SNUPPS
Standardized Nuclear Unit
Power Plant System

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SUBJ: Regulatory Guide 1.97

Mr. Harold Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Docket Nos: STN 50-482 and STN 50-483

Dear Mr. Denton:

Provided herewith is the SNUPPS response to Revision 2 of Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions during and Following an Accident". Post-accident monitoring is license condition #11 in the Callaway and Wolf Creek SERs. The response is in the form of an FSAR addition and will be included in the next revision to the SNUPPS FSAR.

Very truly yours,

NA Petrick

Nicholas A. Petrick

RLS/mtk

Attachment

cc: G. L. Koester KGE
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APPENDIX 7A

7A.1 INTRODUCTION

This appendix provides an evaluation of the instrumentation to assess plant and environs conditions following an accident. The plant instrumentation and features provided in the SNUPPS units have resulted from detailed design evaluations and reviews. Design features that enable the plant to be taken to cold shutdown while utilizing only safety-grade equipment are described in Appendix 5.4A, Cold Shutdown. Chapter 18.0 provides a comparison of the SNUPPS design to the requirements of NUREG-0737.

Since most of the instrumentation in the SNUPPS units was purchased and installed prior to the issuance of Regulatory Guide 1.97, strict compliance to the many prescriptive recommendations is not provided in all cases. However, the SNUPPS instrumentation and control room design is adequate to allow the operators to evaluate and mitigate the consequences of postulated accidents.

This appendix provides a detailed comparison of the SNUPPS design to the recommendations contained in the regulatory guide.

7A.2 ORGANIZATION

The text of this appendix provides a summary description of the bases for the SNUPPS instrumentation design as they relate to the recommendations of the regulatory guide. The tables provide the data necessary to perform a detailed comparison of the SNUPPS design with the recommendations of the regulatory guide.

Table 7A-1 is a cross-reference between Table 2 of the regulatory guide and the information presented in this appendix. Table 7A-1 lists the variables in the same sequence in which they appear in the regulatory guide table, assigns variable identification numbers, and identifies the data sheet upon which the detailed comparison with the SNUPPS design has been provided.

Table 7A-2 provides a summary of the SNUPPS design to the recommendations of the regulatory guide. This table also serves as an index to the data sheets in Table 7A-3.

Table 7A-3 consists of individual data sheets. One data sheet is provided for each variable or group of related variables identified in Table 2 of the regulatory guide. The data sheet contains the recommended range, category, and purpose for the variable and includes the multiple listing requirements. A discussion is provided of the SNUPPS plant design bases for

ranges, qualification, etc., and other pertinent data which support the adequacy of the current design or describe design modifications which are being implemented. Table 7A-3 also provides an indication of the computer into which the variable is inputted and thereby made available to the Emergency Response Facility Information System (ERFIS) computer network.

7A.3 SNUPPS DESIGN BASIS COMPARISON TO REGULATORY GUIDE 1.97

The SNUPPS design bases are stated throughout the FSAR. The discussions provided below summarize the SNUPPS design bases as they pertain to the salient recommendations of the regulatory guide. Appropriate references to other FSAR sections are provided in Table 7A-3 for more detailed information. The discussions below are intended to aid the review of the SNUPPS design bases for compliance with the intent of the regulatory guide recommendations.

7A.3.1 TYPE A VARIABLES

Variables classified as Type A for the SNUPPS design are identified in Table 7A-2. The reason for the classification is provided on the corresponding data sheet in Table 7A-3.

The following criteria are the bases for identification of Type A variables for the SNUPPS plants. The terminology used in the discussion is consistent with that of the generic Emergency Response Guidelines (ERGs) for Westinghouse plants, which were submitted to the NRC by Westinghouse Owners Group letter OG-64, dated November 30, 1981.

a. Variables used for event diagnosis are classified as Type A because these variables direct the operator to the appropriate Optimal Recovery Guidelines (formerly termed Emergency Operating Instructions) or to monitoring of critical Safety Functions.

b. Variables used by the operator to perform manual actions prescribed by the Optimal Recovery Guidelines, which are associated with Condition IV events (LOCA, MSLB, and SGTR), are classified as Type A. Condition I, II and III events are not considered in identifying Type A variables (e.g., Spurious Safety Injection).

c. Variables which identify the need for operator action to correct single failures are not classified as Type A. These actions are often identified as "Notes" or "Contingency Actions" in the ERGs.

d. Variables associated with operator actions required for events not currently in the design bases of the plant are not identified as Type A variables.

7A.3.2 REDUNDANCY AND DIVERSITY FOR CATEGORY 1 VARIABLES

The following discussion summarizes salient points of the SNUPPS design with respect to the regulatory recommendations:

a. Adequate redundancy is considered to exist when adequate information is available to the operator to make appropriate decisions, assuming a single failure. This is done on a system, loop, or component basis, as appropriate. For the steam generator heat sink function and pressurizer, it was done on a component basis. For the reactor and reactor coolant loops, it was done on a system basis due to the abundance of diverse or associated variables which are available to indicate the nature of the event and identify its cause.

b. Diverse variables are considered to be those which vary directly with or have a direct relation with the primary variable. Associated variables are those which, when considered with the primary and/or diverse variables, aid in the identification and evaluation events and the status of the plant.

c. The need for a third reading or a diverse variable is based on the control room operators' need for the identification of the proper recovery from an event. Diversity is not provided solely for TSC/EOF use, accident reconstruction, or range not associated with DBEs.

d. Since the need for a diverse variable arises upon the single failure of the primary instrumentation and that failure must result in ambiguity (e.g., the instrument fails in midscale, not offscale high or low), diverse variables may be performance or commercial grade. Many diverse variables on SNUPPS are qualified as Class IE for reasons other than their diversity function.

e. Items identified as diverse variables are not considered to be part of the post-accident monitoring data base and are not included in the Emergency Response Facility Data Base solely for that purpose. Many diverse variables are part of the post-accident monitoring data base because of their primary function. Since it is highly unlikely that a variable will be required for a diversity function, the EOF/TSC may contact the control room should the need arise.

7A.3.3 RECORDERS

Dedicated recorders are required only where trend information is immediately required for operator use. The current value (indicated) of the PAMs variables is normally used by the operator for decision-making purposes. Where Class IE indicators are provided, recorders may be performance grade.

7A.3.4 INSTRUMENT RANGES

Instrument ranges have been determined, considering the function(s) of the sensed parameters. The installed instrumentation may meet the ranges recommended in the regulatory guide, meet the intent of the recommended range, or have a range appropriate for the design function. Instrumentation that has an appropriate range is identified on Table 7A-2. The ranges are justified on the individual data sheets of Table 7A-3.

7A.3.5 UNNECESSSARY VARIABLES

Several variables listed in the regulatory guide are not necessary for post-accident monitoring for the SNUPPS units. Table 7A-2 identifies which variables are considered unnecessary from a post-accident monitoring standpoint, and the individual data sheets provide a discussion justifying the determination.

7A.3.6 QUALIFICATION FOR CATEGORY 1 PARAMETERS

With one exception, Tables 7A-2 and 7A-3 show that instrumentation for all variables designated as Category 1 by the NRC and those designated as Type A herein are qualified as Class IE from the sensor to the indicator. The only exception is the neutron detectors which are suitably qualified for their function. Refer to data sheet 1.1 for further discussion of these items.

Qualification of these devices will be justified in the NUREG-0588 submittals which will be provided in the last quarter of 1982. All Class IE equipment is qualified to IEEE-323-1974 and IEEE-344-1975.

7A.3.7 QUALIFICATION FOR CATEGORY 2 PARAMETERS

The SNUPPS design utilizes Class IE and non-Class IE sensors, transmitters, indicators, and power sources. There is no qualification category between these two categories, as implied by the Category 2 terminology of the regulatory guide.

Table 7A-2 shows that many of the Category 2 items are in fact fully qualified to Class IE environmental and seismic requirements. These items exceed the regulatory recommendations.

The non-Class IE instruments are termed performance grade. These items are purchased to perform in their anticipated service environments for the plant conditions in which they must function. The regulatory guide implies that they must function in the accident environment for the area in which they are located without consideration of the design function. If an instrument has to function following an accident, it is fully qualified to Class IE requirements. If the instrument is not required following an accident, it is termed non-safety-related and purchased to performance grade requirements. The equipment service conditions are provided in the purchase specification and include radiation levels and integrated doses, temperature, relative humidity, and other special considerations. The current qualification levels for each item reflect its importance to safety. Table 7A-3 addresses the function of performance grade items in Category 2.

Non-Class IE equipment is supplied from Separation Groups 5 and 6, which are highly reliable (refer to Chapter 8.0). The non-Class IE 125 V dc buses are backed by the emergency diesel generator.

For the purpose of compliance to the regulatory requirements for seismic qualification for items identified as Category 2, the sensors/transmitters continued operation is not assumed to be required, since the indicators need not be qualified. Assurance of pressure boundary integrity during and after seismic events is ensured for safety-related systems. No seismic requirements are placed on items in non-safety-related systems.

7A.3.8 QUALIFICATION FOR CATEGORY 3 ITEMS

The Category 3 qualification guidelines of the regulatory guide imply a possible need to ensure that the instrument sensor and transmitter are qualified for an accident environment. Table 7A-2 identifies those Category 3 instruments located inside the containment, and the appropriate data sheet of Table 7A-3 justifies the lack of post-accident qualification.

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TABLE 7A-1

REGULATORY GUIDE 1.97 VARIABLE LIST

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
B.1	Reactivity Control	
B.1.1	Neutron Flux	1.1
B.1.2	Control Rod Position	1.2
B.1.3	RCS Soluble Boron Concentration	13.1
B.1.4	RCS Cold Leg Water Temperature	2.1
B.2	Core Cooling	
B.2.1	RCS Hot Leg Water Temperature	2.2
B.2.2	RCS Cold Leg Water Temperature	2.1
B.2.3	RCS Pressure	2.3
B.2.4	Core Exit Temperature	1.3
B.2.5	Coolant Level in Reactor	1.4
B.2.6	Degrees of Subcooling	1.5
B.3	Maintaining Reactor Coolant System Integrity	
B.3.1	RCS Pressure	2.3
B.3.2	Containment Sump Water Level	6.2
B.3.3	Containment Pressure	6.1
B.4	Maintaining Containment Integrity	
B.4.1	Containment Isolation Valve Position (excluding check valves)	6.3

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TABLE 7A-1 (Sheet 2)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
B.4.2	Containment Pressure	6.1
C.1	Fuel Cladding	
C.1.1	Core Exit Temperature	1.3
C.1.2	Radioactivity Concentration or Radiation Level in Circulating Primary Coolant	13.3
C.1.3	Analysis of Primary Coolant (gamma spectrum)	13.1
C.2	Reactor Coolant Pressure Boundary	
C.2.1	RCS Pressure	2.3
C.2.2	Containment Pressure	6.1
C.2.3	Containment Sump Water Level	6.2
C.2.4	Containment Area Radiation	11.1
C.2.5	Effluent Radioactivity - Noble Gas Effluent from Condenser Air Removal System Exhaust	12.2
C.3	Containment	
C.3.1	RCS Pressure	2.3
C.3.2	Containment Hydrogen Concentration	6.4
C.3.3	Containment Pressure	6.1
C.3.4	Containment Effluent Radioactivity - Noble Gases from Identified Release Points	12.1
C.3.5	Radiation Exposure Rate (inside building or areas, e.g., auxiliary building, reactor shield building annulus, and fuel handling building, which are in direct contact with primary containment where penetrations and hatches are located)	11.2

