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November 29, 1985

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Mr. Hugh L. Thompson, Director
Division of Licensing
Washington, DC 20555

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Generic Letter No. 82-33; Supplement to NUREG-0737,
Regulatory Guide 1.97, Revision 2, Report

Gentlemen:

In accordance with our commitment documented in our confirmatory order dated June 12, 1984, we are providing the Regulatory Guide 1.97, Revision 2, Report for the Beaver Valley Nuclear Power Station, Unit No. 1 Nuclear Power Plant.

If you have any questions regarding this submittal, please contact myself or members of my staff.

Very truly yours,

J. J. Carey
Vice President, Nuclear

Attachment

cc: Mr. W. M. Troskoski, Resident Inspector
U. S. Nuclear Regulatory Commission
Beaver Valley Power Station
Shippingport, PA 15077

U. S. Nuclear Regulatory Commission
c/o Document Management Branch
Washington, DC 20555

Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Attn: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
Washington, DC 20555

Add:
AD - J. Knight (ltr only)
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Beaver Valley Power Station Unit Number 1

Regulatory Guide 1.97, Revision 2

Report

The accompanying table summarizes the status of conformance of the Beaver Valley Power Station Unit-1 (BVPS-1) to Regulatory Guide 1.97, Revision 2. Provided below is additional information explanatory to the table.

Type A Variables

The current BVPS-1 Emergency Operating Procedures (EOPs) have been used to identify those instrumets to be classified as Type A variables. These EOPs are based on the Westinghouse Owner's Group Emergency Response Guidelines, Revision 1.

Environmental Qualification

A "yes" in the table under environmental qualification indicates that the instrumentation complies with 10CFR50.49.

Seismic Qualification

A "yes" in the table under seismic qualifications indicates that the instrumentation complies with the seismic qualification program which was the basis for plant licensing. An outline of the design philosophy for Seismic Class I systems and components is contained in the BVPS-1 UFSAR, Appendix B.

Quality Assurance

Quality Assurance of the instrumentation is in accordance wijth the BVPS-1 Quality Assurance Program described in UFSAR, Appendix A.

Power Supply

All safety-related instrumentation is fed from reliable and separate vital buses as described in Section 8.5.4 of the UFSAR to guarantee continuous monitoring and control of all instrument channels. Each bus receives power from a separate battery. The 1E designation as used in the table under Power Supply denotes that the instrumentation channel(s) is powered from a vital bus. The 120 volt AC vital bus system consists of four completely independent subsystems and is provided in accordance with IEEE Std. 308-1971, as also described in Section 8.5.4 of the UFSAR.

Electrically Separation

The Category 1 instrumentation listed in the table, while not meeting the full requirements of R.G. 1.75, does possess adequate separation of channels. The plant design and installation complies with the AEC general design criteria 17 and 18 and the applicable BVPS specifications. This is consistent with separation requirements at the time the operating license for BVPS-1 was granted. The separation requirements are discussed in the UFSAR Sections 8.1, 8.5, 8.5.2.2, 1.29, Q7.1(3), Q8.5 and for Safety Guides 6 and 9.

Redundancy

Redundancy is indicated by the number of channels for a variable in the table. Deviations are identified in the notes for the table when appropriate.

Conformance to R.G. 1.97

A "yes" in the column indicates conformance to R.G. 1.97 on the basis of the information provided above and in the table. A note is provided wherein the specific deviations are identified and in which additional information and/or supporting justification or alternatives are presented.

BVPS-1 R. G. 1.97 VARIABLE TABLE

VARIABLE	TYPE/CATEGORY	QUALIFICATION ENVIRONMENTAL	QUALIFICATION SEISMIC	NUMBER OF CHANNELS	RANGE/ STATUS	POWER SUPPLY	DISPLAY LOCATION CONTROL ROOM	TSC	EOF	CONFORMANCE/ (NOTE)
Containment Sump Level	A1, B1, C1,	Yes	Yes	2 Per Plant	0-90 In.	1E, Battery Backed	Indication Record One Channel	Yes	Yes	(1)
	B2, C2	Yes	Yes	1 Per Plant	3-15 In.	1E, Battery Backed	Indication	Yes	Yes	Yes
Containment Area Radiation	A1, C3, E1	Yes	Yes	2 Per Plant	1-10E7 R/Hr	1E, Battery Backed	Indication Both Channels Record Both Channels	Yes	Yes	Yes
Primary Plant DWST Level	A1, D1	Exempt, Mild Environment	Yes	2 Per Plant	0-30 Ft.	1E, Battery Backed	Indication Both Channels	Yes	Yes	(2)
Auxiliary Feedwater Flow	A1, D2	Yes	Yes	1 Per Loop	0-400 GPM	1E, Battery Backed	Indication Each Channel	Yes	Yes	Yes
RCS Pressure (WR)	A1, B1, C1	Yes	Yes	2 Per Plant	0-3000 PSIG	1E, Battery Backed	Indication Both Channels Record Both Channels	Yes	Yes	Yes
RCS T Hot (WR)	A1, B1	Yes	Yes	1 Per Loop	0-700 °F	1E, Battery Backed	Record Each Channel	Yes	Yes	(3)
RCS T Cold (WR)	A1, B1, B3	Yes	Yes	1 Per Loop	0-700 °F	1E, Battery Backed	Record Each Channel	Yes	Yes	(3)
Steam Generator Level	A1, D1,	Yes	Yes	3 Channels Per Loop	0-100%	1E, Battery Backed	Indication Each Channel Record One Channel Per Loop	Yes	Yes	(4)
Pressurizer Level	A1, D1	Yes	Yes	3 Per Plant	0-100%	1E, Battery Backed	Indication Each Channel Record Each Channel	Yes	Yes	(5)

