate to meet RG 1.97 range requirements. The main steamline monitors act as backup indication of a containment breach and are included for the containment safety function even though their range is not used to meet the RG 1.97 range requirements.

R2

R2

For a SGTR, steam generator pressure provides the primary indication of a containment breach and is assigned as Category 1 for the Type C containment integrity safety function. The main steamline radiation level provides only backup/verification indication and is therefore assigned as Category 3.

The existing design meets the requirements of RG 1.97 for Category 2 and 3 variables.

CP&L Position: No modifications are required.

TABLE D

Safety Function	Variable	Sensor	Cat	RG 1.97 or HBR	Range	EQ	SQ	Power	Redun- dant	Sensor Loca- tion	Display	Recorder	Comments
RCS	Pressurizer Heater Status	Control Group Backup Group A Backup Group B	3	RG 1.97 HBR	Electric Current On-Off	NR NR	NR NR	NR Stn.	NR Yes	-- CV	On Demand RTGB	NR NR	
RCS	PORV Block Valve Position	RC-535 RC-536	3	RG 1.97 HBR	NR Open-Closed	NR NR	NR NR	NR DB	NR NR	-- CV	On Demand RTGB	NR NR	
RCS	PRT Pressure	PT-472	3	RG 1.97 HBR	0 - design pressure 0-120 psig	NR NR	NR NR	NR DB	NR NR	-- CV	On Demand RTGB	NR NR	Design pressure = 100 psig.
RCS	PRT Level	LT-470	3	RG 1.97 HBR	Top to Bottom 0-100%	NR NR	NR NR	NR DB	NR NR	-- CV	On Demand RTGB	NR NR	
RCS	RCS Subcooling Margin	CCM-520 CCM-521	3	RG 1.97 HBR	NR 200°F subcooled to 2250°F super- heat	NR NR	NR NR	NR Ch.1 = BB Ch.2 = DB	NR Yes	-- CV	On Demand RTGB	NR NR	CCM-520 = Ch. 1, CCM-521 = Ch. 2.
RCS	PRT Temperature	TE-471	3	RG 1.97 HBR	50°F-750°F 50°F-350°F	NR NR	NR NR	NR DB	NR NR	-- CV	On Demand ERFIS	NR NR	

TABLE D

Safety Function	Variable	Sensor	Cat	RG 1.97 or HBR	Range	EQ	SQ	Power	Redun- dant	Sensor Loca- tion	Display	Recorder	Comments
AFW	AFW Pump Discharge Header Pressure	PT-1421A PT-1421B	3	RG 1.97 HBR	NR 0 - 2000 psig	NR NR	NR NR	NR PT-1421A -BB PT-1421B -DB	NR NR	-- TB	On Demand RTGB	NR NR	PT-1421A monitors discharge pressure of motor driven AFW Pump A and/or Pump B as it is on cross-tie between the 2 pumps. PT-1421B monitors discharge pressure of steam driven AFW pump.
AFW	AFW Pump Discharge Valve Position	AFW-V2-14A AFW-V2-14B AFW-V2-14C AFW-V2-16A AFW-V2-16B AFW-V2-16C	3	RG 1.97 HBR	NR Open-Closed	NR NR	NR NR	NR DB	NR NR	-- TB	On Demand RTGB	NR NR	
Containment Cooling	Containment Spray Flow	FT-958A FT-958B	2	RG 1.97 HBR	0 - 110% of design 0 - 1500 gpm	Yes YES	NR NR	Reliable FT-958A -DB FT-958B -BB	NR NR	-- AB	On Demand RTGB	NR NR	110% of design flowrate = 1277 gpm for each train.
Containment Cooling	Containment Sump Water Temperature	TE604A TE604B	3	RG 1.97 HBR	50°F-250°F 50°F-400°F	NR NR	NR NR	NR DB	NR NR	-- AB	On Demand ERFIS	NR NR	Instrument loop provides residual heat removal heat exchanger inlet temperature considered same as containment sump water temperature.

TABLE D

Safety Function	Variable	Sensor	Cat	RG 1.97 or HBR	Range	EQ	SQ	Power	Redun- dant	Sensor Loca- tion	Display	Recorder	Comments
Containment Cooling	Containment Spray Addition Tank Isolation Valve Position	SI-845A	3	RG 1.97	NR	NR	NR	NR	NR	--	On Demand	NR	
		SI-845B		HBR	Open-Closed	NR	NR	DB	NR	AB	RTGB	NR	
		SI-845C											
Containment Cooling	Containment Spray Pump Discharge Isolation Valve Position	SI-880A	3	RG 1.97	NR	NR	NR	NR	NR	--	On Demand	NR	
		SI-880B		HBR	Open-Closed	NR	NR	DB	NR	AB	RTGB	NR	
		SI-880C											
		SI-880D											
Containment Cooling	Containment Atmosphere Temperature and Pressure	TC-1A	3	RG 1.97	40-400°F	NR	NR	NR	NR	--	On Demand	NR	
		TC-2A		HBR	0-300°F	NR	NR	TBD	NR	CV	RTGB	NR	
		TC-3A											
		TC-4A											
		TC-5A											
		PT-956	3	RG 1.97	NR	NR	NR	NR	NR	--	On Demand	NR	
		PT-957		HBR	0-120 psig	NR	NR	PT-956=DB PT-957=BB	NR	AB	RTGB	Yes	
CVCS	Charging Flow	FT-122	2	RG 1.97	0-110% design flow	Yes	NR	Reliable	NR	--	On Demand	NR	Pump design flow = 77 gpm.
				HBR	0-150 GPM	YES	NR	BB	NR	AB	RTGB	NR	1.1x77 = 85 gpm.   R2
CVCS	Letdown Flow	FT-150	2	RG 1.97	0-110% design flow	Yes	NR	Reliable	NR	--	On Demand	NR	Letdown design flow equals charging design flow.
				HBR	0-150 GPM	Yes	NR	DB	NR	AB	RTGB	NR	