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TABLE 7A-1 (Sheet 3)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
C.3.6	Effluent Radioactivity - Noble Gases (from buildings as indicated above)	12.1
D.1	Residual Heat Removal (RHR) or Decay Heat Removal System	
D.1.1	RHR System Flow	3.1
D.1.2	RHR Heat Exchanger Outlet Temperature	3.1
D.2	Safety Injection Systems	
D.2.1	Accumulator Tank Level and Pressure	3.2
D.2.2	Accumulator Isolation Valve Position	3.2
D.2.3	Boric Acid Charging Flow	3.3
D.2.4	Flow in HPI System	3.3
D.2.5	Flow in LPI System	3.1
D.2.6	Refueling Water Storage Tank Level	3.4
D.3	Primary Coolant System	
D.3.1	Reactor Coolant Pump Status	2.4
D.3.2	Primary System Safety Relief Valve Positions (including PORV and code valves) or Flow Through or Pressure in Relief Valve Lines	2.5
D.3.3	Pressurizer Level	2.6
D.3.4	Pressurizer Heater Status	2.7
D.3.5	Quench Tank Level	2.8
D.3.6	Quench Tank Temperature	2.8
D.3.7	Quench Tank Pressure	2.8

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TABLE 7A-1 (Sheet 4)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
D.4	Secondary System (Steam Generator)	
D.4.1	Steam Generator Level	4.1
D.4.2	Steam Generator Pressure	4.2
D.4.3	Safety/Relief Valve Positions or Main Steam Flow	4.3
D.4.4	Main Feedwater Flow	4.4
D.5	Auxiliary Feedwater or Emergency Feedwater System	
D.5.1	Auxiliary or Emergency Feedwater Flow	5.1
D.5.2	Condensate Storage Tank Water Level	5.2
D.6	Containment Cooling Systems	
D.6.1	Containment Spray Flow	10.1
D.6.2	Heat Removal by the Containment Fan Heat Removal System	8.1
D.6.3	Containment Atmosphere Temperature	6.5
D.6.4	Containment Sump Water Temperature	6.6
D.7	Chemical and Volume Control System	
D.7.1	Makeup Flow-In	7.1
D.7.2	Letdown Flow-Out	7.1
D.7.3	Volume Control Tank Level	7.1
D.8	Cooling Water System	
D.8.1	Component Cooling Water Temperature to ESF System	9.1
D.8.2	Component Cooling Water Flow to ESF System	9.1

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TABLE 7A-1 (Sheet 5)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
D.9	Radwaste System	
D.9.1	High-Level Radioactive Liquid Tank Level	14.1
D.9.2	Radioactive Gas Holdup Tank Pressure	14.2
D.10	Ventilation Systems	
D.10.1	Emergency Ventilation Damper Position	15.1
D.11	Power Supplies	
D.11.1	Status of Standby Power and Other Energy Sources Important to Safety (hydraulic, pneumatic)	16.1
E.1	Containment Radiation	
E.1.1	Containment Area Radiation - High Range	11.1
E.2	Area Radiation	
E.2.1	Radiation Exposure Rate (inside buildings or areas where access is required to service equipment important to safety)	11.2
E.3	Airborne Radioactive Materials Released from Plant	
E.3.1	Noble Gases and Vent Flow Rate	
E.3.1.1	o Containment or Purge Effluent	12.1
E.3.1.2	o Reactor Shield Building Annulus (if in design)	NA
E.3.1.3	o Auxiliary Building (including any building containing primary system gases, e.g., waste gas decay tank)	12.1
E.3.1.4	o Condenser Air Removal System Exhaust	12.2

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TABLE 7A-1 (Sheet 6)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
E.3.1.5	o Common Plant Vent or Multipurpose Vent Discharging Any of Above Releases (if containment purge is included)	12.1
E.3.1.6	o Vent From Steam Generator Safety Relief Valves or Atmospheric Dump Valves	12.3
E.3.1.7	o All Other Identified Release Points	12.4
E.3.2	Particulates and Halogens	
E.3.2.1	o All Identified Plant Release Points (except steam vent design flow generator safety relief valves or atmospheric steam dump valves and condenser air removal system exhaust). Sampling with Onsite Analysis Capability	12.5
E.4	Environs Radiation and Radioactivity	
E.4.1	Radiation Exposure Meters (continuous indication at fixed locations)	17.1
E.4.2	Airborne Radiohalogens and Particulates (portable sampling with onsite analysis capability)	17.2
E.4.3	Plant and Environs Radiation (portable instrumentation)	17.3
E.4.4	Plant and Environs Radioactivity (portable instrumentation)	17.4
E.5	Meteorology	
E.5.1	Wind Direction	17.5
E.5.2	Wind Speed	17.5
E.5.3	Estimation of Atmospheric Stability	17.5

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TABLE 7A-1 (Sheet 7)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
E.6	Accident Sampling Capability (Analysis Capability on Site)	
E.6.1	Primary Coolant	13.1
E.6.1.1	o Gross Activity	13.1
E.6.1.2	o Gamma Spectrum	13.1
E.6.1.3	o Boron Content	13.1
E.6.1.4	o Chloride Content	13.1
E.6.1.5	o Dissolved Hydrogen or Total Gas	13.1
E.6.1.6	o Dissolved Oxygen	13.1
E.6.1.7	o pH	13.1
E.6.2	Sump	13.2
E.6.2.1	o Gross Activity	13.2
E.6.2.2	o Gamma Spectrum	13.2
E.6.2.3	o Boron Content	13.2
E.6.2.4	o Chloride Content	13.2
E.6.2.5	o pH	13.2
E.6.3	Containment Air	
E.6.3.1	o Hydrogen Content	6.4
E.6.3.2	o Oxygen Content	NA
E.6.3.3	o Gamma Spectrum	13.1

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TABLE 7A-2

SUMMARY COMPARISON TO

REGULATORY GUIDE 1.97

DATA SHEET NUMBER	VARIABLE DESCRIPTION	NRC QUAL. CATEGORY	SNUPPS TYPE A VARIABLE	RANGE COMPARISON			SENSOR LOCATION		CHANNEL QUALIFICATION	
				Complies with Req.	Meets Intent	Appropriate Range	Inside Ctmt	Outside Ctmt	Class IE	Perf. Grade
CORE AND REACTOR VESSEL VARIABLES										
1.1	Neutron Flux - Intermediate Range	1		X			X		X	X
1.2	Control Rod Position	3		X			X			X
1.3	Core Exit Temperature	1		X			X		X	
1.4	Reactor Vessel Level	1		X			X		X	
1.5	Subcooling Monitor	2		X			X		X	
RCS AND RELATED VARIABLES										
2.1	RCS T_{cold}	1	Yes		X		X		X	
2.2	RCS T_{hot}	1	Yes		X		X		X	
2.3	RCS Pressure	1	Yes	X			X			X
2.4	RCP Status (motor current)	3		X				X	X	
2.5	Primary System Valve Position	2		X			X		X	
2.6	Pressurizer Level	1	Yes		X		X		X	
2.7	Pressurizer Heater Status	2		X				X		X
2.8	PRT Level	3		X			X			X
2.8	PRT Temperature	3				X	X			X
2.8	PRT Pressure	3		X			X			X
ECCS VARIABLES										
3.1	RHR/LPI Flow Rate	2		X				X		X
3.1	RHR/Heat Exchanger T_{out}	2		X				X		X
3.2	Accumulator Tank Level	2				X	X			X
3.2	Accumulator Tank Pressure	2			X		X			X
3.2	Accumulator Tank Valve Position	2		X				X	X	
3.3	Centrifugal Charging Pump Flow	2		X				X	X	
3.3	Safety Injection Pump Flow	2		X				X		X
3.3	RCP Seal Injection	2		X				X	X	
3.4	RWST Level	1	Yes	X						

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TABLE 7A-2 (Sheet 2)

DATA SHEET NUMBER	VARIABLE DESCRIPTION	NRC QUAL. CATE-GORY	SNUPPS TYPE A VARIABLE	RANGE COMPARISON: Complies with Req.	Meets Intent	Appro-priate Range	SENSOR LOCATION: Inside Ctmt	Outside Ctmt	CHA[illegible] QUALIFI[illegible]: Class IE	P[illegible] Gr[illegible]
	SECONDARY SIDE VARIABLES									
4.1	Steam Generator Level - Wide Range	1			X		X		X	
.1	Steam Generator Level - Narrow Range	1	Yes	NA			X		X	
.2	Steam Line Pressure	1	Yes		X			X	X	
3	Secondary Side PORV Position	2		X				X	X	
	Secondary Side Safety Position	2		NA			NA		NA	
	Main Feedwater Flow Rate	3		X				X		X
	ARY FEEDWATER SYSTEM VARIABLES									
	Auxiliary Feedwater Flow Rate	2		X				X	X	
	Condensate Storage Tank Level (Pressure)	1		X				X	X	
	T VARIABLES									
	ainment Pressure - Design ure Range	1	Yes	X			X		X	
	inment Pressure - Extended	1		X			X		X	
	ment Normal Sump Level	1	Yes	X			X		X	
	ment RHR Sump Level	1		X			X		X	
	ent Isolation Valve Position	1		X			X	X	X	
	nt Hydrogen Concentration	1		X			X		X	
	nt Atmosphere Temperature	2		X			X		X	
	t Sump Temperature	2		NA*						
	N SYSTEM VARIABLES									
	ng Flow	2			X			X		X
	n Flow	2		X				X		X
	Tank Level	2			X			X	X	
	Safety Related	2		X			X		X	

fer to Table 7A-3

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TABLE 7A-2 (Sheet 2)

DATA SHEET NUMBER	VARIABLE DESCRIPTION	NRC QUAL. CATE-GORY	SNUPPS TYPE A VARIABLE	RANGE COMPARISON			SENSOR LOCATION		CHANNEL QUALIFICATION	
				Complies with Req.	Meets Intent	Appro-priate Range	Inside Ctmt	Outside Ctmt	Class 1E	Perf. Grade
SECONDARY SIDE VARIABLES										
4.1	Steam Generator Level - Wide Range	1			X		X		X	
4.1	Steam Generator Level - Narrow Range	1	Yes	NA			X		X	
4.2	Steam Line Pressure	1	Yes		X			X	X	
4.3	Secondary Side PORV Position	2		X				X	X	
4.3	Secondary Side Safety Position	2		NA			NA		NA	
4.4	Main Feedwater Flow Rate	3		X				X		X
AUXILIARY FEEDWATER SYSTEM VARIABLES										
5.1	Auxiliary Feedwater Flow Rate	2		X				X	X	
5.2	Condensate Storage Tank Level (Pressure)	1		X				X	X	
CONTAINMENT VARIABLES										
6.1	Containment Pressure - Design Pressure Range	1	Yes	X			X		X	
6.1	Containment Pressure - Extended Range	1		X			X		X	
6.2	Containment Normal Sump Level	1	Yes	X			X		X	
6.2	Containment RHR Sump Level	1		X			X		X	
6.3	Containment Isolation Valve Position	1		X			X	X	X	
6.4	Containment Hydrogen Concentration	1		X			X		X	
6.5	Containment Atmosphere Temperature	2		X			X		X	
6.6	Containment Sump Temperature	2		NA*						
CHARGING AND LETDOWN SYSTEM VARIABLES										
7.1	Normal Charging Flow	2			X			X		X
7.1	Normal Letdown Flow	2		X				X		X
7.1	Volume Control Tank Level	2			X			X	X	
7.1	Letdown Flow - Safety Related	2		X			X		X	

*Unnecessary Variable - Refer to Table 7A-3

TABLE 7A-2 (Sheet 3)

DATA SHEET NUMBER	VARIABLE DESCRIPTION	NRC QUAL. CATE-GORY	SNUPPS TYPE A VARIABLE	RANGE COMPARISON			SENSOR LOCATION		CHANNEL QUALIFICATION	
				Complies with Reg.	Meets Intent	Appro-priate Range	Inside Ctmt	Outside Ctmt	Class IE	Perf. Grade
CONTAINMENT COOLING SYSTEM VARIABLES										
8.1	Containment Cooler Heat Removal	2		NA*						
COMPONENT COOLING WATER SYSTEM VARIABLES										
9.1	Component Cooling Water Temperature to ESF	2		X				X		X
9.1	Component Cooling Water Flow Rate to ESF	2		X				X		X
CONTAINMENT SPRAY SYSTEM VARIABLES										
10.1	Containment Spray Flow Rate	2			X			X		X
AREA RADIATION MONITORING 1										
11.1	Containment Area Radiation	1	Yes	X			X		X	
11.2	Area Radiation Monitor - Containment Penetration Area	2				X		X		X
EFFLUENT MONITORS										
12.1	Unit Vent - Noble Gas	2		X				X	X	
12.2	Condensate Air Removal - Radiation Monitor	3		X				X		X
12.3	Secondary Side Radiation Release	2			X			X		X
12.4	AFW Turbine Radiation Release	2			X			X		X
12.5	Vent Particulates and Halogens	3		X				X		X

