SNUPPS

Standardized Nuclear Unit Power Plant System

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Nicholas A. Petrick
Executive Director

August 16, 1984

SLNRC 84-107 FILE: 0278
SUBJ: Conformance to Regulatory Guide 1.97

Mr. Harold R. 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

References: 1. NRC letters (B. Youngblood) to Union Electric Company (D. Schnell) and Kansas Gas and Electric Company (G. Koester) dated June 25 and 26, 1984, respectively: Request for Additional Information - Conformance to Regulatory Guide 1.97
2. SLNRC 82-031, dated July 6, 1982: Regulatory Guide 1.97

Dear Mr. Denton:

The Reference 1 letters requested additional information to permit the NRC staff to complete its evaluation of conformance to Regulatory Guide 1.97 for the SNUPPS plants - Callaway Plant Unit No. 1 and Wolf Creek Generating Station Unit No. 1. The request for additional information resulted from an NRC preliminary review of Reference 2 regarding SNUPPS plant conformance to the guidelines of Revision 2 to Regulatory Guide 1.97. The information provided in Reference 2 has been incorporated into the SNUPPS Standard FSAR as Appendix 7A.

Enclosure 1 consists of revised FSAR Appendix 7A pages which have been modified and enhanced to address the specific NRC request for additional information and also to incorporate as-built plant design information not included in the original submittal and make minor or editorial changes. Enclosure 2 identifies the specific Appendix 7A pages which address the request for additional information. In addition, three issues identified in the NRC preliminary review are further discussed below.

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Regulatory Guide 1.97 recommends instrumentation to measure radioactivity concentrations or radiation levels in the reactor coolant system to detect potential fuel cladding failures. The NRC preliminary review has concluded that the SNUPPS Post-Accident Sampling System (PASS) is acceptable for this function, on an interim basis, on the condition that the SNUPPS Utilities commit to evaluate and commit to install a fully qualified and redundant system for direct monitoring of radioactivity concentrations or radiation levels. The SNUPPS Utilities are not aware of any system, meeting the recommendations of the Regulatory Guide, that is available to the industry at the present time. The NRC preliminary review of this variable states that instrumentation suitable for this variable is under research and development. Even if such a system were available, the SNUPPS Utilities are not convinced that its installation would contribute substantially to plant or public safety. The SNUPPS PASS is a state of the art system which has not only grab-sample but on-line continuous monitoring capability. The PASS technical details are discussed in Enclosure 1 at Data Sheets 13.1 and 13.3 and in Section 18.2.3 of the SNUPPS FSAR. Following events which could result in significant fuel cladding damage, the PASS system would provide the information recommended by the Regulatory Guide. A decision to implement a backfit of the magnitude recommended by the Regulatory Guide would have to consider, among other things, a comparison of the capabilities of the yet-to-be-developed system against the substantial capabilities already present in the SNUPPS design.

The NRC preliminary review indicates that the SNUPPS Utilities have taken exception to the Regulatory Guide 1.97 recommendations regarding Sump and Containment Air sampling capability. It is believed that this conclusion results from the Appendix 7A statements that sump sampling for the auxiliary building and ECCS rooms is unnecessary and that containment atmosphere oxygen content measurement is not applicable. The SNUPPS PASS fully meets the Regulatory Guide recommendations regarding containment sump and containment atmosphere sampling. The sample parameters of interest in post-accident fluid leakage into the auxiliary building or ECCS rooms would be bounded by containment sump parameters. Also, as discussed in SNUPPS submittals in support of the NRC review of NUREG-0737, Item II.B.3, regarding post-accident sampling, the SNUPPS PASS has the capability of monitoring containment atmosphere oxygen concentration.

Regarding the commitment of the SNUPPS Utilities to the provisions of the Regulatory Guide, the SNUPPS Utilities are in agreement with the purpose of the Regulatory Guide which is to provide the required instrumentation systems for monitoring plant and environmental conditions during and following postulated accidents in a light-water-cooled nuclear power plant. The degree of conformance of the SNUPPS design to the regulatory positions in Section C of the guide is provided in Appendix 7A of the SNUPPS FSAR as updated by the enclosed information.

Based on the Appendix 7A material, as updated by the enclosed information, the SNUPPS Utilities consider that the SNUPPS design provides the required and appropriately qualified instrumentation to satisfy the purpose of the Regulatory Guide.