BVPS-1 R. G. 1.97 VARIABLE TABLE

VARIABLE	TYPE/CATEGORY	QUALIFICATION ENVIRONMENTAL	QUALIFICATION SEISMIC	NUMBER OF CHANNELS	RANGE/ STATUS	POWER SUPPLY	DISPLAY LOCATION CONTROL ROOM	TSC	EOF	CONFORMANCE/ (NOTE)
Containment Pressure	A1, B1, C1	Yes	Yes	4 Per Plant	10-70 PSIA	1E, Battery Backed	Indication Each Channel Record 1 Channel	Yes	Yes	Yes
	C1	Yes	Yes	2 Per Plant	0-200 PSIA	1E, Battery Backed	Indication Each Channel Record 1 Channel	Yes	Yes	Yes
Containment Hydrogen Concentration	A1, C1, E3	Yes	Yes	2 Per Plant	0-10%	1E, Battery Backed	Indication Each Channel Record 1 Channel	Yes	Yes	Yes
Steam Generator Pressure	A1, D2	Yes	Yes	3 Per Steam Generator	0-1400 PSIG	1E, Battery Backed	Indication Each Channel Record 1 Channel Per Steam Generator	Yes	Yes	Yes
RWST Level	A1, D2	Exempt, Mild Environment	Yes	4 Per Plant	0-51 Ft.	1E, Battery Backed	Indication Three Channels Record 1 Channel	Yes	Yes	(6)
Neutron Flux	B1	No	Yes	2 Per Plant	10-10E6 CPS	1E, Battery Backed	Indication Each Channel Record Each Channel			(7)
		No	Yes	2 Per Plant	10E-11-10E-3 Amps	1E, Battery Backed	Indication Each Channel	Yes	Yes	
		No	Yes	4 Per Plant	0-120%	1E, Battery Backed	Indication Each Channel Record Each Channel			
Control Rod Position	B3	NR	NR	1 Per Rod	Full In/ Not Full In	Non 1E	1 Status Light Per Rod			Yes
RCS Soluble Boron Concentration	B3	(See Note)	(See Note)	N/A	0-6000 PPM	N/A	Post Accident Sampling Local Indication			(8)
Core Exit Temperature	B3/C1	(See Note)	(See Note)	51 Per Plant	0-1650°F	Non 1E	8 T/Cs Subcooling Margin Display All T/Cs Plant Variable Computer	Yes	Yes	(9)
Coolant Level In Reactor	B1	(See Note)	(See Note)	2 Per Plant	0-100% Span	1E, Battery Backed	Indication Each Channel Record Each Channel	Yes	Yes	(9)

BVPS-1 R. G. 1.97 VARIABLE TABLE

VARIABLE	TYPE/CATEGORY	QUALIFICATION ENVIRONMENTAL	QUALIFICATION SEISMIC	NUMBER OF CHANNELS	RANGE/ STATUS	POWER SUPPLY	DISPLAY LOCATION CONTROL ROOM	TSC	EOF	CONFORMANCE/ (NOTE)
Degrees Subcooling	B2	(See Note)	(See Note)	1 Per Plant	200°F Sub-cooled to 2000°F Superheat	See Note	Indication	Yes	Yes	(9)
Containment Penetration Isolation Valve Position (See Note For Exceptions)	B1	Yes	Yes	1 Per Valve	Open/ Closed	1E, Battery Backed	1 Pair Of Lights Per Valve	Yes	Yes	(10)
Radition Level In Primary Coolant	C1	Exempt, Mild Environment	(See Note)	2 Per Plant	10-10E6 CPM	1E, Battery Backed	Indication Each Channel Record Each Channel	Yes	Yes	(11)
Analysis of Primary Coolant (Gamma Spectrum)	C3	N/A	N/A	N/A	Up to 10Ci/g With Dilution	Non 1E	Post Accident Sampling System - Sample Analysis			Yes
Condenser Air Ejector Monitor	C3	Exempt, Mild Environment	NR	1 Per Plant	10-10E6 CPM	1E, Battery Backed	Indication Record	Yes	Yes	(12)
Containment Purge Exhaust Radioactivity	C2	Exempt, Mild Environment	Category 3	2 Per Plant	10-10E6 CPM	1E, Battery Backed	Indication Each Channel Record Each Channel	Yes	Yes	(29)
		Effluent released via identified release point.								
RHR System Flow	D2	No	Yes	1 Per Plant	0-8500 GPM	1E, Battery Backed	Indication			(13)
RHR Heat Exchanger Outlet Temperature	D2	No	Yes	1 Per Plant	50-400°F	1E, Battery Backed	Indication Record	Yes	Yes	(13)

BVPS-1 R. G. 1.97 VARIABLE TABLE

VARIABLE	TYPE/CATEGORY	QUALIFICATION ENVIRONMENTAL	QUALIFICATION SEISMIC	NUMBER OF CHANNELS	RANGE/ STATUS	POWER SUPPLY	DISPLAY LOCATION CONTROL ROOM	TSC	EOF	CONFORMANCE/ (NOTE)
Quench Tank Pressure	D3	NR	NR	1 Per Plant	0-120 PSIG	1E, Battery Backed	Indication	Yes	Yes	Yes
Main Feedwater Flow	D3	NR	NR	2 Per S.G.	0-4.4E6 LB/HR	1E, Battery Backed	Indication Each Channel	Yes	Yes	Yes
Containment Spray Flow	D2									(20)
Containment Atmosphere Temperature	D2	No	NR	2 Per Plant	0-200°F	1E, Battery Backed	Indication Each Channel	Yes	Yes	(21)
Containment Sump Water Temperature	D2	Yes	Yes	2 Per Plant	0-300°F	1E, Battery Backed	Indication Each Channel	Yes	Yes	Yes
RCS Makeup Flow-In	D2	Exempt, Mild Environment	NR	1 Per Plant	0-150 GPM	1E, Battery Backed	Indication	Yes	Yes	Yes
RCS Letdown Flow-Out	D2	No	NR	1 Per Plant	0-150 GPM	1E, Battery Backed	Indication	Yes	Yes	(22)
Volume Control Tank Level	D2	No	NR	2 Per Plant	0-100% Span	Non 1E	Indication Each Channel	Yes	Yes	(23)
Component Cooling Water Temperature to ESF System	D2	No	NR	1 Per Plant	0-200°F	1E, Battery Backed	Indication			(24)
High Level Radioactive Liquid Tank Level	D3	NR	NR	1 Per Tank	0-132 In. Water	1E, Battery Backed	Indication			(25)
Radioactive Gas Holdup Tank Pressure	D3	NR	NR	1 Per Tank	0-100 PSIG	1E, Battery Backed	Record Each Channel	Yes	Yes	(26)
Emergency Ventilation Damper Position (See Note For Exceptions)	D2	Yes	Yes	1 Per Damper	Open/ Closed	1E, Battery Backed	1 Status Light Per Damper	Yes	Yes	(27)