*Unnecessary Variable - Refer to Table 7A-3

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TABLE 7A-2 (Sheet 4)

DATA SHEET NUMBER	VARIABLE DESCRIPTION	NRC QUAL. CATE-GORY	SNUPPS TYPE A VARIABLE	RANGE COMPARISON			SENSOR LOCATION		CHANNEL QUALIFICATION	
				Complies with Req.	Meets Intent	Appro-priate Range	Inside Ctmt	Outside Ctmt	Class IE	Perf. Grade
SAMPLING SYSTEMS										
13.1	Inline Sampling System	3		X				X		X
13.2	Containment Recirculation Sump Sample	3		X				X		X
13.2	ECCS Room Sump Sample	3		NA*						
13.2	Auxiliary Building Sump Sample	3		NA*						
13.3	Radiation Level in RCS	1		NA*						
RADWASTE SYSTEM VARIABLES										
14.1	Recycle Holdup Tank Level	3		NA*						
14.2	Waste Gas Decay Tank Pressure	3		NA*						
DAMPER POSITION										
15.1	Emergency Ventilation Damper Position	2		X			X	X	X	
POWER SUPPLY STATUS INDICATION										
16.1	Electric Power Supply Status	2		X				X	X	
16.2	Gas Accumulator Tank Pressure	2		X				X		X
ENVIRONMENTAL MONITORING										
17.1	Fixed Radiation Exposure Meters	3								
17.2	Port Emergency Monitor - Particulates and Halogen	3								
17.3	Particulates Monitor - Plant and Environs	3								
17.4	Plant and Environs - Gamma Spectra	3								
17.5	Meteorological Parameters	3		X						

*Unnecessary Variable - Refer to Table 7A-3

TABLE 7A-3, DATA SHEET 1.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.1.1	Neutron Flux	10^{-6}% to 100% full power	1	Function detection, accomplishment of mitigation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.1.1	Intermediate Range	10^{-6}% to 200% full power	NE35	Y	003	N	-	-	NSSS
			NE36	Y	003	N	-	-	NSSS
NA	Source Range (diversity for intermediate range)	10^{-9}% to Later	NE31	Y	003	N	-	-	NSSS
			NE32	Y	003	N	-	-	NSSS

III. REMARKS

1. The excore neutron detectors are described in Section 7.2 and are powered by a Class IE power source and provide inputs to the reactor protection system. The indicators are of high quality and receive power from a Class IE source through a qualified isolation device located in the RPS racks in the control room. Since the indicators are powered from the Class IE source and are located in a benign environment of the control room on a seismically designed control board, they are considered adequately designed to meet the intent of the regulatory recommendations.
2. Since the source and intermediate range detectors do not have to operate following a design basis event, they are not qualified to LOCA or MSLB environmental transients. The sensors are qualified per equipment qualification data packages ESE-8 and-9 of WCAP 8587. As noted, therein, the sensors are qualified to very high gamma and neutron integrated doses which result from normal operational environments. The sensors are also qualified to Seismic Category I requirements.
3. The diversity requirements are provided in the range overlap regions of the source range detectors and also by the boron concentration data from inline post-accident sampling system described on data sheet 13.1 of this table. The control rod positions also provide diverse information which helps ensure that the reactor is shut down. As stated in Section 7A.3.2, diverse variables do not require Class IE qualification.

TABLE 7A-3, DATA SHEET 1.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.1.2	Control Rod Position	Full in or not full in	3	Verification

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.1.2	Control Rod Position	Full in to full out	SF0074 53 rods	N	022	N	002	N	NSSS

III. REMARKS

1. The SNUPPS design meets the stated recommendations.
2. SNUPPS has 53 full-length control rods arranged in four banks (A through D), and each bank is divided into two groups. Each group consists of several assemblies which move together.
3. The rod position monitoring is performed by two separate systems: (1) the digital rod position indication system and (2) a demand position system. The position of each rod is indicated on a dedicated LED. These systems are described in FSAR Section 7.7.1.3.2.

TABLE 7A-3, DATA SHEET 1.3

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.2.4	Core Exit Temperature[1]	200 F to 2300 F (for operating plants - 200 F to 1650 F)	3[3]	Verification
C.1.1	Core Exit Temperature[1]	200 F to 2300 F (for operating plants - 200 F to 1650 F)	1[3]	Detection of potential for breach, accomplishment of mitigation, long-term surveillance

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.2.4 C.1.1	Core Exit Temperature	200 - 2300 F	TE-1 through TE-50 (50 total)	Y	RP081	Y	RP081	Y	NSSS

III. REMARKS

1. The SNUPPS design meets the stated recommendations.
2. All 50 thermocouples are qualified to Class IE requirements and provide inputs to the subcooling monitor described on data sheet 1.5.
3. All 50 thermocouples are indicated and recorded on qualified devices in the control room. Diversity is not required due to extensive redundancy provided.

TABLE 7A-3, DATA SHEET 1.4

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.2.5	Coolant Level in Reactor	Bottom of core to Top of Vessel	1 (direct indicating or recording device not required)	Verification, accomplishment of mitigation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER	CONTROL ROOM				ERFIS COMPUTER
				INDICATOR		RECORDER		
			IDENT. NO. CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.2.5	Reactor Vessel Water Level	Bottom to top of vessel	LIT 1311 Y	021	Y	080	Y	NSSS
			LIT 1312 Y	021	Y	080	Y	NSSS
			LIT 1321 Y	021	Y	-	-	NSSS
			LIT 1322 Y	021	Y	-	-	NSSS

III. REMARKS

1. The SNUPPS design meets all of the stated recommendations.
2. The SNUPPS RV level indication system will provide information on the RV water level with or without the RC pumps in operation. This Class IE system will utilize two pressure taps to cover the range from the bottom of the vessel to the top of the vessel.
3. The design includes four indicating devices which provide redundancy (two devices) for the two design conditions.
4. Diversity is provided by the core exit thermocouples described on data sheet 1.3.

TABLE 7A-3, DATA SHEET 1.5

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.2.6	Degrees of Subcooling	200 F subcooling to 35 F superheat	2 (With confirmatory operator procedures)	Verification and analysis of plant conditions

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.2.6	Subcooling Monitor	200 F subcooled to 2,000 F superheat	RP081A	Y	022		-	-	NSSS
			RP081B	Y	022		-	-	NSSS

III. REMARKS

1. The SNUPPS subcooling monitor meets all of the stated recommendations.
2. The subcooling monitor design provisions are described in Section 18.2.13.4. The system is Class IE and fully qualified.
3. Diversity is not required, since this system is considered to be Category 2 per the regulatory recommendations; however, extensive redundancy in the inputs is provided to ensure system reliability.
4. This system could be utilized by the plant operators following an event; however, it is not considered a Type A variable, since the operator will be able to perform subcooling calculations, using existing instrumentation.

TABLE 7A-3, DATA SHEET 2.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.1.4	RCS Cold Leg Water Temperature[1]	50 F to 400 F	3	Verification
B.2.2	RCS Cold Leg Water Temperature[1]	50 F to 750 F	1	Function detection, accomplishment of mitigation, verification, long-term surveillance

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.1.4	RCS Temperature	0-700 F	TE-413B	Y	021	Y	022	N	NSSS
B.2.2	Wide Range T_{Cold}	0-700 F	TE-423B	Y	021	Y	022	N	NSSS
		0-700 F	TE-433B	Y	-	-	022	N	NSSS
		0-700 F	TE-443B	Y	-	-	022	N	NSSS

III. REMARKS

1. The RCS wide-range T_{cold} instruments are Class IE and powered from Protection Sets I and II. Protection Set I instruments are indicated separately on a qualified indicator. The T_{cold} and T_{hot} readings for each loop are recorded on a dual pen recorder.
2. The existing range meets the intent of the recommended range in that it exceeds all expected design basis conditions. Other associated variables will be available to help ensure that the operator is aware of primary system parameters.
3. Diversity is not required due to the extensive redundancy provided; however, the operator can use the steam line pressure of the associated steam generator to estimate the T_{cold} readings. T_{cold} will trend with T_{sat} for each steam generator. Associated variables which provide useful information include T_{hot} and the core exit temperatures.
4. This parameter is a Type A variable, and it is used throughout the EOIs.

TABLE 7A-3, DATA SHEET 2.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.2.1	RCS Hot Leg Water Temperature	50 F to 750 F	1	Function detection, accomplishment of mitigation, verification, long-term surveillance

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.2.1	RCS Temperature Wide Range T_{Hot}	0-700 F	TE-413A	Y	021	Y	022	N	NSSS
		0-700 F	TE-423A	Y	021	Y	022	N	NSSS
		0-700 F	TE-433A	Y	021	-	-	N	NSSS
		0-700 F	TE-443A	Y	021	-	-	N	NSSS

III. REMARKS

1. The RCS wide-range T_{hot} instruments are Class IE and powered from Protection Sets I and II. Protection Set I instruments are indicated separately on a qualified indicator. As noted on data sheet 2.1, T_{hot} is recorded with T_{cold} of the same loop on a dual pen recorder.
2. The existing range meets the intent of the regulatory recommendation in that it exceeds all expected design basis conditions.
3. Diversity is not required due to the extensive redundancy provided; however, the operator could use the core exit thermocouples as a diverse measurement. Refer to data sheet 1.3.
4. This parameter is a Type A variable, and it is used throughout the EOIs.

TABLE 7A-3, DATA SHEET 2.3

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.2.3	RCS Pressure[1]	0-3,000 psig (4,000 psig for CE plants)	1[2]	Function detection, accomplishment of mitigation, verification, long-term surveillance
B.3.1	RCS Pressure[1]	0-3,000 psig (4,000 psig for CE plants)	1[2]	Function detection, accomplishment of mitigation
C.2.1	RCS Pressure[1]	0-3,000 psig (4,000 psig for CE plants)	1[2]	Detection of potential or actual breach, accomplishment of mitigation, long-term surveillance
C.3.1	RCS Pressure[1]	0-3,000 psig (4,000 psig for CE plants)	1[2]	Detection of potential for breach, accomplishment of mitigation.

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.2.3	RCS Pressure	0-3,000 psig	PT-405	Y	022	Y	022	N	NSSS
B.3.1		0-3,000 psig	PT-403	Y	022	Y	022	N	NSSS
C.2.1		0-3,000 psig	PT-XXX	Y	022	Y	-	-	-
C.3.1									
NA	Pressurizer Pressure	1,700 to 2,500 psig	PT-455	Y	002	N	022	N	NSSS
			PT-456	Y	002	N	PR 455-Select		NSSS
			PT-457	Y	002	N	1 of 4		NSSS
			PT-458	Y	002	N			NSSS

III. REMARKS

1. The RCS pressure instruments meet all of the stated requirements.
2. RCS pressure is a Type A variable, and is used throughout the EOIs.