Very truly yours,

J. D. Cermak for

Nicholas A. Petrick

MHF/nldl2a9-11
Enclosures

cc:	D. F. Schnell	UE	H. Bundy	USNRC/WC
	G. L. Koester	KGE	B. L. Forney	USNRC/RIII
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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 of 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 within 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 μCi/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.

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 of 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 UNNECESSARY 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

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.

Qualification of these devices was documented in the SNUPPS NUREG-0588 submittal which was provided to the NRC in March 1983. All Class IE equipment is qualified in accordance with Regulatory Guide 1.89, and Regulatory Guide 1.100 as discussed in Appendix 3A.

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 Section 8.3.1.3). The non-Class IE 125 V dc buses are backed by the emergency diesel generators.

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.

TABLE 7A-1 (Sheet 5)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
D.11	Power Supplies	
D.11.1	Status of Standby Power and Other Energy Sources Important to Safety (hydraulic, pneumatic)	16.1, 16.2
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
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	

TABLE 7A-1 (Sheet 6)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
E.3.2.1	o 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	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
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

TABLE 7A-1 (Sheet 7)

VARIABLE IDENT. NO.	VARIABLE	DATA SUMMARY SHEET NO.
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	13.1
E.6.3.3	o Gamma Spectrum	13.1

TABLE 7A-2

SUMMARY COMPARISON TO

REGULATORY GUIDE 1.97

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
CORE AND REACTOR VESSEL VARIABLES										
1.1	Neutron Flux	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 Safety Relief 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		NA*			X			X
3.2	Accumulator Tank Pressure	2		NA*			X			X
3.2	Accumulator Isolation 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				X	X	

*Unnecessary variables - refer to Table 7A-3

**Complies with range recommended in Revision 3 of Regulatory Guide 1.97

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 Reg.	Meets Intent	Appro-priate Range	Inside Ctmt	Outside Ctmt	Class IE	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 Valve 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 Penetrations Hatches and Areas Important to Safety	2		N/A*						
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

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 Reg.	Meets Intent	Appro-priate Range	Inside Ctmt	Outside Ctmt	Class IE	Perf. Grade
SAMPLING SYSTEMS										
13.1	Post-Accident 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		NA*						
17.2	Portable Emergency Monitor - Particulates and Halogen	3		X				X		X
17.3	Particulates Monitor - Plant and Environs	3		X				X		X
17.4	Plant and Environs - Gamma Spectra	3		X				X		X
17.5	Meteorological Parameters	3		X				X		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	Neutron Flux	10^{-8} to 200% power	SENE60	Y	020	Y	-	-	BOP
			SENE61	Y	020	Y	020	Y	BOP

III. REMARKS

1. Redundant Class IE neutron flux monitors, independent from the NSSS protection system, have been added to the SNUPPS design. These monitors meet the stated recommendations.

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	RP081A, B	Y	RP081A, B	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	LT 1311	Y	021	Y	080	Y	NSSS
			LT 1312	Y	021	Y	080	Y	NSSS
			LT 1321	Y	021	Y	-	-	NSSS
			LT 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 18.2.13.2. 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 recommended range of Revision 3 of Regulatory Guide 1.97. 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.

*Revision 3 of Regulatory Guide 1.97 revised the range to 50 F to 700 F. Thus, the existing range now meets the regulatory recommendation.

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	-	-	022	N	NSSS
		0-700 F	TE-443A	Y	-	-	022	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 of Revision 3 of Regulatory Guide 1.97.
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.

*Revision 3 of Regulatory Guide 1.97 revised the range to 50 F to 700 F. Thus, the existing range now meets the regulatory 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	ZS-455A	Y	021	Y	-	-	BOP
			ZS-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	ZS-8010A	Y	021	Y	-	-	BOP
			ZS-8010B	Y	021	Y	-	-	BOP
			ZS-8010C	Y	021	Y	-	-	BOP

III. REMARKS

1. The SNUPPS design meets the stated recommendations. Section 18.2.6.2 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 2.8

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 LOCA or MSLB. 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	0-169%	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

See next page for Remarks.

*Revision 3 to Regulatory Guide 1.97 revised the range to 40 F to 350 F.

