

DUKE POWER COMPANY

STEAM PRODUCTION DEPT.

GENERAL OFFICES

422 SOUTH CHURCH STREET

CHARLOTTE, N. C. 28242

P. O. BOX 33189

TELEPHONE: AREA 704
373-4011

January 29, 1980

Mr. T. N. Crawford
Pacific Gas & Electric

Mr. Ripley Newcomb
Virginia Electric & Power Co.

Mr. John Gagliarda
Public Service Electric & Gas

Mr. M. E. Stern
Wisconsin Public Service Corp.

Mr. Ralph Phelps
Southern California Edison Co.

Mr. P. A. Herrmann
Southern Company Services

Mr. C. S. Walker
Tennessee Valley Authority

Mr. R. F. Johnston
Duke Power Company

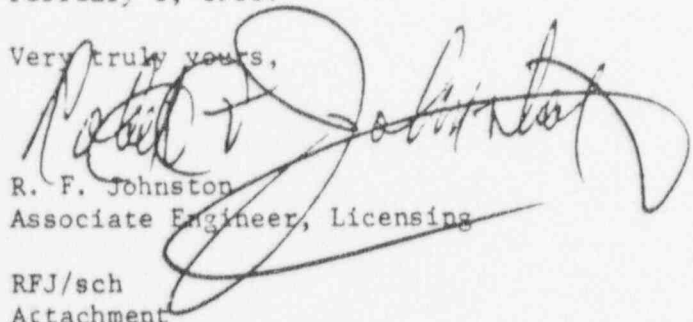
Subject: NRC Regulatory Guide 1.97 Proposed Revision 2*
PWR Near-Term OL Group Generic Comments
Final Draft

Gentlemen:

Attached is one copy of the final draft of our PWR Near-Term OL Group's generic comments on RG 1.97 Rev. 2* per our discussions in Atlanta.

Each utility is expected to provide a cover letter which will transmit a copy of the generic comments and your plant specific comments for your near term OL to Victor Benaroya at the NRC on or immediately after February 1, 1980.

Very truly yours,


R. F. Johnston
Associate Engineer, Licensing

RFJ/sch
Attachment

cc: Mr. K. S. Canady
Mr. N. A. Rutherford
Mr. W. A. Coley
Mr. J. E. Cole
Mr. T. C. McMeekin
Mr. W. H. Owen
Mr. T. P. Harrall

Mr. E. K. Moyers
Mr. G. J. Braddick
Mr. T. F. Timmons
Mr. Glenn Huff
Mr. H. O. Thrash

Mr. John A. Honey
Section File GS-811.05
Section File MC-811.05
Master File GS-811.05
Master File MC-811.05

8008310163

NEAR TERM OL GENERIC COMMENTS

Table 1

DESIGN CRITERIA

CRITERIA	INSTRUMENTATION TYPES ²				
	A	B	C	D	E
1. Seismic qualification per Regulatory Guide 1.100 25	yes	yes	yes	no	no ¹
2. Single failure criteria per Regulatory Guide 1.53 26	26 yes	26 yes	26 yes	no	no
3. Environmental qualification per Regulatory Guide 1.89 23	yes	yes	yes ⁴	yes NO	no ¹
4. Power source 25	21 Emr⁶	21 CD⁷	21 CD⁷	22 Emr⁶	22 Emr⁶
5. Out-of-service interval before accident	8	8	8	10	10
6. Portable	no	no	no ¹¹	no ¹¹	no ¹¹
7. Quality assurance level	12	12	12	24	24
8. Display type ¹³	Con ¹⁴	Con ¹⁴	Con¹⁴ OD¹⁵	OD ¹⁵	OD ¹⁵
9. Display method	Rec ¹⁶	Rec ¹⁷	Rec ¹⁷	Ind ¹⁸	Ind ^{18,19}
10. Unique identification	yes	yes	yes	no	no
11. Periodic testing per Regulatory Guide 1.110 25	yes	yes	yes	yes NO²⁰	no ²⁰

DELETE ¹Unless different specifications are given in this regulatory guide, the specifications in ANSI N320-1979, "Performance Specifications for Reactor Emergency Radiological Monitoring Instrumentation", apply to the high-range containment area monitors, area exposure rate monitors in other buildings, effluent and environmental monitors, and portable instruments for measuring radiation or radioactivity.

²Type A - Those instruments that provide information required to take preplanned manual actions.

Type B - Those instruments that provide information to monitor the process of accomplishing critical safety functions.

Type C - Those instruments that indicate the potential for breaching or the actual breach of the barriers to fission product release.

Type D - Those instruments that indicate the performance of individual safety systems.

Type E - Those instruments that provide information for use in determining the magnitude of the release of radioactive materials and for continuously assessing such releases, for defense in depth, and for diagnosis.