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TABLE 7A-3, DATA SHEET 2.4

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.3.1	Reactor Coolant Pump Status	Motor Current	3	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.3.1	Reactor Coolant Pump Motor Current	0-600A	CT-PA0107	N	021	N	-	-	BOP
		0-600A	CT-PA0108	N	021	N	-	-	BOP
		0-600A	CT-PA0204	N	021	N	-	-	BOP
		0-600A	CT-PA0205	N	021	N	-	-	BOP

III. REMARKS

1. The SNUPPS design meets the stated recommendations.

TABLE 7A-3, DATA SHEET 2.5

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.3.2	Primary System Safety Relief Valve Positions (including PORV and code valves) or Flow Through or Pressure in Relief Valve Lines	Closed-not closed	2	Operation status, to monitor for loss of coolant

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.3.2	PORV Position	Closed-not closed	HIS-455A	Y	021	Y	-	-	BOP
			HIS-456A	Y	021	Y	-	-	BOP
D.3.2	PORV Block Valve Position	Closed-not closed	HIS-8000A	Y	021	Y	-	-	BOP
			HIS-8000B	Y	021	Y	-	-	BOP
D.3.2	Safety Valve Position	Closed-not closed	ZL-8010A	Y	021	Y	-	-	BOP
			ZL-8010B	Y	021	Y	-	-	BOP
			ZL-8010C	Y	021	Y	-	-	BOP

III. REMARKS

1. The SNUPPS design meets the stated recommendations. Section 18.2.14.2 provides more information on these items.
2. Since the SNUPPS design provides position monitoring of the subject valves, the flow through or pressure in the discharge lines to the PRT is not provided.
3. Diversity is not required, since this is an NRC Category 2 variable. However, the PRT parameters described on data sheet 2.8 are available.

TABLE 7A-3, DATA SHEET 2.6

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.3.3	Pressurizer Level	Bottom to top	1	To ensure proper operation of pressurizer

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. 1E	PANEL	CL. 1E	PANEL	CL. 1E	
D.3.3	Pressurizer Level	Bottom to top of straight shell	LT-459	Y	002	Y	002		NSSS
			LT-460	Y	002	Y	Select 1 of 3		NSSS
			LT-461	Y	002	Y			NSSS

III. REMARKS

1. The range covered meets the intent of the recommended range. Approximately 85 percent of the total volume is covered. Monitoring level in the hemispherical heads is not advisable, since the volume-to-level ratio is not linear.
2. This is a Type A variable, and is used throughout the EOIs for operator action.
3. Diversity is not required due to the extensive redundancy provided.

TABLE 7A-3, DATA SHEET 2.7

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.3.4	Pressurizer Heater Status	Electric current	2	To determine operating status

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.3.4	Pressurizer Heater Current	0-300A 0-300A	CT-NB0106 CT-NB0208	Y Y	015 015	Y Y	- -	- -	BOP BOP

III. REMARKS

1. The SNUPPS design meets the stated recommendations.
2. Diversity is not required, since this is an NRC Category 2 variable.

TABLE 7A-3, DATA SHEET 2.8

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.3.5	Quench Tank Level	Top to bottom	3	To monitor operation
D.3.6	Quench Tank Temperature	50 F to 750 F	3	To monitor operation
D.3.7	Quench Tank Pressure	0 to design pressure[4]	3	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.3.5	Pressurizer Relief Tank Level	Top to bottom	LT-470	N	021	N	-	-	NSSS
D.3.6	Relief Tank Temperature	50 to 350	TE-468	N	021	N	-	-	NSSS
D.3.7	Relief Tank Pressure	0-100 psig (design)	PT-469	N	021	N	-	-	NSSS

III. REMARKS

1. The PRT is a horizontal, cylindrical tank. The level is measured for 100 of the 114-inch tank diameter, which is essentially top to bottom.
2. The PRT temperature range is adequate to monitor any expected conditions in the tank. The PRT design pressure is 100 psig (T_{sat} = 327.8 F), and the rupture disc release pressure is 91 psig, nominal. Following breach of the disc, the temperature of the tank cannot exceed the saturation temperature associated with the existing containment pressure.
3. The PRT parameters are available in the ERFIS and NSSS computers; therefore, it is not necessary to provide a dedicated recorder.
4. Although these instruments are located inside the containment, they are not qualified for post-accident conditions, since they are not required following a major LOCA or MSLB break. Primary and secondary loop parameters, as well as containment parameters, are available to allow the operator to determine the nature and course of the accident. The EOIs do not indicate any use of these parameters following an event. Refer to Section 7A.3.8.

TABLE 7A-3, DATA SHEET 3.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.1.1	RHR System Flow	0 to 110% design flow[10]	2	To monitor operation
D.1.2	RHR Heat Exchanger Outlet Temperature	32 F to 350 F	2	To monitor operation and for analysis
D.2.5	Flow in LPI System	0 to 110% design flow[10]	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.1.1	RHR/LPI-Inj./Recirc. Cold Leg	0-114%	FT-618	N	017	N	018	N	NSSS
			FT-619	N	017	N	018	N	NSSS
D.2.5	LPI - Hot Leg Recirculation Flow	0-170%	FT-988	N	018	N	-	-	NSSS
D.1.2	RHR Heat Exchanger A Inlet/Outlet Temperatures	50-400 F	TE-612	N	-	-	018	N	NSSS
			TE-604	N	-	-	018	N	NSSS
D.1.2	RHR Heat Exchanger B Inlet/Outlet Temperatures	50-400 F	TE-613	N	-	-	018	N	NSSS
			TE-605	N	-	-	018	N	NSSS

III. REMARKS

1. The accumulator tank level and pressure instruments are provided to ensure that, during normal operation, the accumulators are functional and available to provide the required flow to the cold legs following a large LOCA. These variables are monitored every shift in accordance with Technical Specification Paragraph 4.5.1.1. The power to the isolation valves is periodically verified to be locked out in accordance with the same technical specification.
2. Since the accumulators will immediately discharge when the RCS pressure drops below the accumulator pressure, the pressure and level of the accumulators is unnecessary following an event. The operator will know their status based on RCS pressure. Since power is locked out at the circuit breaker (outside of the control room), the operator would not be able to utilize the pressure and level indicators for manual actions, except for events where the RCS pressure is decreasing very slowly. For these events, the present indicators could be expected to function properly.
3. Should there be a question as to whether the accumulators actually discharged into a depressurized but relatively intact primary system, the operator could utilize the pressurizer and RV level indication to determine if nitrogen was in pressurizer or the vessel head. These areas can be vented from the control room, if it is deemed appropriate.

TABLE 7A-3, DATA SHEET 3.1 (Continued)

III. REMARKS

1. The proper operation of the RHR system is verified by observing pump and valve status indications provided on the main control board, which contains mimic diagrams of the flow paths. These indications are fully qualified to Class IE requirements.
2. The RHR system (Figure 5.4-7) serves the dual function of residual heat removal and low pressure injection/recirculation. The flow rates are indicated for all modes of operation; however, they are provided for performance monitoring only. The flow rate and temperature monitoring is not required for any safety-related function and, therefore, the instruments are not safety grade or Class IE. The proper operation of the RHR system is verified by observing pump and valve status indications provided on the main control board, which contains mimic diagrams of the flow paths. These indications are fully qualified to Class IE requirements.
3. Since the sensors/transmitters are part of the pressure boundary, they are designed to remain intact following an SSE; however, functionality is not assured.
4. The RHR injection phase runout flow is limited to 4,428 gpm. The range of FT-618 and 619 is 0 to 5,500 gpm. The RHR hot leg recirculation flow is 2,641 gpm for one RHR pump operating. The range of FT-988 is 0 to 4,500 gpm.
5. Train A flow (FT-618) and temperatures (TE-604 and 612) are recorded on TR-612. Train B flow (FT-619) and temperatures (TE-605 and 613) are recorded on TR-613. The heat exchanger inlet temperatures are not considered to be part of the Regulatory Guide 1.97 data base.

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TABLE 7A-3, DATA SHEET 3.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.2.1	Accumulator Tank Level and Pressure	10% to 90% volume 0 to 750 psig	2	To monitor operation
D.2.2	Accumulator Isolation Valve Position	Closed or open	2	Operation status

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.2.1	Accumulator Tank Level (Unnecessary)	13+ inches	LT-950 through 957	N	018	N	-	-	NSSS
D.2.1	Accumulator Tank Pressure (Unnecessary)	0-700 psig	PT-960 through 967	N	018	N	-	-	NSSS
D.2.2	Accumulator Isolation Valves	Closed/Open	HIS 8808A through D	Y	018	Y	-	-	BOP

III. REMARKS

1. The accumulator tank level and pressure instruments are provided to ensure that, during normal operation, the accumulators are functional and available to provide the required flow to the cold legs following a large LOCA. These variables are monitored every shift in accordance with Technical Specification Paragraph 4.5.1.1. The power to the isolation valves is periodically verified to be locked out in accordance with the same technical specification.
2. Since the accumulators will immediately discharge when the RCS pressure drops below the accumulator pressure, the pressure and level of the accumulators is unnecessary following an event. The operator will know their status based on RCS pressure. Since power is locked out at the circuit breaker (outside of the control room), the operator would not be able to utilize the pressure and level indicators for manual actions, except for events where the RCS pressure is decreasing very slowly. For these events, the present indicators could be expected to function properly.
3. Should there be a question as to whether the accumulators actually discharged into a depressurized but relatively intact primary system, the operator could utilize the pressurizer and RV level indication to determine if nitrogen was in pressurizer or the vessel head. These areas can be vented from the control room, if it is deemed appropriate.

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TABLE 7A-3, DATA SHEET 3.3

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.2.3	Boric Acid Charging Flow	0-110% design flow[10]	2	To monitor operation
D.2.4	Flow in HPI System	0-110% design flow	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.2.3	Centrifugal Charging Pump Flow (BIT)	0-140% 0-140%	FT-917A FT-917B	Y Y	018 018	Y Y	- -	- -	NSSS NSSS
D.2.4	Safety Injection Pump Flow	0-121% 0-121%	FT-918 FT-922	N N	017 017	N N	- -	- -	NSSS NSSS
D.2.4	Charging to RCP Seals	0-400% 0-400%	FT-215A FT-215B	Y Y	001 001	Y Y	- -	- -	NSSS NSSS

III. REMARKS

1. The SI pump flow rates are 440 gpm for injection and recirculation. The range of FT-918 and 922 (shown on Figures 6.3-1, Sheet 2) is 0 to 800 gpm. The centrifugal charging pump flow rate to the BIT path is 714 gpm for injection and recirculation. The range of FT-917A and 917B (shown on Figure 6.3-1, Sheet 3) is 0 to 1,000 gpm.
2. The flow to the RCP seals (shown on Figure 9.3-8) is provided by the centrifugal charging pumps, as described in Section 9.3.4. The normal flow rate is 20 gpm (5 gpm per pump). This flow path is also utilized as part of safe shutdown with only safety-related equipment. Refer to Appendix 5.4A. The range of FT-215A and 215B is 80 gpm.
3. The safety injection flow is provided for performance monitoring only and is not required following an accident; therefore, the transmitters are not Class IE. The centrifugal charging pump flow elements/ transmitters are used during safe shutdown; therefore, they are Class IE.

TABLE 7A-3, DATA SHEET 3.4

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.2.6	Refueling Water Storage Tank Level	Top to bottom	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.2.6	Refueling Water Storage Tank Level	Top to Bottom	LT-930	Y	018	Y	018	N	NSSS
			LT-931	Y	018	Y	018	N	NSSS
			LT-932	Y	018	Y	-	-	NSSS
			LT-933	Y	018	Y	-	-	NSSS

III. REMARKS

1. The RWST level instrumentation is shown on Figure 6.3-1 and fully meets the stated requirements.
2. The RWST level indications and alarms are utilized during switchover from injection to recirculation in a 2-out-of-4 logic. RWST level is a Type A variable, per the assumptions stated in Section 7A.3.1.

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TABLE 7A-3, DATA SHEET 4.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.4.1	Steam Generator Level	From tube sheet to separators	1	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.4.1	Steam Generator Level - Wide Range	Near tube sheet to separators	LT-501	Y	025	Y	026	N	NSSS
			LT-502	Y	025	Y	026	N	NSSS
			LT-503	Y	025	Y	026	N	NSSS
			LT-504	Y	025	Y	026	N	NSSS
NA	Steam Generator Level - Narrow Range	91 inches	LT-517,518,519	Y	026	Y	-	-	NSSS
			LT-527,528,529	Y	026	Y	-	-	NSSS
			LT-537,538,539	Y	026	Y	-	-	NSSS
			LT-547,548,549	Y	026	Y	-	-	NSSS
			LT-551,2,3&4	Y	025	N	-	-	NSSS

III. REMARKS

1. The steam generator wide range instrumentation provides level indication from 22 inches above the tube sheet to the moisture separators and meets the intent of the recommended range.
2. The four narrow range level transmitters on each loop are fully qualified and are considered to be a Type A variable per the assumptions stated in Section 7A.3.1. The narrow range transmitters are used to identify a steam generator tube rupture.
3. The narrow range instruments provide diverse indications within their range and would indicate the failure (high or low) of a wide range instrument.