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 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 2,662 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.
6. The RHR heat exchanger outlet temperature range from 50 F to 400 F is adequate to monitor any expected conditions leaving the heat exchanger. The minimum temperature of the RHR system will be 60 F in the long term following an accident due to the automatic temperature control on the CCW system, which provides cooling water to the RHR heat exchanger. The air-operated temperature control valve which bypasses flow around the CCW heat exchanger is a safety-related qualified valve; however, it is supplied by a nonsafety-related instrument air system. This system will most likely be available during the long term following an accident, and it may be loaded onto the emergency diesel generator.

   If this automatic control is not available, many options exist for operator action to control the CCW and/or RHR temperatures and flows to maintain a minimum RHR heat exchanger outlet temperature at or above 50 F; therefore, the existing range of the outlet temperature indicators is adequate. With the given decay heat, it would take several days for the outlet temperature to approach the low end of the currently monitored range. With operators periodically monitoring RCS water temperature after an accident, it is not deemed credible for the outlet temperature to fall below 50 F with no remedial actions being taken by the operating staff. As evidenced by the Revision 3 change to the low end of the range (from 32 F to 40 F), it is SNUPPS' position that this required range is arbitrary and not based on plant-specific requirements for post-accident monitoring.

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	ZS 8808AA,AB through DA,DB	Y	018	Y	-	-	BOP

III. REMARKS

1. The accumulator isolation valve position indication requirements are met.
2. Accumulator tank level and pressure indication are unnecessary variables and need not be provided for post-accident monitoring. Therefore, Category 2 instruments are not required. Remark 3 provides additional justification. Remarks 4 and 5 discuss the available pressure and level monitors and their ranges. These remarks also address the adequacy of the existing ranges when compared to the recommended ranges of Table 2 of Regulatory Guide 1.97. Since these variables are unnecessary, the comparison is provided only for information.
3. Table 2 of Regulatory Guide 1.97 lists accumulator pressure and level under Type D variables which are defined therein as: "Type D Variables: Those variables that provide information to indicate the operation of individual safety systems and other systems important to safety. These variables are to help the operator make appropriate decisions in using the individual systems important to safety in mitigating the consequences of an accident."

TABLE 7A-3, DATA SHEET 3.2 (Continued)

III. REMARKS (Continued)

Accumulator level and pressure indication do not provide information which is relevant to the defined purpose of a Type D variable. The accumulators are designed to passively inject water into the RCS when the primary pressure falls below the accumulator cover gas pressure (602 to 648 psig per Technical Specification 3.5.1.d). The nitrogen cover gas would not be injected until much lower pressures (around 300 psig) are reached. Since the discharge of water from the accumulators is beneficial for transients resulting from RCS breaks, the accumulator discharge valves are locked open and cannot be opened from the control room. Section 15.6 provides RCS depressurization curves for various size LOCAs. The accumulators inject water for all LOCAs analyzed except for the 3-inch LOCA wherein the analysis was terminated at 2500 seconds.

If the operator had determined that there is no further need or potential need for accumulator water injection and he desired to preclude the addition of nitrogen during the long-term LOCA recovery phase and if the RCS pressure had not dropped below 300 psig, the operator may vent the accumulators and/or isolate the discharge of the accumulators by directing the power breakers to be unlocked (outside the control room), provided that this action would not violate any procedures.

For a LOCA, there is no need to determine if accumulator water has been injected. If water has been injected, it was needed or at least not adverse to the core.

Should there be a question as to whether the accumulators actually discharged nitrogen into a depressurized but relatively intact primary system, the operator could utilize the pressurizer and RV level indication to determine if nitrogen was in the pressurizer or the vessel head. These areas can be vented from the control room, if it is deemed appropriate.

Other Condition IV events (SGTR and MSLB) do not result in RCS depressurization transients which result in discharge of accumulator nitrogen into the RCS. For these events, the operating staff will isolate or depressurize the accumulators prior to proceeding to a cold shutdown condition. The operating staff has two variables available to them to indicate the successful completion of this action: valve position of the accumulator discharge valves and valve position of the nitrogen vent valves. The operator is capable of isolating or depressurizing the accumulators even with an assumed single failure. Therefore, the accumulator level and pressure indications are unnecessary for these events as well as a LOCA.