BVPS-1 R. G. 1.97 VARIABLE TABLE

VARIABLE	TYPE/CATEGORY	QUALIFICATION ENVIRONMENTAL	QUALIFICATION SEISMIC	NUMBER OF CHANNELS	RANGE/ STATUS	POWER SUPPLY	DISPLAY LOCATION CONTROL ROOM	TSC	EOF	CONFORMANCE/ (NOTE)
Accumulator Tank Level And Pressure	D2	No	NR	2 Per Accumulator	0-100% Span	1E, Battery Backed	Indication Each Channel	Yes	Yes	(14)
		No	NR	2 Per Accumulator	0-800 PSIG	1E, Battery Backed	Indication Each Channel	Yes	Yes	
Accumulator Isolation Valve Position	D2	Yes	Yes	1 Per Accumulator	Open/ Closed	1E, Battery Backed	1 Status Light Per Valve	Yes	Yes	Yes
Boric Acid Charging Flow	D2	No	NR	1 Per Plant	0-160 GPM	Non 1E	Record	Yes	Yes	(15)
Flow In LPI System	D2	No	Yes	1 Per Train	0-4000 GPM	1E, Battery Backed	Indication Each Channel	Yes	Yes	(16)
Reactor Coolant Pump Status	D3	NR	NR	1 Per Pump	0-1200 ACI	Non 1E	Indication Each Channel	Yes	Yes	Yes
Primary System Safety Relief Valves Positions	D2	Yes	Yes	1 Per Valve	Open/ Closed (0-100%)	1E, Battery Backed	Display Accoustic Monitor	Yes	Yes	Yes
		Yes	Yes	1 Per Valve (PORVs)	Open/ Closed	1E, Battery Backed	1 Status Light Per Valve	Yes	Yes	
Pressurizer Heater Power Availability	D2	Yes	Yes	1 Per Heater Group	Closed/ Trip	1E, Battery Backed	Control Switch Indication			(17)
Quench Tank Level	D3	NR	NR	1 Per Plant	0-100% Span	Non 1E	Indication	Yes	Yes	(18)
Quench Tank Temperature	D3	NR	NR	1 Per Plant	50-350°F	1E, Battery Backed	Indication	Yes	Yes	(19)

BVPS-1 R. G. 1.97 VARIABLE TABLE

VARIABLE	TYPE/CATEGORY	QUALIFICATION ENVIRONMENTAL	QUALIFICATION SEISMIC	NUMBER OF CHANNELS	RANGE/ STATUS	POWER SUPPLY	DISPLAY LOCATION CONTROL ROOM	TSC	EOF	CONFORMANCE/ (NOTE)
High Pressure SI Flow	D2	Yes	Yes	1 Per Plant	0-1000 GPM	Non-1E	Indication Record	Yes	Yes	Yes
Status of Standby Power and Other Energy Sources Important to Safety	D2	Exempt, Mild Environment	Yes	1 per Voltage/ Current	Channel Specific	Non-1E	Indication Each Channel	Yes	Yes	Yes
Radiation Exposure Rate-Inside Buildings or Areas which are in Direct Contact with Primary Containment Where Penetration and Hatches are Located	C2	(See Note)	(See Note)	1 Per Monitor	Channel Specific (See Note)	Non-1E with Backup Power	Indication Each Channel Record Each Channel	Yes	Yes	(28)
Effluent Radioactivity -Noble Gases From Area Indicated for Previous Variable	C2	Exempt, Mild Environment	(See Note)	1 Per Monitor	Channel Specific (See Note)	Non-1E with Backup Power	Indication Each Channel Record Each Channel	Yes	Yes	(29)
Secondary System Safety Relief Valve Positions	D2	No	Yes	1 Per S.G.	Open/Closed	1F, Battery Backed	1 Pair of Status Lights Per Valve			(30)
Radiation Exposure Rate - Areas Where Access is Required to Service Equipment Important to Safety	E2	(See Note)	(See Note)	1 Per Monitor	0.1-10E4mR/ HR.	Non-1E	Indication Each Channel Record Each Channel	Yes	Yes	(31)

BVPS-1 R. G. 1.97 VARIABLE TABLE

VARIABLE	TYPE/CATEGORY	QUALIFICATION ENVIRONMENTAL	SEISMIC	NUMBER OF CHANNELS	RANGE/ STATUS	POWER SUPPLY	DISPLAY LOCATION CONTROL ROOM	TSC	EOF	CONFORMANCE/ (NOTE)
Noble Gas and Vent Flow-Containment or Purge Effluent	E2	Effluent released via identified release point.								(29)
Noble Gas and Vent Flow-Reactor Shield Building Annulus	E2	Effluent released via identified release point.								(29)
Noble Gas and Vent Flow-Auxiliary Building	E2	Effluent released via identified release point.								(29)
Noble Gas and Vent Flow- Comnar Plant Vent	E2	Effluent released via identified release point.								(29)
*Vent from S.G. Safety Relief Valves or Atmospheric Valves	E2	Exempt, Mild Environment	(See Note)	1 Per Monitor	0.1-10E3μ Ci/cc	Non-1E	Indication Each Channel			(32)
Noble Gas and Vent Flow Rate-All Other Identified Release Points	E2	Exempt, Mild Environment	(See Note)	1 Per Monitor	0.1-10E3 μCi/cc	Non-1E	Indication			(33)
Particulates and Halogens-All Identified Release Points (except S.G. Safety Reliefs or Atmospheric Dumps) Sampling with On Site Analysis	E3	N/A	N/A	N/A	10E-3-10E2μCi/cc	N/A	Laboratory Analysis of Filter	N/A	N/A	Yes

BVPS-1 R. G. 1.97 VARIABLE TABLE

VARIABLE	TYPE/CATEGORY	QUALIFICATION ENVIRONMENTAL	QUALIFICATION SEISMIC	NUMBER OF CHANNELS	RANGE/ STATUS	POWER SUPPLY	DISPLAY LOCATION CONTROL ROOM	TSC	EOF	CONFORMANCE/ (NOTE)
Environs Radiation and Radioactivity										
Radiation Exposure Meter	E3									(34)
Airborne Radiohalogens and Particulates (Portable Sampling with On Site Analysis Capability)	E3	NR	NR	N/A	10E-9μCi/cc-10E-3μCi/cc	N/A	N/A			Yes
Plant and Environs Radiation (Portable Instrumentation)	E3	NR	NR	N/A	(See Note)	N/A	N/A			(35)
Plant and Environs Radiation (Portable Instrumentation)	E3	NR	NR	N/A	Gamma-Ray Spectrometer	N/A	N/A			Yes
Meteorlogical Parameters	E3	NR	NR	1	Parameter Specific	Non-1E	Strip Chart Recorders			(36)
Accident Sampling Capability-Primary Coolant and Sump and Containment Air-Analysis Capability On Site	E3	This capability exists via the PASS (see Note 8)								Yes

NA = Not Applicable
NR = Not Required

Comment Notes To BVPS-1 R.G. 1.97 Variable Table

1. Containment Sump Level

R.G. 1.97, Revision 2, recommends that the containment sump level indication, wide range, measure from the bottom of containment to 600,000 gallons level equivalent. The BVPS-1 indication is from 0-90 inches and is considered adequate based on plant specific requirements for operator monitoring as described in the symptom based EOPs. It is also noted that Revision 3 of R.G. 1.97 changed the gallonage criterion to plant specific. Based on the above, we believe the instrumentation to be in conformance with R.G. 1.97.