TABLE 7A-3, DATA SHEET 4.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.4.2	Steam Generator Pressure	From atmospheric pressure to 20 percent above the lowest safety valve setpoint	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.4.2	Steam Line Pressure	0-1,300 psig (0-110% above lowest safety valve setpoint)	PT-514, 5, 6	Y	026	Y	026 (PT-514)	N	NSSS
			PT-524, 5, 6	Y	026	Y	026 (PT-524)	N	NSSS
			PT-534, 5, 6	Y	026	Y	026 (PT-535)	N	NSSS
			PT-544, 5, 6	Y	026	Y	026 (PT-545)	N	NSSS
NA	Steam Line Pressure for PORV Operation	0-1,500 psig 126%	PT-1	Y	006	Y	-	-	-
			PT-2	Y	006	Y	-	-	-
			PT-3	Y	006	Y	-	-	-
			PT-4	Y	006	Y	-	-	-

III. REMARKS

1. The lowest safety valve setpoint is 1,185 psig. The steam line pressure transmitters have a range of 0 to 1,300 psig, which is 110 percent above the lowest setpoint. Although this range is considered to be adequate, the higher ranges can be monitored by PT-1 through PT-4.
2. The steam line pressure transmitters used for PORV operation have a range of 0 to 1,500 psig, which is 126 percent of the lowest setpoint. These instruments are not considered part of the RG 1.97 data set per the assumptions stated in Section 7A.3.2 and are not inputted to the ERFIS data systems.
3. The steam line pressure is a Type A variable per the assumptions stated in Section 7A.3.1, and is used to detect an SGTR and secondary side break and to identify the affected steam generator.

TABLE 7A-3, DATA SHEET 4.3

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.4.3	Safety/Relief Valve Positions or Main Steam Flow	Closed - not closed	2	To monitor operation

II SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.4 3	Atmospheric Relief Valve Position (PORV)	Closed - not closed	ZS-1	Y	006	Y	-	-	BOP
			ZS-2	Y	006	Y	-	-	BOP
			ZS-3	Y	006	Y	-	-	BOP
			ZS-4	Y	006	Y	-	-	BOP
D.4.3	Safety Relief Valve Position (20 valves)	See Note 2							

III. REMARKS

1. The atmospheric relief valve (PORV) position fully meets the stated requirements. See data sheet 12.3 for a discussion of the use of the demand position indication in determining release flow rates.
2. As described on data sheet 12.3, steam line pressure and flow will be utilized to determine if any safety valve is open.
3. Main steam flow instrumentation is provided and available in the control room, but it is not considered necessary or appropriate for the recommended function.

TABLE 7A-3, DATA SHEET 4.4

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.4.4	Main Feedwater Flow	0-110 percent	3	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.4.4	Main Feedwater Flow	0-121 percent of VWO flow	FT-510	N	026	N	006	N	NSSS
			FT-511	N	026	N	-	-	NSSS
			FT-520	N	026	N	006	N	NSSS
			FT-521	N	026	N	-	-	NSSS
			FT-530	N	026	N	006	N	NSSS
			FT-531	N	026	N	-	-	NSSS
			FT-540	N	026	N	006	N	NSSS
			FT-541	N	026	N	-	-	NSSS

III. REMARKS

1. The SNUPPS design meets all of the stated recommendations.
2. The flow transmitter has a range from 0 to 4.8 x 10^6 lbs/hr. The VWO flow is 3.96 x 10^6 lbs/hr for each line.

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TABLE 7A-3, DATA SHEET 5.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.5.1	Auxiliary or Emergency Feedwater Flow	0-110 percent design flow[10]	2 (1 for B & W plants)	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.5.1	Auxiliary Feedwater Flow	0-170%	FT-1	Y	006	Y	-	-	BOP
			FT-2	Y	006	Y	-	-	BOP
			FT-3	Y	006	Y	-	-	BOP
			FT-4	Y	006	Y	-	-	BOP
NA		0-170%	FT-7	Y	-	-	-	-	BOP
			FT-9	Y	-	-	-	-	BOP
			FT-11	Y	-	-	-	-	BOP

III. REMARKS

1. The auxiliary feedwater system is described in Section 10.4.9 and shown on Figure 10.4-9.
2. Auxiliary feedwater flow to each steam generator is monitored by Class IE flow loop. Each flow transmitter is powered by a different separation group (1 through 4) corresponding to the power supply for the steam line PORV. Only two of the four steam generators are required to establish a heat sink for the RCS. The required flow indication to two intact steam generators is assured assuming a single failure.
3. A comparison of the AFWS to the NUREG-0737 requirements for reliability and flow indication is provided in Section 18.2.7 which shows complete compliance to all recommendations.
4. The flow transmitters leave a range of 0 to 400 gpm. The design flow to the steam generators is 250 gpm for a normal shutdown. For a MSLB the design flow to two intact steam generators is 470 gpm (235 gpm each). The range above is calculated using the normal shutdown flow requirements.

TABLE 7A-3, DATA SHEET 5.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.5.2	Condensate Storage Tank Level	Plant Specific	1	To ensure water supply for auxiliary feedwater (Can be Category 3 if not primary source of AFW. Then whatever is primary source of AFW should be listed and should be Category 1.)

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.5.2	Condensate Storage Tank Level (indicated by pump suction pressure)	Top to bottom	PT-24	Y	005	Y	-	-	BOP
			PT-25	Y	005	Y	-	-	BOP
			PT-26	Y	005	Y	-	-	BOP
NA	Condensate Storage Tank Level (for automatic AFWS switchover)	Appropriate for automatic switch-over to ESW	PT-37	Y	026	Y	-	-	BOP
			PT-38	Y	026	Y	-	-	BOP
			PT-39	Y	026	Y	-	-	BOP
NA	Condensate Storage Tank Level	0-100%	LT-4	N	005	N	-	-	BOP

III. REMARKS

1. The CST is shown on Figure 9.2-12, and the pressure transmitters are shown on Figure 10.4-9. As stated in Section 10.4.9, the CST level will be determined by PT-24, 25, and 26. The automatic switchover to ESW upon the depletion of CST water volume will be initiated by PT-37, 38, and 39. LT-4 is non-safety grade and provides a direct level reading; however, this instrument is not considered part of the RG 1.97 data base.
2. Since there is no manual action required for switchover to the alternate source of auxiliary feedwater (ESW), the CST level measurements are not Type A variables.

TABLE 7A-3, DATA SHEET 6.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.3.3	Containment Pressure[1]	0 to design pressure[4] (psig)	1	Function detection accomplishment of mitigation, verification
B.4.2	Containment Pressure[1]	10 psia to design pressure[4]	1	Same
C.2.2	Containment Pressure[1]	10 psia to design pressure[4], psig (5 psia for subatmospheric containments)	1	Detection of breach, accomplishment of mitigation, verification, long-term surveillance
C.3.3	Containment Pressure[1]	10 psia to 3 times design pressure for concrete (4 times design pressure for steel) (5 psia for subatmospheric containments)	1	Detection of potential for or actual breach, accomplishment of mitigation, verification

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.3.3 B.4.2 C.2.2	Containment Pressure (normal design range)	0-60 psig	PT-934	Y	018	Y	018	N	NSSS
			PT-935	Y	018	Y	018	N	NSSS
			PT-936	Y	018	Y	018	N	NSSS
			PT-937	Y	018	Y	018	N	NSSS
C.3.3	Containment Pressure - Wide Range	-5 to 180 psig	PT-938	Y	020	Y	020	N	NSSS
			PT-939	Y	020	Y	020	N	NSSS
NA	Containment Pressure (normal operating range)	-3 to +3 psig	PDY-40	N	020	N	-	-	BOP

III. REMARKS

1. The SNUPPS design meets all of the stated requirements.
2. The design pressure of the containment is 60 psig. The peak calculated pressure following a LOCA and MSLB are 47.3 and 48.1 psig, respectively. As stated in Section 7A.3.2, diversity is not required in extended ranges not associated with DBEs.
3. Monitoring of subatmospheric conditions recommended in items B.4.2 and C.2.2 is accomplished by the wide range instruments.
4. Normal containment pressure will be maintained near atmospheric pressure and measured by pressure transmitters located inside and outside of the containment. The difference in pressures will be indicated in the control room. This instrumentation is not part of the Regulatory Guide 1.97 data base.

TABLE 7A-3, DATA SHEET 6.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.3.2	Containment Sump Water Level[1]	Narrow range (sump) Wide range (bottom of containment to 600,000-gallon level equivalent)	2 1	Function detection, accomplishment of mitigation, verification
C.2.3	Containment Sump Water Level[1]	Narrow range (sump) Wide range (bottom of containment to 600,000-gallon level equivalent)	2 1	Detection of breach, accomplishment of mitigation, verification, long-term surveillance

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.3.2	Normal Sump Water Level	868,000 gallons	LIT-9	Y	018	Y	-	-	BOP
C.2.3			LIT-10	Y	018	Y	020	Y	BOP
NA	RHR Recirculation Sump Level	604,000 gallons	LIT-7	Y	018	Y	-	-	BOP
			LIT-8	Y	018	Y	020	Y	BOP

III. REMARKS

1. Refer to Section 18.2.12 for a comparison with NUREG-0737 requirements.
2. The SNUPPS design provides for Class IE level monitoring in each of the two containment normal sumps and in each of the two RHR sumps. The bottom of the normal and RHR sumps are at Elevations 1,995 feet and 1,992 feet, respectively. The levels in each sump are monitored from 6 inches above the sump bottoms for the next 156 inches. The MSLB results in the maximum flood level of 2006'-6" (650,000 gallons). The normal sump level extends to 2008'-6", providing 2 feet of range above the maximum flood level.
3. Both the normal and RHR sumps are provided with twin level elements which are indicated on one continuous indicator. Redundancy is provided in each type of sump. Diversity is not required, since there are four independent water level measurements.
4. The normal sump level is a Type A variable on SNUPPS. The normal sump level is used for event identification. The RHR sump level is not a Type A variable. Although the recirculation sump level could be used for event identification, it is not required and would not be flooded with water immediately following an event since there is a 6-inch curb around it. Similarly, since switchover to recirculation is initiated automatically on low RWST level, verification containment water level is not required nor part of a preplanned manual safety function. Refer to Section 7A.3.1.

TABLE 7A-3, DATA SHEET 6.3

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
B.4.1	Containment Isolation Valve Position (excluding check valves)	Closed - not closed	1	Accomplishment of isolation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
B.4.1	Containment Isolation Valve Position (excluding manual and check valves)	Closed - not closed	See Figure 6.2.4-1	Y	Misc.	Y	-	-	BOP

III. REMARKS

1. Refer to Section 6.2.4 and 18.2.11 for discussions of containment isolation. As noted in Section 6.2.4, manual valves do not have position indication in the control room. The position of the manual valves is verified on a monthly basis in accordance with Technical Specification Paragraph 4.6.1.1. In addition, these valves are under administrative control and are locked or sealed closed whenever containment integrity is required.