4. The range of the accumulator tank pressure transmitter is adequate to monitor any expected pressure in the accumulator. The maximum pressure allowed by the plant Technical Specification is 648 psig. No fluid addition to the tank is expected following an accident due to the check valve in the discharge line from each accumulator. Therefore, there is no need to extend the pressure indication beyond the present 700 psig range.
5. The recommended range of level indication from 10 to 90 percent of tank volume is unnecessary. The plant Technical Specifications require that the content of the tank be maintained within a very narrow range (6122 to 6594 gallons). The instrumentation provided monitors the level of the tank for a span of 13 inches in which the normal level is maintained. Monitoring the level above the Technical Specification value is not required because fluid addition following an accident is not postulated.

Monitoring the levels between the present range and the recommended range of 10 percent of tank volume is not required because the addition of water contained in that volume, as noted previously, is beneficial and of no concern following an accident.

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[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.2.3	Centrifugal Charging Pump Flow (BIT)	0-280% 0-280%	FT-917A FT-917B	Y Y	018 018	Y Y	- -	- -	NSSS NSSS
D.2.4	Safety Injection Pump Flow	0-123% 0-123%	FT-918 FT-922	N N	017 017	N N	- -	- -	NSSS NSSS
D.2.4	Charging to RCP Seals	0-250% 0-250%	FT-215A FT-215B	Y Y	001 001	Y Y	- -	- -	NSSS NSSS

III. REMARKS

1. The SI pump flow rate is 650 gpm for hot leg 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 (357 gpm per pump) 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 32 gpm (8 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, Sheet 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.

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	7 inches above 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	128 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 7 inches above the tube sheet to the moisture separators (a range of 559 inches) and meets the intent of the recommended range. The steam generator is essentially dry when the level drops below the lower tap (less than 300 gallons).
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 (438 to 566 inches above the tube sheet) and would indicate the failure (high or low) of a wide range instrument.
4. Additional diverse variables for the wide range steam generator level measurement when the steam generator level is below the bottom tap of the narrow range span consist of one channel of auxiliary feedwater flow per loop and three steamline pressure measurements per loop.

   Furthermore, a review of the SNUPPS Emergency Operating Procedures indicates that wide range steam generator level is not utilized in any application that necessitates it being a Category 1 variable. As such, one channel per steam generator is adequate to meet Category 2 requirements.

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. Assuming a repeatability factor of ±3 percent on the opening setpoint of the safety valves and a ±3 percent total channel accuracy of the steam line pressure monitoring channels, a margin of 40 psi exists between the upper range of the steam line pressure transmitters and the opening setpoint of the lowest safety valve.

   In addition, the SNUPPS atmospheric relief valves are fully qualified and available for controlled heat removal and steam generator level control by maintaining a steam discharge rate approximately equal to the auxiliary feedwater addition rate.

   These atmospheric relief valves are set at 1140 psig and would lift prior to the safety valve with the lowest set pressure. The operation of these valves provides another 45 psi margin between the opening of a relief valve and the 1300 psig range of the steam line pressure indicators. Using this setpoint, the steam line pressure transmitters have a range of 0 to 114 percent. The existing range of 0 to 1300 psig is adequate for the SNUPPS design since it provides sufficient margins above the expected secondary side pressures.
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. These instruments are fully qualified and meet the requirements of Category 2 instrumentation.
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 Valve Position (20 valves)	See Note 2							

III. REMARKS

1. The atmospheric relief valve (PORV) position fully meets the stated requirements.
2. The number of safety valves open is determined by the radiological release information system (RRIS) computer using main steam flow and other valve positions (main steam isolation valves, condenser dump valves, atmospheric relief valves).

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 design flow[10]	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.

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	0-160%	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		0-160%	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 have 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 500 gpm (250 gpm each).

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[4] 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	Containment Pressure	0-60 psig	PT-934	Y	018	Y	018	N	NSSS
B.4.2	(normal design range)		PT-935	Y	018	Y	018	N	NSSS
C.2.2			PT-936	Y	018	Y	018	N	NSSS
			PT-937	Y	018	Y	018	N	NSSS
C.3.3	Containment Pressure -	-5 to 180 psig	PT-938	Y	020	Y	020	N	NSSS
	Wide Range		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, C.2.2, and C.3.3 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	836,000 gallons	LIT-9	Y	018	Y	-	-	BOP
C.2.3			LIT-10	Y	018	Y	020	Y	BOP
NA	RHR Recirculation Sump Level	576,000 gallons	LIT-7	Y	018	Y	-	-	BOP
			LIT-8	Y	018	Y	020	Y	BOP