2. Primary Plant DWST Level

The BVPS-1 instrumentation for this variable does not conform completely to redundancy in that the instruments are powered from the same vital bus. The following describes the existing instrumentation for this tank and summarizes the related BVPS-1 procedural instructions to the operator.

Both level transmitters provide remote level indication in the Control Room, and there are two low-level alarms and two low-low level alarms. In addition to these transmitters, a local tank level indication is available. A loss of power to either transmitters will result in a full downscale indication and a low-level alarm. The local "float type" level indicator would provide indication should a power failure occur to both channels. The operator is instructed to monitor the PPDWST level as a criterion of auxiliary feedwater switchover. Upon reaching a low-level alarm at approximately 26 1/2 feet water level, the operator is instructed to take water makeup action to the PPDWST and first verifies the alarms by observing the remote level indication. If both level indications read low, the operator verifies low level using the local indication, if it is suspected that the power supply has lost power. Should the water level in the tank decrease to approximately four feet, a low-low level will alarm. This setpoint allows 30 minutes for the operator to take corrective action.

Based on the above and a review of this system, the followirg is provided in support of the existing instrumentation.

a. The instruments do not provide assistance in determining the nature of any accidents addressed in the FSAR.

b. The instruments do not provide ear[illegible]y indications necessary to protect the public or provide an estimate [illegible] the magnitude of an impending threat.

c. Performance of the AFWS is primarily evaluated by the operator through interpretation of auxiliary feedwater flow, steam generator level, and RCS temperature and the level instrument indication does not, therefore, define proper operation of reactor trip ESF system operation.

d. The instrument power supply failure would not cause the operator to take actions that would aggravate the course of any accident. The instruments simultaneous failures would only result in conservative actions being taken earlier in an accident.

e. The instruments do not provide information related to determining the potential for breaching any fission product barriers.

f. The instruments are not subject to HELB and electrical failure can be readily identified through annunciation. Local "float type" level indication is utilized for a backup system.

3. RCS T hot and T cold

The range of 0-700°F for RCS T hot and T cold is considered to be in conformance with R.G. 1.97 based on the Revision 3 recommended range of 50-700°F.

4. Steam Generator Level

R.G. 1.97 recommends level indication from the steam generator tube sheet to the separators. The BVPS-1 level range of 0-100% represents a span twelve (12) inches above the tube sheet to a point above the separators. During accident conditions, operator action (i.e. regulation of feedwater flow) is based on the 5 to 50% range of this span - values below the range essentially indicating complete depletion of steam generator inventory. Since the 0% indicated level down to the tube sheet represents a small percentage of steam generator volume, the additional twelve inches of span capability would provide only marginal benefit.

5. Pressurizer Level

R.G. 1.97 recommends level indication from the top to the bottom of the pressurizer. The BVPS-1, 0-100% span is essentially for the cylindrical portion of the pressurizer and does not include the hemispherical ends. The currently installed span provides adequate indication to evaluate system conditions and to initiate manual operator actions for accident conditions.

6. Refueling Water Storage Tank (RWST) Level

R.G. 1.97 recommends that the RWST level be measured from the top to the bottom of the tank. The BVPS-1, 0-100% span is from twelve inches off the bottom to the top of the cylindrical portion of the tank. This spans fifty-one (51) of the approximately fifty-seven (57) feet of tank height. The RWST level instrumentation adequately provides for all levels of indication required during emergency operating conditions such as switchover from the injection to recirculation mode.

7. Neutron Flux

R.G. 1.97 recommends that the neutron flux indication be environmentally qualified. The description of the BVPS-1 installed Reactor Control System is provided in Section 7.7 of the UFSAR with response consideration of reactivity in Section 7.7.2.2. In general, overall reactivity control is achieved by the combination of soluble boron and rod cluster control assemblies. Long-term regulation of core reactivity is accomplished by adjusting the concentration of boric acid in the reactor coolant. Short-term reactivity control for power changes is accomplished by the rod control system, which moves the RCCAs. This system uses input signals including neutron flux, coolant temperature, and turbine load. Borating the primary system after an accident in accordance with the EOPs ensures that adequate shutdown margin is maintained. In addition, a loss of shutdown margin would be reflected in a heat up of the RCS, which is monitored by qualified instruments.

8. RCS Soluble Boron Concentration

R.G. 1.97 recommends that continuous indication for this variable be provided in the Control Room. BVPS-1 utilizes the Post Accident Sampling System (PASS) for this variable. The PASS lines and equipment are designed to conform to the classification of the system to which each sampling line is connected. In addition, PASS is designed to meet clarification Item II.B.3 in NUREG-0737 by promptly obtaining reactor coolant and containment atmosphere samples, which can be analyzed under accident conditions. In-line analyzers are provided for direct measurement of dissolved Oxygen, dissolved Hydrogen, pH, Boron, Chloride, and conductivity from post accident samples. Additional information on PASS is contained in Section 9.6 of the UFSAR.

9. Core Exit Temperature, Coolant Level in Reactor Degrees Subcooling

The Core Exit Thermocouple (CETC) System Coolant Level in reactor and degrees subcooling are elements of the Inadequate Core Cooling (ICC) Instrumentation. The BVPS-1 proposed ICC System is presented in our letter to the NRC dated April 24, 1984, in response to the NRC request for additional information dated December 16, 1983, NUREG-0737, Item II.F.2; ICC Instrumentation System (Generic Letter 82-28).

10. Containment Penetration Isolation Valve Position.

There are three general groupings of containment isolation valve position indications, which are not in strict conformance with the recommendations of R.G. 1.97. They are classified and identified below based on (A) electrical redundancy, (B) environmental qualification, or (C) Control Room indication availability.

A. Containment isolation valves in series which do not have electrically redundant position indication, within a single train of equipment.

This arrangement of valve position indication is for the two Hydrogen Analyzers, which are on separate trains and redundant to each other. The valve position indications for one analyzer are, therefore, correspondingly on the same train, Train A, and those for the other analyzer are on Train B. This arrangement is necessary to maintain the redundancy of one analyzer to the other and is, therefore, believed to be an acceptable deviation from R.G. 1.97.