³~~Radiation monitors should meet the requirements of ANSI N320-1979, Section 5.14 and/or Section 9.1.15, as appropriate.~~

NEAR TERM OL GENERIC COMMENTS

Footnotes continued for Table 1

- ⁴See paragraph 6.3.6 of Draft Standard ANS-4.5.
- ⁵~~Qualified to the conditions of its operation and, for radiation monitors, ANSI N320-1979.~~
- ⁶~~Emergency power source.~~
- ⁷~~Critical Instrument Bus - Class IE Power.~~
- ⁸Paragraph 4.11, "Exemption", of IEEE Standard 279-1971.
- ⁹Based on normal Technical Specification requirements on out-of-service for the safety system it serves.
- ¹⁰Not necessary to include in the Technical Specifications unless specified by other requirements.
- ¹¹Radiation monitoring outside containment may be portable if so designated in Tables 2 and 3.
- ¹²Level of quality assurance per Appendix B to 10 CFR Part 50.
- ¹³Continuous indication or recording displays a given variable at all times; intermittent indication or recording displays a given variable periodically; on-demand indication or recording displays a given variable only when requested.
- ¹⁴Continuous display.
- ¹⁵Indication on demand.
- *¹⁶Where trend or transient information is essential to planned operator actions during and after an accident.
- *¹⁷Recording for those parameters for which trend or historical information is required during and after an accident.
- ¹⁸Dial or digital indication.
- ¹⁹Effluent release monitors require recording, including effluent radioactivity monitors, environs exposure rate monitors, and meteorology monitors.
- ²⁰~~Radiation monitors should be periodically tested in accordance with the requirements of ANSI N320-1979.~~
- ²¹Class "IE" Power.
- ²²High Reliability NON-IE Power Source battery backed when momentary interruption is not tolerable for the connected equipment.
- ²³Types A, B & C - assume LOCA environment for in-containment instruments. Types D & E - assume worst case non-accident environment for in-containment instruments.
- ²⁴Purchased to "commercial grade" standards with installation and engineering practices consistent with Nuclear Power Plant applications.
- ²⁵FSAR Licensing Commitments for safety grade equipment.
- ²⁶Single failure criteria can be met by using either redundant inputs from a given parameter or by diversity through inputs from different Instrumentation Types (A, B or C) for the given parameter or by independent diverse parameters.

* = indicates notes where Near Term OL Group added underlined portions.

Table 2

PWR VARIABLES

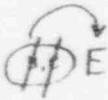
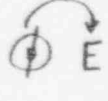
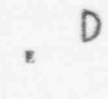
Measured Variable	Range	Type	Purpose	Near Term OL Group Generic Comments
CORE				
Core Exit Temperature	150°F to 2200°F ^{1650°F}	 E	ANS-4.5, Section 6.2.3. To provide incore temperature measurements to identify localized hot areas. (Approximately 50 measurements)	Change 50 to 16 as this is a reasonable cross section. 1650°F is about 2x Critical Temperature and T/C with stainless steel sheath will maintain physical capability to 1650°F.
Control Rod Position	Full in or not full in	 E	To provide positive indication that the control rods are fully inserted. (Minimum 5 days after accident)	Mechanism power is adequate means to assure rods are on bottom. Accident plus stuck rods which requires corrective action is beyond design basis.
Neutron Flux	1 c/s to 1% power (at least one fission counter)	 D	ANS-4.5, Section 6.2.2. For indication of approach to criticality.	Fission counter would be destroyed in normal power operation.
REACTOR COOLANT SYSTEM				
RCS Hot Leg Temperature	150°F to 750°F	B	ANS-4.5, Section 6.2.3. To aid in determining reactor system subcooling and to provide indication of natural circulation.	
RCS Cold Leg Temperature	150°F to 750°F	B	ANS-4.5, Section 6.2.3. To provide indication of natural circulation; to provide input for heat balance calculations; to provide direct indication of ECCS injection.	
RCS Pressure	0 to 3000 15 psig to 4000 psig	B,C	ANS-4.5, Sections 6.2.3 and 6.2.4. For indication of an accident and to indicate that actions must be taken to mitigate an event.	The range of this measurement has been limited to 3000 psig since this may be the current maximum range available in a qualified pressure transmitter. It should be noted, however, that this transmitter should be able to withstand pressurization up to 4000 lbs without damage to the transmitter or a significant shift in calibration.
RCS PRESSURE	0 to 4000 psig	E		It is suggested that a single type E 4000 psig transmitter be added to assure coverage of the short duration high pressure transient associated with ATWS phenomena.