III. REMARKS

1. Refer to Section 18.2.12.2 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 bottoms 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 LOCA results in the maximum flood level of 2004'-6" (348,800 gallons, minimum). The normal sump level extends to 2008'-6", providing ~4 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 of curb around it. Similarly, since switchover to recirculation is initiated automatically on low RWST level, verification of 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 6.4

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.6.3.1	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.6.3.1	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 18.2.12.2 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.d, 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 system 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 6.6

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.
6. The Callaway SER also addresses the containment heat removal systems and similarly finds them acceptable. Page 6-10 indicates that the RHR system serves to remove heat from the containment during the recirculation mode following a LOCA by cooling the containment sump fluid in the RHR heat exchanger. During this mode of operation, the RHR inlet temperature monitors described on Data Sheet 3.1 would provide indication of the containment sump water temperature. As noted on Data Sheet 3.1, the RHR heat exchanger inlet temperature is not considered to be part of the Regulatory Guide 1.97 data base.

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-149	N	-	-	-	-	NSSS
D.7.2	Safety Related Letdown	0 to 167%	FT-138A	Y	001	Y	-	-	NSSS
		0 to 167%	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. FT-138A and B have a range of 0 to 50 gpm. The maximum emergency letdown flow rate at RCS loop temperatures above 400 F is 30 gpm. The design flow below 400 F has not been established; however, it will be maintained below 50 gpm.

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. Quantification of the amount of heat being removed by the containment fan coolers is an unnecessary variable and is not provided on SNUPPS. The accomplishment of post-accident heat removal is verified by monitoring the operation of the fan coolers and monitoring the containment pressure and air temperature. Containment pressure and air temperature monitors are described on Data Sheets 6.1 and 6.5.
2. Monitoring of containment air cooler operation is provided by three sets of indications, all of which are safety-related and qualified for post-accident operation. These items do indicate that the air coolers are operating; however, they do not quantify the amount of heat being removed from the containment atmosphere.

   The handswitches for each containment air cooler fan are provided with lights which indicate the mode of operation (stop, slow, or fast) for each containment air cooler.

   The ESF status panel indicates whether the fan coolers are being provided with power (control and fan power supply). If the control fuse blows or if the power breaker trips, a red trouble light appears on one of the ESF status panel windows "Ctmt Cooler Fan SGN01A (B, C or D)." Also, an audio alarm is generated.

   The containment isolation valves serving each set of two containment air coolers are also provided with Class IE hand indication switches in the control room. These position switches indicate that the isolation valves are open and that the lines to each cooler are capable of passing the cooling water flow. Since the containment isolation valves are normally open and receive a confirmatory open signal on the receipt of a safety injection signal, the ESF status panel also contains windows for these valves. A red light will appear and an audio alarm will be sounded if any valve fails to take its post-accident position (open).

TABLE 7A-3, DATA SHEET 8.1 (Continued)

III. REMARKS (Continued)

On SNUPPS, the heat removal capability of the containment air coolers is accurately determined by sophisticated mathematical and computer modeling developed by the air cooler supplier. The accuracy of the model was verified during the prototype testing of three different coils at three different post-accident pressures. Topical Report AAF-TR-7101 (Reference 1 of FSAR Section 6.2.2.3) provides a comparison of the measured heat removal during the tests to the computer analysis predictions. The comparisons show very close agreement between the predicted and actual heat removal abilities. The NRC has approved the topical report for reference in construction permit and operating license applications.

3. 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.
4. 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.

*Revision 3 of Regulatory Guide 1.97 revised the range to 40 F to 200 F.

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.
4. Class IE operability indications for each containment spray train are provided in the control room. All motor-operated valves in the flow paths are provided with hand indication switches and receive a CSAS to open. The containment spray pumps also have hand switches and start automatically on a CSAS. The ESF status indication panel provides backup information on a component and system level and indicates the system's status. Should the power breakers trip or the control fuses blow, an amber light will appear and an audio signal will be generated.

   Also, redundant Class IE level indication is provided on the spray additive tank. Reducing level in this tank indicates that sodium hydroxide additive is being injected into an operable spray system flow path.

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	RE-59	Y	067	Y	-	-	BOP
E.1.1			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.
2. As described in Section 7A.3.2, diverse variables are performance grade. Diversity for containment area radiation is provided by the in-line post-accident 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.

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 11.5. 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.
4. Exposure rate monitors associated with variable C.3.5 were deleted in Revision 3 of Regulatory Guide 1.97.