B. Environmental Qualification: Within this classification there are four subgroupings of valve position indication.

1) Containment isolation valves in series wherein the position indication for the valve inside containment is environmentally qualified or is a check valve (CV) and the position indication for the valve outside containment is not environmentally qualified. The number of outside valves is listed below generically.

Component Cooling Water System (12 valves)
RCS Letdown Line (1 valve)
Containment Sump Pump Discharge (1 valve)
Primary Drain Transfer Pump No. 1 Discharge (1 valve)
S.I. Accumulator Sample Line (1 valve)
Pressurizer Relief Tank Nitrogen Supply (1 valve, CV inside)
Primary Grade Water Supply to the Pressurizer Relief Tank (1 valve, CV inside)
Main Condenser Ejector for Containment (1 valve, CV inside)
Pressurizer Relief Tank Vent (1 valve)

2) Containment isolation valves in series where indication for the valves are not environmentally qualified.

Sampling System (9 pairs of valves, one inside and one outside containment)
Containment Activity Monitor Suction (1 pair of valves outside containment)
Containment Vacuum Pump 1B Suction (1 pair of valves outside containment)
Containment Open Pressure System (1 pair of valves outside containment, channel separation does not exist)

3) Containment isolation valves in a closed or sealed system wherein the position indication is not environmentally qualified.

Containment Sealed Pressure System (2 valves inside containment, CV outside each line)
Main Steam Line Trip Valves (3 valves outside containment)
Main Steam Blowdown (Line Drain) (3 valves outside containment)

4) Containment isolation valve position indication, which is not environmentally qualified but may be opened or closed on an intermittent basis under administrative control.

Nitrogen supply lines to SI Accumulators (two valves in series, one inside and one outside containment).

SI Accumulator Testline (one valve inside containment, position indication environmentally qualified, in series with one valve outside containment).

For each of the above four groups of valve indications, the following EOP information on performance of containment isolation checklists is provided.

Dual or no valve indication (red-green status lights) will be indicated if a containment isolation valve fails for any reason. In accordance with the EOPs, the operator notes the discrepancy when isolation valve status is checked.

If a discrepancy exists with a valve, the operator checks and notes that its redundant valve is closed and checks that the redundant valve is not subject to an adverse environment. If the redundant valve stays open, the EOP checklist identifies the solid state protection system slave relays to associated equipment and instructs the operator in taking the appropriate actions for maintaining containment integrity. Valves that have environmentally qualified components are identified on the checklist.

C. Containment Isolation Valves Which Have No Control Room Indication

Thirty-three containment isolation valves are identified for BVPS-1, which do not have Control Room indication. The main steam code safety valves are not included here as they are addressed elsewhere in the table. We believe that no Control Room indication is necessary for these valves based on the following results of our review.

Thirty-one of the valves are included either in an operation surveillance test or quarterly padlock log review. The normal system arrangement for all thirty-three valves is "shut" with twenty-five valves being locked shut and two valves having lead seals for administrative control. One of the locked shut valves may be opened or closed on an intermittent basis under administrative control.

One of the two remaining valves is a relief valve in the RCS letdown line. This line has remote temperature indication and alarm in the Control Room, which provides backup indication for the status of this valve. The other remaining valve is inside containment and is associated with the containment air lock. For personnel to exit containment, this valve must be closed in order to equalize the airlock pressure.

11. Radiation Level In Primary Coolant

The BVPS-1 channels for this variable are not in strict conformance with R.G. 1.97 redundancy recommendation in that they are powered from the same 1E source, battery backed. However, evaluation of this variable can be backed up by the PASS in the event the common 1E power source should be lost (See Note 8, PASS). Category 1 is not considered necessary since these monitors are backed up by the PASS.

12. Condenser Air Ejector Monitor

The instrumentation for this C3 variable meets the guidance of R.G. 1.97, except the range is 2.85 E-5 μCi/cc to 2.85 μCi/cc. It should be noted, however, that the Condenser Air Ejector Vent Monitor is not the final point effluent monitor and, therefore, it is not included as an E2 variable. As a general note, the radiological instrumentation ranges as above are nominal values. Actual ranges vary as a function of periodic calibration.

13. RHR System Flow & RHR Heat Exchanger Outlet Temperature

The instrumentation for the RHR System Flow and RHR Heat Exchanger Outlet Temperature deviate from R.G. 1.97 in environmental qualification and in the heat exchanger minimum indicated temperature.

With respect to the latter, R.G. 1.97, Revision 2, recommends a minimum temperature indication of 32°F. This minimum temperature has been changed to 40°F in Revision 3 to R.G. 1.97. The BVPS-1 minimum temperature indication of 50°F is, therefore, not considered a significant deviation. In addition, during cold shutdown, the heat loads are transferred by the RHR Heat Exchangers to the component cooling water. The component cooling system with all components operating as designed will produce water at 70°F with the river water at 34°F. Therefore, the minimum indicated temperature of 50°F envelopes the lowest expected RHR Heat Exchanger Outlet temperature.

The environmental qualification of equipment that pertains to the RHR system should not be considered deficient as BVPS-1 is licensed and designed for hot shutdown and is not required to have a Class 1E qualified path to cold shutdown. For this reason, the equipment listed in the R.G. 1.97 table for the RHR system is considered exempt from environmental qualification.

In our submittal pertaining to environmental qualification, we have also provided information for a primary and backup method to RHR, for each of several accident scenarios, which would preclude any problems with putting the plant in a cold shutdown condition.

14. S.I. Accumulator Tank Level and Pressure

R.G. 1.97 categorizes accumulator tank level and pressure as a Category 2 variable and thus requiring environmental qualification. Category 2 is designated for instrumentation indicating system operating status after an accident. Based on the following, we believe that the BVPS-1 instrumentation for accumulator tank level and pressure should not be Category 2 but Category 3 variables.

The accumulators are a passive safety feature in that they will perform their design function in the total absence of an actuation signal or power source. The only moving parts in the accumulator injection train are in the two check valves. Information on the accumulator check valve tests and reliability and the administrative controls placed on the accumulator isolation valves are provided in Section 6.3.3.7 of the BVPS-1 UFSAR. The accumulator isolation valves position indications are qualified as presented in the table herein. To provide additional assurance that the isolation valves are open, they also receive an actuation signal to open on S.I.

The current BVPS-1 Emergency Operating Procedure (symptom based) do not require either the accumulator tank level or pressure to be monitored during or after an accident. During certain accidents, the accumulators are isolated by operator action to prevent discharge into the RCS when RCS subcooling or hot leg temperature criteria are satisfied. In these cases, either the contents of the accumulators are no longer required because of operator control actions or the contents are considered to be discharged and isolation prevents nitrogen injection to the RCS. Nitrogen injection into the RCS is prevented whenever the RCS pressure remains greater than 210 psig. The corresponding operator action to isolate the accumulators is based, therefore, either on RCS pressure or, if appropriate, on other system parameters which correlate to the RCS pressure (i.e. S.G. pressure).