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TABLE 7A-3, DATA SHEET 6.4

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
C.3.2	Containment Hydrogen Concentration	0 to 10% (capable of operating from 10 psia to maximum design pressure[4])	1	Detection of potential for breach, accomplishment of mitigation, long-term surveillance
E.6.4	Hydrogen Content	0 to 10%	3	Release assessment, verification analysis

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
C.3.2	Containment Hydrogen	0-10%	AT-10	Y	020	Y	020	Y	BOP
E.6.4	Concentration		AT-19	Y	020	Y	-	-	BOP

III. REMARKS

1. The hydrogen analyzers are described in Section 6.2.5 and shown on Figure 6.2.5-1.
2. The hydrogen analyzers meet all of the stated requirements. Refer to Section 18.2.12 for a comparison with NUREG-0737 requirements. The analyzers will operate properly within the recommended containment pressure ranges.
3. The hydrogen concentration is not a Type A variable, since the recombiners will be started 1 day after an accident. Should the need arise, the recombiners could be started following load sequencing operations should the core or primary systems indicate a potential for hydrogen generation rates above any current design bases. As stated in Section 7A.3.1.g, Type A variables are not identified for postulated conditions not in the current design bases.
4. Although there is no need for a diverse variable, the post-accident sampling systems will provide the capability to sample the containment atmosphere following an event. Refer to data sheet 13.1. As stated in Section 7A.3.2.d, diverse variables need only be performance grade and not Class IE.

TABLE 7A-3, DATA SHEET 6.5

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.6.3	Containment Atmosphere Temperature	40 F to 400 F	2	To indicate accomplishment of cooling

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.6.3	Containment Atmosphere Temperature	0-400 F	TE-60	Y	018	Y	-	-	BOP
			TE-61	Y	018	Y	-	-	BOP
			TE-62	Y	018	Y	-	-	BOP
			TE-63	Y	018	Y	020	Y	BOP

III. REMARKS

1. The SNUPPS design meets all of the stated recommendations.
2. The SNUPPS design utilizes containment pressure to verify that containment heat removal is being accomplished. Refer to data sheet 8.1 for a further discussion.
3. Containment temperature is not a Type A variable, since it does not meet the requirements discussed in Section 7A.3.1.

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TABLE 7A-3, DATA SHEET 6.6

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.6.4	Containment Sump Water Temperature	50 F to 250 F	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.6.4	Containment Sump Water Temperature (unnecessary variable)								

III. REMARKS

1. This variable is unnecessary for the SNUPPS plants. The recommended purpose is to "monitor operation"; however, there is no system on SNUPPS for it to monitor. Containment cooling is monitored by the air temperature monitors described on data sheet 6.5.
2. Sump temperature is not required for RHR operation or assurance of NPSH available, since NPSH calculations conservatively assume saturated water was present. See Safety Evaluation Eleven of Section 6.2.2.1.3 and Table 6.2.2-7.
3. Primary system, PRT, and other containment parameters are all available to help determine the plant conditions. Sump level indications indicate the amount of water, and the other parameters indicate its source.
4. Note that proper RHR functions during the recirculation mode are provided by other variables described on data sheet 3.1.
5. The Callaway SER (NUREG-0830) in Section 6.2.1.1 (page 6-4) indicates that the NRC Staff agrees that this variable is not necessary for the SNUPPS plants and finds this exception to the guidelines of Regulatory Guide 1.97 acceptable.

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TABLE 7A-3, DATA SHEET 7.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.7.1	Makeup Flow - In	0 to 110% design flow[10]	2	To monitor operation
D.7.2	Letdown Flow - Out	0 to 110% design flow[10]	2	To monitor operation
D.7.3	Volume Control Tank Level	Top to bottom	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.7.1	Normal Charging Flow	50 to 267%	FT-121	N	002	N	-	-	NSSS
D.7.2	Normal Letdown Flow	0 to 267%	FT-132	N	002	N	-	-	NSSS
D.7.3	Volume Control Tank Level	Top to bottom of straight shell	LT-185	Y	002	Y	-	-	-
			LT-112	Y	002	Y	-	-	-
			LT-144	N	-	-	-	-	NSSS
D.7.2	Safety Related Letdown	Later	FT-138A	Y	001	Y	-	-	NSSS
		Later	FT-138B	Y	001	Y	-	-	NSSS

III. REMARKS

1. The normal charging and letdown flow rates are described on this data sheet. The DBA-related portion of the charging system is described on data sheet 3.3.
2. The volume control tank level is Class IE to ensure a suction source from the RWST (automatically) on low VCT level.
3. The level of the VCT is monitored for the straight shell portion only. The span is 75 inches. The hemispherical heads are not monitored, since the volume-to-level ratio is not linear.
4. Appendix 5.4A describes the safety grade cold shutdown system provided in the SNUPPS design. As part of this design, a Class IE letdown system is provided to the PRT through the excess letdown heat exchanger.

TABLE 7A-3, DATA SHEET 8.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.6.2	Heat Removal by the Containment Fan Heat Removal System	Plant specific	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.6.2	Containment Cooler Heat Removal - (unnecessary variable)								

III. REMARKS

1. This variable is unnecessary and is not provided on SNUPPS. The accomplishment of post-accident cooling is verified by monitoring the containment pressure and air temperature, as described on data sheets 6.1 and 6.5, respectively.
2. During the transient of an accident, heat removal by air coolers cannot be used by an operator, since too many variables are changing rapidly. The amount of energy released to the containment cannot be accurately quantified. Heat removal mechanisms are those identified in Section 6.2.1 and include heat transfer to passive heat sinks, containment sprays, and containment air coolers. The operator must determine what equipment is operating and watch the changes in containment pressure, temperature, sump level, and radiation levels to determine the nature of the accident.
3. The operability of the air coolers is verified periodically throughout the life of the plant in accordance with Technical Specification Paragraph 4.6.2.3, which ensures the proper operation of the system.

TABLE 7A-3, DATA SHEET 9.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.8.1	Component Cooling Water Temperature to ESF System	32 F to 200 F	2	To monitor operation
D.8.2	Component Cooling Water Flow to ESF System	0 to 110% design flow[10]	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.8.1	CCW Heat Exchanger Discharge Temperature	0-200 F	TE-31	Y	019	Y	-	-	BOP
			TE-32	Y	019	Y	-	-	BOP
D.8.2	CCW Pump Discharge Flow	0-137 percent	FT-95	N	-	-	-	-	BOP
			FT-96	N	-	-	-	-	BOP
			FT-97	N	-	-	-	-	BOP
			FT-98	N	-	-	-	-	BOP

III. REMARKS

1. The component cooling water system is described in Section 9.2.2. The SNUPPS design meets the recommended ranges.
2. Section 7A.3.7 describes the qualification of NRC Category 2 variables, as provided on SNUPPS. The instruments described herein are located outside of the containment in areas served by Class IE room coolers. These instruments are not required for the proper operation of the system; rather, they are provided for performance monitoring only.
3. Since these instruments are part of the system pressure boundary, they are seismically designed to ensure integrity of the system boundary.

TABLE 7A-3, DATA SHEET 10.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.6.1	Containment Spray Flow	0-110% design flow[10]	2	To monitor operation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.6.1	Containment Spray Flow	0-126% (design flow - injection)	FT-5	N	017	N	-	-	BOP
		0-106% (design flow - recirculation)	FT-11	N	017	N	-	-	BOP

III. REMARKS

1. The containment spray system is described in Section 6.2.2. The spray system need only operate during the injection phase for cooling purposes. During this phase, the flow rate monitor exceeds the recommended range.
2. Section 7A.3.7 describes the qualification of NRC Category 2 items, as provided on SNUPPS. These instruments are located outside of the containment in areas served by Class IE room coolers. These instruments are provided for performance monitoring and not to allow proper system operation.
3. The instruments are part of the pressure boundary and are seismically designed to ensure its integrity.

SNUPPS

TABLE 7A-3, DATA SHEET 11.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
C.2.4	Containment Area Radiation[1]	1 R/hr to 10^4 R/hr	3[6,7]	Detection of breach, verification
E.1.1	Containment Area Radiation - High Range[1]	1 R/hr to 10^7 R/hr	1[6,7]	Detection of significant releases, release assessment, long-term surveillance, emergency plant actuation

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
C.2.4	Containment Area Radiation	1 to 10^8 R/hr	0-GT-RE-59	Y	067	Y	-	-	BOP
E.1.1			0-GT-RE-60	Y	067	Y	20	Y	BOP

III. REMARKS

1. These instruments meet all of the stated recommendations and are further described in Section 18.2.12.
2. As described in Section 7A.3.2, diverse variables are performance grade. Diversity for containment area radiation is provided by the post-accident in line sampling system. Also, the SNUPPS design includes area radiation monitors with a range to 10 R/hr located inside the containment.
3. This is a Type A variable and is used for event identification in the EOIs.

SNUPPS

TABLE 7A-3, DATA SHEET 11.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
C.3.5	Radiation Exposure Rate (inside buildings or areas, e.g., auxiliary building, reactor shield building annulus, fuel handling, which are in direct contact with primary containment where penetrations and hatches are located)[1]	10^{-1} R/hr to 10^{4} R/hr	2[7]	Indication of breach
E.2.1	Radiation Exposure Rate[1] (inside building or areas where access is required to service equipment important to safety)	10^{-1} R/hr to 10^{4} R/hr	2[7]	Detection of significant releases, release assessment, long-term surveillance

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
C.3.5	Radiation Exposure Rate	Unnecessary Variable							
E.2.1									

III. REMARKS

1. Area radiation monitors are shown on Figure 12.3-2 and are provided in accordance with the criteria stated in Section 12.3.4.1. Process and effluent monitors are provided in accordance with the criteria stated in Section 12.3.4.2. Area monitors are provided in the corridors of the auxiliary building and not in the penetration areas or equipment spaces. As described in Section 12.3.4.2.2.2.9, a portable monitor may be used to determine the conditions in any equipment space.
2. The process and effluent monitors will provide indication of releases and/or breaches in the systems in operation following an event. Use of extended range area monitors in the areas adjacent to the containment are not appropriate since the background, direct radiation levels can be expected to be quite high. The process and effluent monitors provide the required public protection.
3. The existing area radiation monitors provide for adequate employee protection with their range to 10R/hr. Should this range be exceeded, employee entry will be prohibited.

TABLE 7A-3, DATA SHEET 12.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
C.3.4	Containment Effluent Radioactivity - Noble Gases from Identified Release Points[1]	10^{-6} Ci/cc to 10^{-2} Ci/cc	2[8,9]	Detection of breach, accomplishment of mitigation, verification
C.3.6	Effluent Radioactivity[1] Noble Gases (from buildings as indicated above)	10^{-6} Ci/cc to 10^{3} Ci/cc	2[8]	Indication of breach
E.3.1.3	Auxiliary Building[1] (including any building containing primary system gases, e.g., waste gas and vent flow rate)	10^{-6} Ci/cc to 10^{3} Ci/cc 0 to 110% vent design flow[10] (Not needed if effluent discharges through common plant vent)	2[8]	Detection of significant releases, release assessment, long-term surveillance
E.3.2.2	Common Plant Vent or Multipurpose Vent Discharge Any of above Releases (if containment purge is included)	10^{-6} Ci/cc to 10^{3} Ci/cc 0 to 110% vent design flow[10] 10^{-6} Ci/cc to 10^{4} Ci/cc	2[8]	Detection of significant releases, release assessment, long-term surveillance

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
C.3.4 E.3.2.2	Plant Unit Vent Wide Range Gas	10^{-7} to 10^{5} µCi/cc	GT-RE-21B	N	SP010	N	SP010	N	RRIS
	Radwaste Building Wide Range Gas	10^{-7} to 10^{5} µCi/cc	CH-RE-10B	N	SP010	N	SP010	N	RRIS

TABLE 7A-3, DATA SHEET 12.1 (Continued)

III. REMARKS

1. The plant unit vent receives the discharge from the containment purge, auxiliary building, control building, fuel building, and the condenser air removal system. The radwaste building vent receives the discharge from the radwaste building exhaust fan. The radwaste building contains the waste gas decay tanks.
2. The unit vent flow rate is determined by fan run contacts which are imputted to the RMS computer. Each system is balanced and assumed to be operating at the design flow. The high range monitor is being purchased with an isokinetic flow monitor. These provisions adequately meet the requirements of the item.
3. The radwaste building vent is a constant flow vent receiving the discharge of the radwaste building exhaust fans. Flow rate monitoring is not required. The high range monitor for the radwaste building vent also has an isokinetic nozzle.