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} µCi/cc to 10^{-2} µCi/cc	2[8,9]	Detection of breach, accomplishment of mitigation, verification
C.3.6	Effluent Radioactivity[1] Noble Gases (from buildings or areas where penetrations and hatches are located)	10^{-6} µCi/cc to 10^{3} µCi/cc	2[8]	Indication of breach
E.3.1.1	Containment or Purge Effluent	10^{-6} µCi/cc to 10^{5} µCi/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
E.3.1.3	Auxiliary Building[1] (including any building containing primary system gases, e.g., waste gas decay tank)	10^{-6} µCi/cc to 10^{3} µCi/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.3.1.5	Common Plant Vent or Multipurpose Vent Discharge Any of above Releases (if containment purge is included)	10^{-6} µCi/cc to 10^{3} µCi/cc 0 to 110% vent design flow[10] 10^{-6} µCi/cc to 10^{4} µCi/cc	2[8]	Detection of significant releases, release assessment, long-term surveillance

TABLE 7A-3, DATA SHEET 12.1 (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.3.1.1	Containment or Purge Effluent	10^{-6} to 10^{5} µCi/cc							
C.3.4 E.3.1.5	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	GH-RE-10B	N	SP010	N	SP010	N	RRIS

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 filtration system. The radwaste building vent receives the discharge from the radwaste building exhaust fans. The radwaste building contains the waste gas decay tanks.
2. The unit vent flow rate is determined by fan run contacts which are inputted to the RMS computer. Each system is balanced and assumed to be operating at the design flow. The high range monitor has 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.

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 - Nobel Gas Effluent from Condenser Air Removal System Exhaust[1]	10^{-6} to 10^{-2} μCi/cc	3[8]	Detection of breach, verification
E.3.1.4	Condenser Air Removal Exhaust[1]	10^{-6} to 10^{5} μCi/cc 0 to 110 percent vent design flow[10] (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. IE	PANEL	CL. IE	PANEL	CL. IE	
C.2.5	Condenser Air Removal Exhaust Radioactivity	10^{-7} to 10^{-2} μCi/cc	RE-92	N	056	N	056	N	RRIS
E.3.1.4	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.3.1.4 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 μ10^{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	1.3 x 10^{-2} μCi/cc to 1.3 x 10^{3} μCi/cc	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 relief valve plumes. The atmospheric relief valves are set to open at a lower pressure than the safety relief valves and are Class IE, highly reliable components. These valves are provided with position indication. It is assumed that the relief valves will be open and releasing the same concentration and distribution of radionuclides any time any of the safety 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 relief valves.
3. Determination of releases from the safety valves and the atmospheric relief valves is made by RRIS computer using main steam pressure and flow, and atmospheric relief valve position.

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} µCi/cc to 10^{2} µCi/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	9×10^{-2} to 9×10^{3} µCi/cc	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.
2. This release is from the main steam line; thus, the monitor was designed with the same capabilities as the monitors for steam generator releases (Data Sheet 12.3). The range recommended is not applicable to secondary side releases, as can be seen by the different ranges recommended here and on Data Sheet 12.3.

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[13]	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^{-3} µCi/cc to 10^{2} µCi/cc (See data sheet 12.5, III. Remarks, Note 3)	GT-RE-21B	N	N/A	N	-	-	
	Radwaste Building Vent Monitors Particulates Iodines	10^{-3} µCi/cc to 10^{2} µCi/cc (See data sheet 12.5, III. Remarks, Note 3)	GH-RE-10B	N	N/A	N	-	-	

III. REMARKS

1. The SNUPPS design meets all of the stated recommendations. Refer to Sections 11.5 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 μCi/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 Soluble 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.6.3	Containment Air	Grab Sample		Release assessment, verification analysis
E.6.3.2	Oxygen Content	0 to 30 percent		Release assessment, verification analysis
E.6.3.3	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 18.2.3.2	SJ-145	N	SJ-082	N	-	-	PASS
E.6.1.2 E.6.3.3	Gamma Spectrum								