The accumulator pressure and level indications are only required during normal operation to meet Technical Specifications. The accumulator pressure is required by the BVPS-1 Technical Specifications to have a nitrogen cover pressure of between 605 and 661 psig during normal operation. The analysis for LOCAs in Chapter 14 of the BVPS-1 UFSAR indicates that RCS pressure will decrease below 605 psig for LOCAs down to and including the three inch small break. It is, therefore, anticipated that the accumulators will passively discharge into the RCS for these accidents.

The accumulator tank level indication (0-100% span) does not conform to the R.G. 1.97 recommended range of 10-90% volume. The BVPS-1 level span covers the equivalent tank volume of 7145 gallons minimum to 7981 gallons maximum which envelopes the BVPS-1 Technical Specification range of 7664 for 7816 gallons. The level instrumentation in conjunction with accumulator pressure indication enables the operator to establish the required water-nitrogen ratio for normal operation which provides assurance of the passive operation of the SI accumulator system in response to accident conditions. We believe, therefore, that the existing range for the accumulator level instrumentation is adequate.

15. Boric Acid Charging Flow

The Westinghouse Owner's Group Emergency Response Guidelines, upon which the BVPS-1 current EOPs are based, do not consider boric acid charging flow as a parameter to be used by operations during or following an accident. Under these conditions, borated water is pumped from the large volume RWST into the RCS. BVPS-1 has designated RWST level, HHSI flow, LHSI flow, containment water level, and emergency core cooling system (ECCS) valve status for monitoring the performance of the ECCS since the ECCS does not normally take suction from the boric acid tank. If boration is used following an accident, qualified charging flow indication and RCS sampling are used to demonstrate that the RCS is being adequately borated.

16. Flow in Low Pressure Injection (LPI) System

R.G. 1.97 recommends that the flow indication in the low pressure injection system be environmentally qualified. We believe that the LPI flow indication does not need to be environmentally qualified based on the following.

The LPI System is part of the Emergency Core Cooling System. A single active failure analysis is presented in Table 6.3.1 of the UFSAR. Credible active system failures are considered. The analysis of the LOCA presented in Section 14 is consistent with the single failure analysis, based on a single failure in the ECCS.

The analysis shows that the failure of any single active component does not prevent fulfilling the design function; also, operator action is not required to correct the malfunction.

In addition to the single active failure capability, an alternate flow path is available through the high head safety injection pumps should any part of the flow path from the low head pumps to the RCS cold legs become unavailable. This feature ensures that core cooling would be monitored in the event of a piping failure in the ECCS. It also should be noted that the reactor cold legs are fed via a common header in the injection mode and it is not possible to isolate the broken leg and prevent spilling under the present design.

Failure analysis of the emergency power supply under LOCA conditions are described in Section 8.5 of the UFSAR.

Both the charging and low head safety injection pumps are located outside the containment and are electric motor-driven. The pumps also ensure an adequate supply of borated water for an extended period of time by recirculation of the water from the containment sump to the reactor core through two separate flow paths.

Within the basis provided in Section 6.3.1.2 of the UFSAR on ECCS Single Failure Criterion Compliance, continued function of the ECCS will meet minimum core cooling requirements and offsite doses resulting from the leak will be within 10CFR100 limits.

There are two separate low pressure safety injection subsystems, which provide long-term reactor core decay heat removal. The redundant features of the ECCS recirculation loop include one pump in each of two separable and redundant trains with crossover capability at the discharge of each pump. Each pump takes suction through separate cross-connected lines from the containment sump. The system design provides for one pump failing to start, with one LHSI pump being sufficient to meet the requirements of safety injection.

Based on the above and depending on the type of accident in progress (i.e. small or large loss of primary or secondary coolant) the operator has adequate backup instrumentation from which the operational status of the LPI System can be derived and by which the operator can take the appropriate contingency actions. These system indications include, RCS pressure, charging/HHSI flow and pump ammeter indications, RCS subcooling, and pressurizer level. In addition, the operator has direct indication of pump operation via the LHSI pump switches and status lights and both LHSI pump ammeter indications on the main control boards.

17. Pressurizer Heater Power Availabilty

R.G. 1.97 specifies that heater current is the preferred parameter for determining heater status. For BVPS-1 heater breaker position, not current indication, was selected for determining heater status. Breaker position provides adequate indication to the operator to ensure the pressurizer heaters are operable. In addition, the power consumption of each of the backup heater groups, A, B, D, and E, is tested on an 18-month interval basis pursuant to Technical Specification Surveillance Requirements.

18. Quench Tank Level

R.G. 1.97 recommends level indication from the top to the bottom of the quench tank. The BVPS-1 level indication does not cover this full range. The level instrumentation provides for annunciated alarm High/Low of 78 ± 2/66 ± 2%. Upon receipt of the alarm, the operator is instructed to correct the level to approximately 72% of the span. Based on this control range and the design provisions for the tank, we believe that the existing level range is adequate.

19. Quench Tank Temperature (Pressurizer Relief Tank)

R.G. 1.97 recommends a range of 50° - 750°F for temperature indication for the tank contents. The temperature indication range is from 50 - 350°F, the design temperature of the tank. The volume of water in the tank is capable of absorbing the heat from the design discharge from the pressurizer with an initial temperature of 120°F, increasing to a final temperature of 200°F. During accident conditions we do not anticipate the temperature to exceed 350°F due to the tank rupture disc relief pressure of 85 ± 5 psig.

20. Containment Spray Flow

R.G. 1.97 recommends instrumentation for this variable with a range of 0-110% of design flow. BVPS-1 does not have direct indication of spray flow. However, we believe that adequate instrumentation is presently available in the Control Room and that the addition of spray flow indication would not

provide additional essential information. The instrumentation presently available in the Control Room is delineated below and includes both containment Quench Spray (QS) and Recirculation Spray (RS).

QS low flow alarm
QS and RS pump motor breaker positions
QS and RS pump motor currents
QS and RS pump discharge pressures
QS and RS valve position indications
Containment pressure
RWST level
River water flow to RS heat exchangers

It should be noted that both QS trains and all four of the RS subsystems are rated at 100% capacity. The effects of containment spray can be monitored by containment pressure. Any trouble in returning the containment pressure subatmospheric or maintaining the containment vacuum would result in timely operator action.