SNUPPS

TABLE 7A-3, DATA SHEET 12.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
C.2.5	Effluent Radioactivity - Noble Gas Effluent from Condenser Air Removal System Exhaust[1]	10^{-6} to 10^{-2} μCi/cc	3[8]	Detection of breach, verification
E.3.2.1	Condenser Air Removal Exhaust[1]	10^{-6} to 10^{5} μCi/cc 0 to 110 percent vent design flow[14] (not needed if effluent discharges through common plant vent)	2[8]	Detection of significant releases, release assessment

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. 1E	PANEL	CL. 1E	PANEL	CL. 1E	
C.2.5	Condenser Air Removal Exhaust Radioactivity	10^{-7} to 10^{-2} μCi/cc	RE-92	N	056	N	056	N	ERIS
E.3.2.1	Condenser Air Removal Exhaust (not required-discharge through plant vent)								

III. REMARKS

1. The condenser air removal exhaust discharges through the plant vent; therefore, the monitor for item E.3.2.1 is not required. The existing condenser air removal exhaust monitor meets the requirements of item C.2.5.

TABLE 7A-3, DATA SHEET 12.3

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.3.1.6	Vent from Steam Generator Safety Relief Valves of Atmospheric Dump Valves	10^{-1} μCi/cc to 10^{3} Ci/cc (duration of releases in seconds and mass of steam per unit time)	2[12]	Detection of significant release assessment

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
E.3.1.6	Vent from Steam Generator Safety Relief Valves or Atmospheric Dump Valves	Later	RE-111	N	SP010	N	SP010	N	RRIS
			RE-112	N	SP010	N	SP010	N	RRIS
			RE-113	N	SP010	N	SP010	N	RRIS
			RE-114	N	SP010	N	SP010	N	RRIS

III. REMARKS

1. The SNUPPS design monitors the atmospheric dump valve plumes. The atmospheric dump valves are set to open at a lower pressure than the safety relief valves and are safety grade, highly reliable components. These valves are provided with position indication. It is assumed that the dump valves will be open and releasing the same concentration and distribution of radionuclides any time any of the safety relief valves on the same steam line are open.
2. Radiation detectors will be positioned to view the plume directly from each of the four atmospheric dump valves.
3. Determination of releases made by the safety valves will be made by reviewing strip chart recording of main steam pressure and flow.

TABLE 7A-3, DATA SHEET 12.4

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.3.1.7	All other Identified Release Points	10^{-6} Ci/cc to 10^{2} Ci/cc. 0-110 percent vent design flow[10] (not needed if effluent discharges through other monitored plant vents)	2[8]	Detection of significant releases, release assessment, long-term surveillance

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
E.3.1.7	Auxiliary Feedwater Pump Turbine Exhaust Monitor	Later	RE-385	N	SP010	N	SP010	N	RRIS

III. REMARKS

1. A radiation detector monitoring the plume of the auxiliary feedwater turbine exhaust is used to determine the releases.

TABLE 7A-3, DATA SHEET 12.5

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.3.2	Particulates and Halogens			
E.3.2.1	All Identified Plant Release Points (except steam generator safety relief valves or atmospheric steam dump valves and condenser air removal system exhaust). Sampling with Onsite. Analysis Capability	10^{-3} µCi/cc to 10^{2} µCi/cc 0 to 110% vent design flow[10]	3[19]	Detection of significant release, release assessment, long-term surveillance

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
E.3.2.1	Unit Vent Monitors Particulates Iodines	 10^{-12} to 10^{-7} µCi/cc 10^{-11} to 10^{-6} µCi/cc	GT-RE-21A	N	SP056	N	-	-	RRIS
	Radwaste Building Vent Monitors Particulates Iodines	 10^{-12} to 10^{-7} µCi/cc 10^{-11} to 10^{-6} µCi/cc	GH-RE-10	N	SP056	N	-	-	RRIS

III. REMARKS

1. The SNUPPS design meets all of the stated recommendations. Refer to Sections 12.3.4.2 and 18.2.12.2 for further discussions.
2. Refer to data sheet 12.1 for a discussion of vent flow rate monitoring and wide range gas monitors.
3. The wide range noble gas monitors described on data sheet 12.1 include the capability to obtain grab samples for both halogens and particulates. After collection, laboratory samples will be used to quantify releases.

TABLE 7A-3, DATA SHEET 13.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.6.1	Primary Coolant	Grab Sample	3[5-18]	Release assessment, verification analysis
E.6.1.1	Gross Activity	10 Ci/ml to 10 Ci/ml		
E.6.1.2	Gamma Spectrum	(Isotopic Analysis)		
E.6.1.3	Boron Content	0 to 6,000 ppm		
E.6.1.4	Chloride Content	0 to 20 ppm		
E.6.1.5	Dissolved Hydrogen or Total Gas[19]	0 to 2,000 cc(STP)/kg		
E.6.1.6	Dissolved Oxygen[19]	0 to 20 ppm		
E.6.1.7	pH	1 to 13		
B.1.3	RCS Soluable Boron Concentration	0 - 6,000 ppm	3	Verification
C.1.3	Analysis of Primary Coolant (Gamma Spectrum)	10 μCi/gm to 10 Ci/gm or TID-14844 source term in coolant volume	3[5]	Detail analysis, accomplishment of mitigation, verification, long-term surveillance
E.6.6	Containment Air Gamma Spectrum	(isotopic analysis)		Release assessment, verification analysis

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
E.6.1.1	Gross Activity	Refer to Section 18.2.3	SJ-145	N	SJ-082	N	-	-	PASS
E.6.1.2	Gamma Spectrum								
E.6.1.3	Boron Content								

TABLE 7A-3, DATA SHEET 13.1 (Continued)

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
E.6.1.4	nloride Content		SJ-145	N	SJ-082	N	-	-	Y
E.6.1.5	Dissolved Hydrogen		SJ-145	N	SJ-082	N	-	-	Y
E.6.1.6	Dissolved Oxygen		SJ-145	N	SJ-082	N	-	-	Y
E.6.1.7	pH		SJ-145	N	SJ-082	N	-	-	Y

III. REMARKS

1. The SNUPPS design inc des an inline post-accident sampling system which meets the stated requirements. Refer to Section 18.2.3 for de ails on the system design provisions. Samples are obtained from redundant sample points with Class IE isolation valves for the containment atmosphere, the containment sump, and the reactor coolant.

TABLE 7A-3, DATA SHEET 13.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.6.2	Sump	Grab sample	3[5,18]	Release assessment, verification analysis
E.6.2.1	o Gross Activity	10 μCi/ml to 10 Ci/ml	3	
E.6.2.2	o Gamma Spectrum	(isotopic analysis)	3	
E.6.2.3	o Boron Content	0-6,000 ppm	3	
E.6.2.4	o Chloride Content	0-20 ppm	3	
E.6.2.5	o pH	1 to 13	3	

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
E.6.2	Sump Grab Sample								
	Containment Recirculation	See data sheet 13.1							
	ECCS Pump Room Sump	Not required							
	Auxiliary Building Sump	Not required							

III. REMARKS

1. The containment recirculation sumps are sampled by the inline sampling system described on data sheet 13.1 and in Section 18.2.3.
2. The ECCS room and auxiliary building sumps are provided with Class IE level indication and operate as described in Section 9.3.3. Process and effluent monitors provide indication of any airborne activity in these sumps since they are directly vented to the auxiliary building normal exhaust system.
3. Sump sampling for the ECCS rooms and auxiliary building is considered unnecessary.

SNUPPS

TABLE 7A-3, DATA SHEET 13.3

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
C.1.2	Radioactivity Concentration or Radiation Level in Circulating Primary Coolant	1/2 Technical Specification limit to 100 times technical specification, limit R/hr.	1	Detection of breach

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
			IDENT. NO.	CL. IE	INDICATOR PANEL	CL. IE	RECORDER PANEL	CL. IE	
C.1.2	Radioactivity Concentration (unnecessary variable)								

III. REMARKS

1. As noted in comments provided by the AIF, this variable is unnecessary, and there is no presently available means of providing this information. Also, there is no apparent need or use for this variable which would require its classification as Category I.
2. The SNUPPS inline sampling system will provide detailed information on the properties of the RCS fluids following an event. This system is designed to function after an event; however, it is not a Class IE system.

SNUPPS

TABLE 7A-3, DATA SHEET 14.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.9.1	High-Level Radioactive Liquid Tank Level	Top to bottom	3	To indicate storage volume

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.9.1	Recycle Holdup Tank Level (Unnecessary Variable)								

III. REMARKS

1. The SNUPPS design precludes the need for this variable. The liquid radwaste system is not required following an event. It is located in the radwaste building, and is controlled from the radwaste building control room. System parameters are not provided in the main control room.
2. The safety grade letdown system is located within the containment, and the containment isolation system is designed to preclude inadvertent discharge from the containment.
3. The recycle holdup tank levels are provided in the radwaste building control room. Since the system will only be operated from that room, the control room operators may obtain that status of the tanks from the radwaste building control room personnel. The liquid radwaste system need not be operated during an accident. It may be used during recovery, if the radwaste building is habitable. As noted in Section 18.2.2.2, inadvertent contamination of the radwaste building is precluded by design and is not postulated.

TABLE 7A-3, DATA SHEET 14.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.9.2	Radioactive Gas Holdup Tank Pressure	0-150% design pressure[4]	3	To indicate storage capacity

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.9.2	Waste Gas Decay Tank Pressure (unnecessary variable)								

III. REMARKS

1. Refer to data sheet 14.1 for a discussion of radwaste system status and operation following an event.
2. The waste gas decay tank pressure are indicated in the radwaste building control room. The range of the indication covers the design pressure ratings of the tanks.

TABLE 7A-3, DATA SHEET 15.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.10.1	Emergency Ventilation Damper Position	Open-closed status	2	To indicate damper status

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.10.1	Safety Related Damper Position	Open-closed	HIS-XX	Y	020 068 019	Y	-	-	BOP

III. REMARKS

1. The safety-related dampers which receive an automatic signal to reposition are provided with Class IE position indication in the control room. The SNUPPS design meets all of the stated recommendations.

TABLE 7A-3, DATA SHEET 16.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.11.1	Status of Standby Power Sources Important to Safety	Voltages, currents,	2[11]	To indicate system status

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. 1E	PANEL	CL. 1E	PANEL	CL. 1E	
D.11.1	Status of Standby Power								
	4160 V Class IE Incoming Current								
	Current	0-2000A	CT-NB0109	Y		Y	-	-	BOP
	Current	0-2000A	CT-NB0111	Y		Y	-	-	BOP
	Current	0-2000A	CT-NB0212	Y		Y	-	-	BOP
	Current	0-2000A	CT-NB0209	Y		Y	-	-	BOP
	Current	0-1200A	CT-PA0201	N		Y	-	-	BOP
	4160 V Class IE Bus Voltage								
	Voltage	0 - 5 KV	PT-101/B	Y		Y	-	-	BOP
	Voltage	0 - 5 KV	PT-201/B	Y		Y	-	-	BOP
	Diesel Gen No. 2								
	Current	0 - 1500A	CT-NE107	Y		Y	-	-	BOP
	Voltage	0 - 5KV	PT-NE107	Y		Y	-	-	-
	KW	0 - 8MW	CT/PT-NE107	Y		Y	-	-	BOP
	Vars	0 - 8Mvar	CT/PT-NE107	Y		Y	-	-	BOP
	Frequency	55 - 65 Hertz	PT-NE107	Y		Y	-	-	BOP
	Diesel Gen No. 1								
	Current	0 - 1500A	CT-NE106	Y		Y	-	-	BOP
	Voltage	0 - 5KV	PT-NE106	Y		Y	-	-	BOP
	KW	0 - 8MW	CT/PT-NE106	Y		Y	-	-	BOP
	Vars	0 - 8MVar	CT/PT-NE106	Y		Y	-	-	BOP
	Frequency	55 - 65 Hertz	PT-NE106	Y		Y	-	-	BOP

TABLE 7A-3, DATA SHEET 16.1 (Continued)