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.6.1.3	Boron Content								
E.6.3.2	Oxygen Content								
E.6.1.4	Chloride 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 includes an inline post-accident sampling system which meets the stated requirements. Refer to Section 18.2.3.2 for details on the system design provisions. Samples are obtained from redundant sample points with Class IE isolation valves for the containment atmosphere, the containment recirculation sumps, 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
			IDENT. NO.	CL. IE	INDICATOR PANEL	INDICATOR CL. IE	RECORDER PANEL	RECORDER CL. IE	
E.6.2	Sump Grab Sample								
	Containment Recirculation	See data sheet 13.1							
	ECCS Pump Room Sumps	Not required							
	Auxiliary Building Sumps	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.
2. The ECCS pump 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 pump rooms and auxiliary building is considered unnecessary. The Class IE level indication will detect any accumulated leakage, and the isolation valves will prevent its discharge from the auxiliary building. Should the leakage be from a line that contains fluid from the recirculation sump, the recirculation sump sample will provide the recommended analyses, since the fluid is from the same source.

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
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	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 post-accident 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, other than the containment isolation valves, it is not a Class IE system.
3. The SNUPPS post-accident sampling system includes an on-line isotopic analysis system. This is a highly reliable system with a backup power source and is designed to function in post-accident conditions. The sample lines to the system include parallel, redundant Class IE isolation valves which ensure the capability of obtaining a sample in the event of a single failure of a containment isolation valve.

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 (LT-261 and LT-262) have a range from the top to bottom of the tank and indications 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.
4. As noted on Data Sheet 13.2, the auxiliary building and ECCS pump room sumps are provided with Class 1E sump level indication. These sumps would collect any long-term leakage from systems which recirculate fluids from the containment sump. As described in Section 9.3.3 and shown on Figure 9.3-6, Sheet 2, the discharge lines from these sumps contain Class IE isolation valves which close on a SIS to preclude inadvertent discharge of fluids to the floor drain tank in the radwaste building. The LOCA analysis includes an evaluation of a 2 gpm leak from lines recirculating sump fluids. Refer to Section 15.6.5.4.1.2 for a discussion of the analysis and to Table 15.6-8 for the resulting radiological consequences. Failure of this tank has been analyzed in FSAR Section 15.7.2.
5. The containment normal and instrument tunnel sumps and the reactor coolant drain tank discharge lines are isolated by a CIS-A signal. This signal is generated as a result of a safety injection signal or as a result of high containment pressure. These lines will be isolated subsequent to any LOCA. Refer to Section 18.2.11, which addresses NUREG-0737 Item II.E.4.2, Containment Isolation Dependability. Inadvertent contamination of the radwaste or auxiliary buildings due to discharge of fluids from the containment 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	Gas Decay Tank Pressure (unnecessary variable)								

III. REMARKS

1. The radioactive gas holdup tank is referred to as the gas decay tank (GDT). Pressure is an unnecessary variable for SNUPPS design as described in Remark 3 below; however, Remark 2 describes the adequacy of the GDT design and the range of the pressure indicators.
2. Addition of radioactive gases to the gaseous radwaste system following an accident is precluded by design and is not postulated. Containment isolation valves on gas bearing lines from the pressurizer relief tank and the reactor coolant drain tank close upon receipt of a CIS-A. Refer to Remark 5 on Data Sheet 14.1 for a further discussion of containment isolation. Since there will be no containment gases added to the gaseous radwaste system, there is no need to monitor the available storage capacity following an accident.
3. The design pressure of each of the eight GDTs is 150 psig. Each tank is provided with a pressure transmitter/indicator/alarm. The indicators are located in the radwaste building control room and have a range of 0 to 150 psig. The alarms for the six GDTs used during normal operation are set at 100 psig. Two of the GDTs are used for shutdown and start-up. All GDTs are provided with relief valves set at or below the tank's design pressure. The relief valves for the six GDTs discharge at design pressure to the shutdown GDTs which are normally at low pressure. Should an extended discharge to the shutdown GDT occur, a high alarm (at 90 psig) would be received prior to the lifting of the shutdown GDT relief valve at 100 psig. The discharge from the radwaste building vent is monitored by the radwaste building vent monitor described on Data Sheet 12.1. Failure of one of these tanks has been analyzed in FSAR Section 15.7.1.

   Based upon the protection afforded by the installed tank relief valves and the potential eventual release to the radwaste building vent, the span of 0 to tank design pressure is adequate to provide information to the operating staff concerning the status of the GDTs.