21. Containment Atmosphere Temperature

R.G. 1.97 recommends that the Containment Atmosphere Temperature be a Category 2 variable. The Westinghouse Owner's Group Emergency Response Guidelines, on which the BVPS-1 EOPs are based, do not require operator action based on containment temperature indication, but on the use of containment pressure indication. The BVPS-1 temperature indication is from 0-200°F. Based on the above, the containment temperature indication should be considered a Category 3 variable and the existing range considered adequate.

22. RCS Letdown Flow

R.G. 1.97 recommends that RCS Letdown Flow indication be a Category 2 variable, thus requiring environmental qualification. Based on the following, we believe that this flow indication should not require environmental qualification.

The RCS Letdown and the Volume Control Tank are part of the Chemical and Volume Control System (CVCS). Other than the charging/HHSI Pumps, the CVCS is not required to function during a LOCA, nor is it required to take action to prevent an emergency condition. During a LOCA, this system is isolated at the containment boundary except for the charging pumps and the piping in the safety injection flow path.

The generation of a safety injection signal automatically closes the motor-operated valves in the outlet line of the volume control tank and in the normal charging line, thus isolating the CVCS from the safety injection path. The letdown line is isolated by valves, which automatically close as a result of a safety injection signal.

23. Volume Control Tank (VCT) Level (See also Note 21)

R.G. 1.97 recommends that the VCT Level instrumentation measure from the top to the bottom of the tank. The BVPS-1 level instrumentation is on the cylindrical section of the tank and does not include the hemispherical heads and a portion of the cylindrical section. However, the level instrumentation is designed to accommodate all normal design flow, providing for diverting the letdown flow and ensuring suction for the charging pumps for normal RCS makeup flow.

24. Component Cooling Water (CCW) Temperature to ESF System

R.G. 1.97 recommends that the CCW Heat Exchanger Outlet Temperature to the ESF System be environmentally qualified. We believe that this upgrade is not necessary since, although the CCW Subsystem normally supplies water to some safety-related items (RHR heat exchangers and fuel pool heat exchangers), it is, however, not used for accident purposes and is not considered part of the Engineered Safety Features as discussed in Section 9.4 of the UFSAR.

However, in the event of a DBA, the river water system is designed to supply sufficient cooling water to the following ESF components; at least two recirculation spray heat exchangers (coolers) and at least one charging pump lube oil cooler.

With a minimum 100% backup capacity at the onset of an accident, the recirculation spray subsystem design is conservative. Within one day after the LOCA, the backup capacity exceeds 400%. The system is designed to satisfy a maximum 86°F inlet temperature of the cooling river water for the recirculation cooler. An annunciator alarm for intake river water temperature greater than 86°F is provided in the Control Room.

The following instrumentation is available in the Control Room for the operator to monitor the River Water System.

a. Flow indication for the 1A and 1B river water supply header to the four recirculation spray heat exchangers.
b. Flow indication for the river water discharge header from the four recirculation spray heat exchangers.
c. Annunciator alarm for river water pump auto start-stop.

In addition, each recirculation spray cooler has outlet temperature indication in the Control Room for the recirculation spray flow.

25. High Level Radioactive Liquid Tank Level

The BVPS-1 Level instrumentation does not completely measure the tank level from top to bottom as recommended in R.G. 1.97. However, the deviation is not considered significant since the tap for the level transmitter is eight inches above the hemispherical bottom of the tank.

26. Radioactive Gas Holdup Tank Pressure

R.G. 1.97 recommends that the tank pressure indication be from 0 to 150% design. The BVPS-1 design pressure is 100 psig for the tanks. Indication is also to 100 psig. However, over pressure protection is provided in the form of a pressure controller followed by a rupture disc in parallel with a restriction orifice and a rupture disc. When the pressure in the decay tank reaches 100 psig, the pressure controller will relieve gas for the release system. If the pressure controller fails to open at the required pressure, the rupture disc, in parallel with the pressure controller will relieve at 110 psig.

27. Emergency Ventilation Damper Position

There are three Emergency Air Supply Fan Discharge Dampers for the Control Area, which do not have position indication in the Control Room. We believe that position indication for these dampers is not necessary due to the operational characteristics of this system as presented below.

The two Emergency Outdoor Air Supply Fans, when started, will open their own discharge dampers and will send a pneumatic opening signal to a selector relay to open the common air filter discharge damper. The selector relay is used to separate the individual damper control systems. The fans do not function during a chlorine leak for which a supply of compressed air is provided to the Control Room. One hour after initiation of Containment Isolation Phase B (CIB), two automatic timers will start the Emergency Supply Fans. Fan control switches with indicating lights are provided to the operator in the Control Room. A Control Area Differential Pressure Indicator (manometer) is located in the Control Room, which provides monitoring capability to the operator to assure a positive pressure is maintained in the Control Area. The Control Area positive pressure is indicative of the operating status of the Emergency Air Supply.

28. Radiation Exposure Rate - (inside buildings or areas which are in direct contact with primary containment where penetrations and hatches are located.)

The following information is provided for the BVPS-1 instrumentation for this variable. We believe that this instrumentation meets the intent of the guidance of R.G. 1.97.

Ranges, Category, and Purpose of Instrumentation.

a. Reactor Containment (High Range) Area Monitor
(outside personnel hatch)
Range: 1.0E-4 to 1.0E4 R/hr.
Category: 3
Purpose: Personnel Exposure Control; Assess Containment Activity

b. Leak Collection Areas Gas Monitor
Range: 2.86E-7 µCi/cc to 2.86E-2 µCi/cc, Xe 133
Category: 3
Purpose: Detect Breach of Containment Penetrations.

c. Supplementary Leak Collection Release System (SLCRS) Effluent Monitors (2 Monitors)
Range: 1.84E-11 to 1.84E-6 µCi/cc/ccI-131
2.86E-7 to 2.86E-2 µCi/cc, Xe 133
Category: 3, with back-up power.

d. Reactor Building/SLCRS Effluent Monitor
Range: 5E-4 to 1E5 µCi/cc Xe 133
Category: 3, with back-up power

e. Reactor Building/SLCRS Effluent Monitor
Range: 8E-8 to 1.0E5 µCi/cc Xe 133
Category: 3, with backup power

Note: Monitors described in c, d, and e operate in parallel with each other, and in series with b.

The following information should be considered for the above instrumentation

1) Area radiation monitors are not suitable for the intended purpose. Conditions that could result in an increase of containment pressure necessary to create leaks in penetrations will be accompanied by high radiation levels which would mask any radiation emitted by leaking containment gas. This is particularly the case with personnel and equipment access hatches.