Variable: Containment Spray Flow

Category: D2

Compliance: The existing design of this variable does meet the requirements for RG 1.97 Type D Category 2 in the area of environmental qualification.

| R2

CP&L Position: No modifications are required.

| R2

Variable: Containment Coolers Service Water Low Flow Indication

Category: D2

Compliance: CP&L provides two key variables (i.e., Category 2) to indicate the heat removal by the containment coolers: 1) containment coolers service water low flow indication and 2) containment coolers fan motor status. In addition, containment atmosphere temperature, containment pressure, and service water from containment coolers radiation level are provided as backup variables (i.e., Category 3). These variables are considered adequate to provide indication of the proper operation of the containment recirculation cooling system.

Containment coolers service water flow indications does not meet the requirements of a RG 1.97 Category 2 variable due to unacceptable environmental qualification.

CP&L Position: The existing sensors will be replaced with environmentally qualified differential pressure switches.

R2

Variable: Charging Flow

Category: D2

Compliance: The variable does meet the requirements of RG 1.97 Type D | R2  
Category 2 in the area of environmental qualification.

CP&L Position: No modifications are required. | R2

TABLE E

Safety Function	Variable	Sensor	Cat	RG 1.97 or HBR	Range	EQ	SQ	Power	Redun-dant	Sensor Loca-tion	Display	Recorder	Comments
Airborne Radioactive Plant Release	Plant Vent	R-14	2	RG 1.97	$10^{-6}$ - $10^{-5}$ $\mu\text{Ci/cc}$	Yes	NR	Reliable	NR	--	On Demand	Yes	Mild Environment
	Gas and	R-34			-noble gas	Yes	NR	R-14=BB	NR	AB	R-14,-35,	R-34=No	R-14,-35 = noble gas
	Particulate	R-35			$10^{-3}$ - $10^{-2}$ $\mu\text{Ci/cc}$			R-34,-35			-36=RTGB	R-35,-36	monitors. R-34,-36 =
	Radiation Level	R-36			-particulate			-36=DB			R-34=Local	=Yes	noble gas, particu-
				HBR	R-14: $2 \times 10^{-5}$							R-14=Yes	late, iodine monitors.
					$-1 \times 10^{-1}$								(2) R-35,-36 recorder has
					R-34: $10^{-7}$ - $10^{-2}$								BB power, R-34,-36
					R-35: $10^{-3}$ - $10^{-2}$								sample pump has DB
					R-36: $10^{-1}$ - $10^{-5}$								power.
					$\mu\text{Ci/cc}$ (noble gas)								
				$10^{-3}$ - $10^{-2}$ $\mu\text{Ci/cc}$									
				(particulate)(5)									
Airborne Radioactive Plant Release	Main Steam-line Radiation Level	R-31A	2	RG 1.97	$10^{-1}$ - $10^{-3}$ $\mu\text{Ci/cc}$	Yes	NR	Reliable	NR	--	On Demand	Yes	Recorder is on BB power supply. Mild environment.
		R-31B		HBR	$10^{-1}$ - $10^{-3}$ $\mu\text{Ci/cc}$	Yes	NR	BB	NR	AB	RTGB	Yes	
		R-31C											
Airborne Radioactive Plant Release	Fuel Handling Bldg. Lower Level Radiation Level	R-20(Gas)2	RG 1.97		$10^{-6}$ - $10^{-2}$ $\mu\text{Ci/cc}$	Yes	NR	Reliable	NR	--	On Demand	Yes	Detectors are battery-backed. Both sample pumps are diesel-backed. Mild environ
		R-30(Gas)	HBR		R-20 $1.6 \times 10^{-6}$ - $10^{-1}$	Yes	NR	BB	NR	FHB	RTGB	Yes(2)	
					R-30 $10^{-2}$ - $10^{-3}$								
					$\mu\text{Ci/cc}$								
		R-20	2	RG 1.97	$10^{-3}$ - $10^{-2}$ $\mu\text{Ci/cc}$	Yes	NR	Reliable	NR	--	NR	NR	Sample provided for analysis. No on-line indication.
		(particulate)		HBR	$10^{-3}$ - $10^{-2}$ $\mu\text{Ci/cc}$	Yes	NR	BB	NR	FHB	NR	NR	
Airborne Radioactive Plant Release	Plant Vent Flow Rate	No	3	RG 1.97	0-110% design	NR	NR	NR	NR	--	On Demand	NR	Design flow = 102,550 scfm. 1.1 x design flow = 112,805 scfm. Local recorder.
		Inst. No.		HBR	0-120,000 scfm	NR	NR	NR	NR	AB	Local	NR	

Table E