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. IE	PANEL	CL. IE	PANEL	CL. IE	
D.11.1	Status of Standby Power								
	4160 V Class IE Incoming Current								
	Current	0-2000A	CT-NB0109	Y	RL015	N	-	-	BOP
	Current	0-2000A	CT-NB0111	Y	RL015	N	-	-	BOP
	Current	0-2000A	CT-NB0212	Y	RL015	N	-	-	BOP
	Current	0-2000A	CT-NB0209	Y	RL015	N	-	-	BOP
	Current	0-1200A	CT-PA0201	N	RL016	N	-	-	BOP
	4160 V Class IE Bus Voltage								
	Voltage	0 - 5250 V	PT-101/B	Y	RL015	Y	-	-	BOP
	Voltage	0 - 5250 V	PT-201/B	Y	RL015	Y	-	-	BOP
	Diesel Gen No. 1								
	Current	0 - 1500A	CT-NE107	Y	RL015	N	-	-	BOP
	Voltage	0 - 5250 V	PT-NE107	Y	RL015	N	-	-	-
	KW	0 - 8MW	CT/PT-NE107	Y	RL015	N	-	-	BOP
	Vars	0 - 8Mvar	CT/PT-NE107	Y	RL015	N	-	-	BOP
	Frequency	55 - 65 Hertz	PT-NE107	Y	RL015	N	-	-	BOP
	Diesel Gen No. 2								
	Current	0 - 1500A	CT-NE106	Y	RL015	N	-	-	BOP
	Voltage	0 - 5250 V	PT-NE106	Y	RL015	N	-	-	BOP
	KW	0 - 8MW	CT/PT-NE106	Y	RL015	N	-	-	BOP
	Vars	0 - 8MVar	CT/PT-NE106	Y	RL015	N	-	-	BOP
	Frequency	55 - 65 Hertz	PT-NE106	Y	RL015	N	-	-	BOP

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 Valves and	0-800 psig	PT-108	N	-	-	-	-	BOP
	Secondary Side	0-800 psig	PT-110	N	-	-	-	-	BOP
	Atmospheric Relief	0-800 psig	PT-112	N	-	-	-	-	BOP
	Valves	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
					INDICATOR		RECORDER		
			IDENT. NO.	CL. IE	PANEL	CL. IE	PANEL	CL. IE	
	(Unnecessary Variable)								

III. REMARKS

This variable has been deleted from Regulatory Guide 1.97 in Revision 3.

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

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 particulates and radioiodines 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. In the control building count room (auxiliary warehouse laboratory for Wolf Creek), 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.

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

A portable, battery powered, 2,048-channel multichannel analyzer will be used with a 2-inch x 2-inch NaI detector for quantification of radioactivity in plant and environmental radiological samples. In addition, portable single-channel analyzers with NaI detectors will be available in emergency kits for analysis of selected radioisotopes.

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 from 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	RD-ZT-5000C* RD-SY-5000C* MTC-RR-222**	N	-	-	-	-	RRIS
E.5.2	Wind Speed	0-50 m/s ±0.07 m/s	RD-ST-5000C* RD-SY-5000C* MTC-RR-222**	N	-	-	-	-	RRIS

* Callaway Site
**Wolf Creek site

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	
E.5.3	Estimate of Atmospheric Stability								
	Temperature	-30 to 50 C, ±0.24 C	RD-TY-5001CA* RD-TE-5001CA* MTC-RR-222**	N	-	-	-	-	RRIS
	Temperature Difference	-5 to 15 C, ±0.025 C	RD-TE-5001AA* RD-TDY-5001* MTC-RR-222**	N	-	-	-	-	RRIS
	Dew Point	-30 to 42 C, ±1.0 C	RD-TE-5001CB* RD-TY-5001CB* MTC-RR-222**	N	-	-	-	-	RRIS
	Precipitation Ground Level	0 -5 inch ±0.5%	RD-QE-5002* RD-QY-5002* MTC-RR-222**	N	-	-	-	-	RRIS

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.

* Callaway site
**Wolf Creek site

Enclosure 2

Correlation of Request for Additional Information Items with Revised Appendix 7A Pages

Request for Additional Information Item	Appendix 7A Table 7A-3 Sheets
1	1.1
2	13.1, 13.3
3	3.1
4	3.2
5	4.1
6	4.2
7	10.1
8	8.1
9	6.6
10	14.1
11	14.2
12	12.3
13	12.4
Para. 3.3.19	13.2
Para. 3.3.20	13.1

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