2) Even without this direct/scattered radiation, an area monitor would be as sensitive a leak detector as would be a ventilation monitor on the exhaust of the area into which the penetration occurs. This is the purpose of Monitor b above, which monitors the ventilation exhaust from the penetration/safeguards equipment areas (SLCRS).

3) Considerations with regard to penetrations.

a) For miscellaneous piping systems, refer to Paragraph 2 above.
b) For ventilation penetrations refer to Effluent Radioactivity - Note (29).
c) Personnel Access Hatch monitor is described in Item "a" above.
d) Equipment Hatch - unmonitored. This hatch would leak directly to the environment. No direct monitoring is possible as described in Paragraph 1 above. Leakage via this pathway will be assessed by onsite monitoring terms using airborne activity samples.

29. Effluent Radioactivity - (noble gases from buildings identified for previous variable.)

Instrumentation for this variable is provided for the Auxiliary Building Ventilation Vent (4 monitors, 2 common to the SCLRS), the SCLRS (4 monitors, 2 common to the Auxiliary Building Ventilation Vent), and the Gaseous Waste System (4 monitors). These are considered to be Category 3. All ten monitors have back-up power. For each area a separate Noble Gas Monitor, whose range envelopes that recommended in R.G. 1.97, was installed to meet NUREG-0737 requirements. In addition, the remaining monitors for each area have overlapping ranges (Xe-133), which span that recommended in R.G. 1.97. We believe, therefore, that the redundancy of the existing monitors provide a capability which meets the intent of R.G. 1.97.

For the release flow to the atmosphere from the Auxiliary Building, the Gaseous Waste, and the SCLRS, there are three monitoring assemblies, the monitors of which are included with the above. Also, as indicated above, one of the monitors, associated with the SPING, was installed to meet NUREG-0737. For the Auxiliary Building Vent, the Gaseous Waste, and the SCLRS flow, there is a flow recorder for each available in the Control Room, which meets the 110% of normal design flow recommendation of R.G. 1.97.

30. Secondary System Safety/Relief Valve Positions

The instrumentation described in the table is for the three atmospheric steam dump valves. The code safety valves have no position indication in the Control Room. We believe that the intent of R.G. 1.97 (i.e. to determine if valves are opened or closed) can be satisfied by the Main Steam Line Flow Indication in conjunction with Main Steam Line Pressure. This instrumentation is environmentally qualified and displayed in the Control Room. Each Main Steam Line has both Flow (2 channels) and Pressure Instrumentation which is located upstream of the safety and relief valves.

31. Radiation Exposure Rate - (areas where access is required to service equipment important to safety.)

The BVPS-1 area radiation monitoring system contains gamma radiation monitors at thirteen locations throughout the controlled area of the plant. Based on the change in R.G. 1.97, Revision 3, we believe Category 3 for this variable is acceptable.

Based on the following, we believe that the existing range of these monitors and area coverage is adequate.

a. The specified range of 0.1 to 10,000 R/hr is inappropriate at both ends of the range. One hundred (100) mR/hr is too high for many areas during normal operations, and would be too high for many accident conditions also. Ten thousand (10,000) R/hr is many orders of magnitude higher than the level at which personnel would be allowed access. The stay time to receive an emergency exposure 100 R is less than 1 minute at this dose rate. The current installed monitor range is appropriate. Personnel would not be authorized access to any area on the basis of a radiation monitor alone, especially at dose rates higher than 10 R/hr.

b. The critical areas in the plant where personnel go in the event of an emergency were required to be identified by NUREG-0737. In addition, affected areas are likely to be impacted by airborne activity, surface contamination, and beta radiation fields, all of which are inadequately monitored by an area radiation monitor. Thus, a health physics survey is required prior to entry into such an area. This administrative requirement, documented in the Radioligical Controls Manual and the Emergency Preparedness Plan, is a suitable, and perhaps more advantageous alternative to that specified in the guidance for this time.

32. Vent from S.G. Safety Relief Valves or Atmospheric Dump Valves

It should be noted that this system is configured such that the monitors view dump valve and lowest setpoint safety valve simultaneously. The range of 0.1 to 1000 µCi/cc is based on the fission product mix. These instruments were installed to meet NUREG-0737 requirements.

33. Noble Gas and Vent Flow Rate - (All other identified release points.)

It is noted that this monitor is for the Auxiliary Feedwater Turbine Exhaust. The range of 0.1 to 1000 µCi/cc is based on the fission product release. This instrument was installed to meet NUREG-0737 requirements.

34. Radiation Exposure Meters

This variable is not addressed herein since it is noted that R.G. 1.97, Revision 3, has deleted it.

35. Plant and Environs Radiation (Portable Instrumentation)

The BVPS survey kits have E530 or similar. This instrument has a response of 0-200 mR/hr beta and photon response.

Available at the station are:

E530N	0 - 20 R/hr photon
Teletector	0 - 1000 R/hr photon
DIC-6A	0-1000 R/hr photon
Cutie Pie 740F/740G	0 - 25 R/hr, 0 - 150 R/hr photon
RO-2	0 - 5 R/hr - Beta/photon
RO-2A	0-50 R/hr - Beta/photon
CP-TP-10K	0 - 10,000 R/hr - Beta/photon

The following is provided in consideration of range recommendation of R.G. 1.97.

a. The specified range of 10,000 R/hr photon or beta is far beyond what is reasonable exposure for a portable survey instrument. An individual using an instrument in such a field would receive unacceptable levels of exposure while performing the survey.

b. The 10,000 R/hr value is particularly unwarranted for environs measurements.

c. A beta field of 10,000 rads/hr is not a personnel exposure situation warranting a survey. The stay time at this dose rate to receive an exposure of 100 R is only 0.6 minutes. A photon survey on a hot piece of equipment may be warranted. This can be accomplished with the CP-TP-10K or with the Teletector. Dose-distance relationships could be used to obtain an on-scale reading which could be subsequently corrected.

36. Meteorological Parameters

The meteorological parameters for BVPS conform to the guidance of R.G. 1.97 except as follows:

R.G. 1.97 recommends ranges for wind speed instrumentation of 0 to 67 mph and for estimation of atmospheric stability of -9 to +18°F. The BVPS instrument range for wind speed is 0 to 50 mph and estimation of atmospheric stability of -4 to +8°F (150 - 35 ft.) and -6 to +12°F (500 - 35 ft.). The instrumentation for wind speed meets the guidance of Regulatory Guide 1.23. The vertical temperature ranges include the range of lapse rates (change of temperature with height) guidance of R.G. 1.23 required to estimate the atmospheric stability class.