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
	Current to Class IE 480 V System								
	Current	0 - 300A	CT-NB0110	Y		Y	-	-	BOP
	Current	0 - 300A	CT-NB0113	Y		Y	-	-	BOP
	Current	0 - 300A	CT-NB0210	Y		Y	-	-	BOP
	Current	0 - 300A	CT-NB0213	Y		Y	-	-	BOP
	Current	0 - 300A	CT-NB0117	Y		Y	-	-	BOP
	Current	0 - 300A	CT-NB0217	Y		Y	-	-	BOP
	Current	0 - 300A	CT-NB0116	Y		Y	-	-	BOP
	Current	0 - 300A	CT-NB0216	Y		Y	-	-	BOP
	Class IE 125 V DC System				All Panel 16				
	Current	-800 - 800A	Shunt	Y		Y	-	-	BOP
	Current	0 - 500A	Shunt	Y		Y	-	-	BOP
	Current	-800 - 800A	Shunt	Y		Y	-	-	BOP
	Current	0 - 500A	Shunt	Y		Y	-	-	BOP
	Current	-800 - 800A	Shunt	Y		Y	-	-	BOP
	Current	0 - 500A	Shunt	Y		Y	-	-	BOP
	Current	-800 - 800A	Shunt	Y		Y	-	-	BOP
	Current	0 - 500A	Shunt	Y		Y	-	-	BOP
	Voltage	0 - 150V	Batt Mon	Y		Y	-	-	BOP
	Voltage	0 - 150V	Batt Mon	Y		Y	-	-	BOP
	Voltage	0 - 150V	Batt Mon	Y		Y	-	-	BOP
	Voltage	0 - 150V	Batt Mon	Y		Y	-	-	BOP

III. REMARKS

1. The SNUPPS design meets all of the stated recommendations. All Class 1E buses are provided with voltage and current indications.

TABLE 7A-3, DATA SHEET 16.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
D.11.1	Status of Energy Sources Important to Safety (hydraulic, pneumatic)	Pressures	2[11]	To indicate system status

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
D.11.1	Air Accumulator Tank Pressures								
	AFW Control Valve and Secondary Side Steam Dump Valve	0-800 psig	PT-108	N	-	-	-	-	BOP
		0-800 psig	PT-110	N	-	-	-	-	BOP
		0-800 psig	PT-112	N	-	-	-	-	BOP
		0-800 psig	PT-114	N	-	-	-	-	BOP

III. REMARKS

1. The safety-related air accumulators are described in Section 9.3.1 and shown on Figure 9.3-1 Sheet 5. The SNUPPS design meets all of the stated requirements.

TABLE 7A-3, DATA SHEET 17.1

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.4.1	Radiation Exposure Meters (continuous indication at fixed locations)	Range, location, and qualification criteria to be developed to satisfy NUREG-0654, Section II.H.5.b and 6.b for emergency radiological monitoring	3	Verification of significant release and local magnitudes

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
			IDENT. NO.	CL. IE	INDICATOR PANEL	CL. IE	RECORDER PANEL	CL. IE	
	Later								

TABLE 7A-3, DATA SHEET 17.2

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.4.2	Airborne Radiohalogens and Particulates (portable sampling with on-site analysis capability)	10^{-9} to 10^{-3} µCi/cc	3[14]	Release assessment; analysis

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
	See Remarks Section								

III. REMARKS

1. Callaway

Health physics air sampling and analysis equipment will be available on site for the monitoring and assessment of airborne radioactivity concentrations. Airborne sampling capabilities for particulate and radioiodine will be provided by low flow air samplers using glass fiber filters and TEDA-impregnated activated charcoal or silver Zeolite cartridges (accident conditions). Analysis of collection media will be performed by germanium gamma ray spectroscopy equipment (multichannel analyzer and HPGe detector with lead shield). In the control building count room or EOF laboratory, utilization of laboratory gamma spectroscopy equipment will ensure the capability to analyze samples within the detection limits of 10^{-9} µCi to 10^{-3} µCi for principal gamma emitters.

2. Wolf Creek

Later

TABLE 7A-3, DATA SHEET 17.3

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.4.3	Plant and Environs Radiation (portable instrumentation)	10^{-3} to 10^{4} R/hr photons 10^{-3} to 10^{4} rads/hr beta radiations and low-energy photons	3^{15} 3^{15}	Release assessment; analysis

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
	See Remarks Section								

III. REMARKS

1. Callaway

In accordance with Regulatory Guide 1.97 recommendations, portable radiation survey instrumentation with the capability to detect gamma radiation over the range of 10^{-3} to 10^{4} R/hr will be maintained in the site health physics instrument inventory. The capability to measure beta radiation fields over the range of 10^{-3} to 10^{4} R/hr will be provided by portable survey instrumentation equipped with beta-sensitive detectors.

2. Wolf Creek

Later

TABLE 7A-3, DATA SHEET 17.4

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.4.4	Plant and Environs Radioactivity (portable instrumentation)	Multichannel gamma-ray spectrometer	3	Release assessment; analysis

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
	See Remarks Section								

III. REMARKS

1. Callaway

A portable, battery powered, 2,048-channel multichannel analyzer will be used with a 2-inch x 2-inch No. I detector for quantification of radioactivity in plant and environmental radiological samples. In addition, portable single-channel analyzers with No. I detectors will be available in emergency kits for analysis of selected radioisotopes.

2. Wolf Creek

Later

TABLE 7A-3, DATA SHEET 17.5

I. REGULATORY GUIDE 1.97 TABLE 2 RECOMMENDATIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	CATEGORY	PURPOSE
E.5.1	Wind Direction	0 to 360 degrees (±5 degrees accuracy with a deflection of 15 degrees). Starting speed 0.45 mps (1.0 mph). Damping ratio between 0.4 and 0.6, distance constant ̲2 meters.	3	Release assessment
E.5.2	Wind Speed	0 to 30 mps (67 mph) ±0.22 mps (0.5 mph) accuracy for wind speeds less than 11 mps (24 mph) with a starting threshold of less than 0.45 mps (1.0 mph)	3	Release assessment
E.5.3	Estimation of Atmospheric Stability	Base on vertical temperature difference form primary system, -5 C to 10 C (-9 F to 18 F) and ±0.15 C accuracy per 50-meter intervals (±0.3 F accuracy per 164-foot intervals) or analogous range for alternative stability estimates	3	Release assessment

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
E.5.1	Wind Direction	0-540 degrees, ±2 degrees	Later	N	-	-	-	-	RRIS
	Wind Speed	0-100 mph, ±.15 mph	Later	N	-	-	-	-	RRIS

TABLE 7A-3, DATA SHEET 17.5 (Continued)

II. SNUPPS DESIGN PROVISIONS

VARIABLE IDENT. NO.	VARIABLE	RANGE	SENSOR/TRANSMITTER		CONTROL ROOM				ERFIS COMPUTER
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
	Estimate of Atmospheric Stability		Later	N	-	-	-	-	RRIS
	Temperature	-50 to 50 C, ±.15 C	Later	N	-	-	-	-	RRIS
	Temperature Difference	-4 to +10 C, ±.05 C	Later	N	-	-	-	-	RRIS
	Dew Point	-50 to 50 C, ±.5 C	Later	N	-	-	-	-	RRIS
	Precipitation Ground Level	0 -5 inch ±.5 inch							

III. REMARKS

1. The SNUPPS design meets all of the stated recommendations.
2. The meteorological information system (site related) provides inputs to the RRIS via the meteorological monitoring system at the met towers. The RRIS converts the inputs to digital form at the met tower and transmits them to the RRIS computer in the computer room.
3. The parameters are sampled at a frequency of 1 minute or less by the RRIS.

NOTES TO TABLE 7A-3 (Sheet 1)

Footnotes to Regulatory Guide 1.97 Table 2 - PWR Variables

[1]Where a variable is listed for more than one purpose, the instrumentation requirements may be integrated and only one measurement provided.

[2]The maximum value may be revised upward to satisfy ATWS requirements.

[3]A minimum of four measurements per quadrant is required for operation. Sufficient number should be installed to account for attrition. (Replacement instrumentation should meet the 2300 F range provision.)

[4]Design pressure is that value corresponding to ASME code values that are obtained at or below code-allowables values for material design stress.

[5]Sampling or monitoring of radioactive liquids and gases should be performed in a manner that ensures procurement or representative samples. For gases, the criteria of ANSI N13.1 should be applied. For liquids, provisions should be made for sampling from well-mixed turbulent zones, and sampling lines should be designed to minimize plateout or deposition. For safe and convenient sampling, the provisions should include:

a. Shielding to maintain radiation doses ALARA

b. Sample containers with container-sampling port connector compatibility

c. Capability of sampling under primary system pressure and negative pressures

d. Handling and transport capability

e. Prearrangement for analysis and interpretation

[6]Minimum of two monitors at widely separated locations.

[7]Detectors should respond to gamma radiation photons within any energy range from 60 keV to 3 MeV with an energy response accuracy of ±20 percent at any specific photon energy from 0.1 MeV to 3 MeV. Overall system accuracy should be within a factor of two over the entire range.

[8]Monitors should be capable of detecting and measuring radioactive gaseous effluent concentrations with compositions ranging from fresh equilibrium noble gas fission product mixtures to 10-day-old mixtures, with overall system accuracies within a factor of two. Effluent concentrations may be expressed

NOTES TO TABLE 7A-3 (Sheet 2)

in terms of Xe-133 equivalents or in terms of any noble gas nuclide(s). It is not expected that a single monitoring device will have sufficient range to encompass the entire range provided in this regulatory guide and that multiple components or systems will be needed. Existing equipment may be used to monitor any portion of the stated range within the equipment design rating.

[9]Provisions should be made to monitor all identified pathways for release of gaseous radioactive materials to the environs in conformance with General Design Criterion 64. Monitoring of individual effluent streams is only required where such streams are released directly into the environment. If two or more streams are combined prior to release from a common discharge point, monitoring of the combined stream is considered to meet the intent of the regulatory guide, provided such monitoring has a range adequate to measure worst-case releases.

[10]Design flow is the maximum flow anticipated in normal operation.

[11]Status indication of all standby power ac buses, dc buses, inverter output buses, and pneumatic supplies.

[12]Effluent monitors for PWR steam safety valve discharges and atmospheric steam dump valve discharges should be capable of approximately linear response to gamma radiation photons with energies from approximately 0.5 MeV to 3 MeV. Overall system accuracy should be within a factor of two. Calibration sources should fall within the range of approximately 0.5 MeV to 1.5 MeV (e.g., CS-137, Mn-54, Na-22, and Co-60). Effluent concentrations should be expressed in terms of any gamma-emitting noble gas nuclide with the specified energy range. Calculational methods should be provided for estimating concurrent releases of low-energy noble gases that cannot be detected or measured by the methods or techniques employed for monitoring.

[13]To provide information regarding release of radioactive halogens and particulates. Continuous collection of representative samples followed by onsite laboratory measurements of samples for radiohalogens and particulates. The design envelope for shielding, handling, and analytical purposes should assume 30 minutes of integrated sampling time at sampler design flow, an average concentration of 10^2 Ci/cc of particulate radioiodines and particulates other than radioiodines, and an average gamma photon energy of 0.5 MeV per disintegration.

[14]For estimating release rates of radioactive materials released during an accident.

NOTES TO TABLE 7A-3 (Sheet 3)

[15]To monitor radiation and airborne radioactivity concentrations in many areas throughout the facility and the site environs where it is impractical to install stationary monitors capable of covering both normal and accident levels.

[16]Guidance on meteorological measurements is being developed in a Proposed Revision 1 to Regulatory Guide 1.23, "Meteorological Programs in Support of Nuclear Power Plants."

[17]The time for taking and analyzing samples should be 3 hours or less from the time the decision is made to sample, except for chloride which should be within 24 hours.

[18]An installed capability should be provided for obtaining containment sump, ECCS pump room sumps, and other similar auxiliary building sump liquid samples.

[19]Applies only to primary coolant, not to sump.