Table 2 (continued)

FWR VARIABLES

Measured Variable	Range	Type	Purpose	Near Term OL Group Generic Comments
Pressurizer Level	Bottom tangent to top tangent WIDE RANGE	B,D	AMS-4.5, Section 6.2.3. To assure proper operation of the pressurizer and to assure safe operation of heaters. It is also used in conjunction with changes in reactor pressure to determine leak and void sizes.	
Degree of Subcooling	200°F subcooling to 35°F superheat	E	For indication of margin in core cooling and the need for emergency coolant additions or reductions as the margin changes and to obviate the necessity to consult steam tables.	

Table 2 (Continued)

PWR VARIABLES

Measured Variable	Range	Type	Purpose	Near Term OL Group Generic Comments
REACTOR COOLANT SYSTEM (Continued)				
Reactor Coolant Loop Flow	0 to 120% ¹ design flow 12% to 121%	 E	To provide indication that the core is being cooled.	The low range flow indication has been deleted since it is not now technically achievable. Further, we feel that this indication is redundant to other primary indications of natural circulation.
Primary System Safety Relief Valve Positions (including PORV and code valves) or flow Through or Pressure in Relief Valve Lines	Closed-not closed	 B/D	By these measurements the operator knows if there is a path open for loss of coolant and that an event may be in progress.	The classification has been modified reflecting appropriate use of this variable.
Radiation Level in Primary Coolant Water	10 μ Ci/cc to 10 Ci/cc	C	ANS-4.5, Section 6.3.2. For early indication of fuel cladding failure and estimate of extent of damage.	Plant specific. See RG 1.101.
CONTAINMENT				
Containment Pressure	10 psia pressure to 3 times design pressure ² for concrete; 4 times design pressure for steel	 B	ANS-4.5, Sections 6.2.5, 6.3.3, 6.3.4, and 6.3.5. To indicate the integrity of the primary or secondary system pressure boundaries; to indicate the potential for leakage from the containment; to indicate integrity of the containment.	The type B requirement has been eliminated since the wide range containment pressure indication is only for short term transients. See comment below.
CONTAINMENT PRESSURE	NARROW RANGE			It is suggested that the existing containment pressure indications (narrow range) are adequate to meet the intent of type B monitoring.
Containment Atmosphere Temperature	40°F to 400°F	E	For indication of the performance of the containment cooling system and adequate mixing.	
Containment Hydrogen Concentration	0 to 10% (capable of operating from 10 psia to maximum design pressure ²)	 C	ANS-4.5, Sections 6.2.5 and 6.3.5. For indication of the need for and to measure the performance of the containment hydrogen recombiner.	Type B requirements have been eliminated consistent with appropriate use of the variable.

¹Design flow - the maximum flow anticipated in normal operation.²Design pressure - that value corresponding to ASME code values that are obtained at or below code-allowable material design stress values.

Table 2 (Continued)

PWR VARIABLES



Measured Variable	Range	Type	Purpose	Near Term OL Group Generic Comments
CONTAINMENT (Continued)				
Containment Isolation Valve Position	Closed-not closed	B,D	ANS-4.5, Section 6.2.5. To indicate the status of containment isolation and to provide information on the status of valves in process lines that could carry radioactive materials out of containment.	If not subject to single failure, do not need redundant indication.
Containment Sump Water Level	Narrow range (sump). Wide range (bottom of containment to 600,000-gallon level equivalent)	 C	ANS-4.5, Section 6.3.3. For indication of leakage within the containment and to ensure adequate inventory for performance of the ECCS.	Plant specific - WSSS vendor should confirm needed inventory. Type B requirements have been eliminated consistent with appropriate use of the variable.
High-Range Containment Area Radiation	1 to 10^7 R/hr (60 keV to 3 MeV photons with $\pm 20\%$ accuracy for photons of 0.1 to 3 MeV) [10^7 R/hr for photons is approximately equivalent to 10^8 rads per hour for betas and photons]	 C E	To help identify if an accident has degraded beyond calculated values and to indicate its magnitude to determine action to protect the public.	Plant specific. See RG 1.101. Type B requirements have been eliminated consistent with appropriate use of the variable.
SECONDARY SYSTEMS				
Steam Generator Pressure	From atmospheric pressure to 20% above safety value setting	D	For indication of integrity of the secondary system and an indication of capability for decay heat removal.	
Steam Generator Level	From tube sheet to separators	D	For indication of integrity of the secondary system and an indication of capability for decay heat removal.	Steam generator wide range level.
Auxiliary Feedwater Flow	0 to 110% design flow ¹	D	To indicate an adequate source of water to each steam generator upon loss of main feedwater.	
Main Feedwater Flow	0 to 110% design flow ¹	E	To indicate an adequate source of water to each steam generator.	Main feedwater flow is not required as a type E variable. Feed flow only indicates water into each SG; it does not indicate an adequate source of water to each steam generator.

Table 2 (Continued)

PWR VARIABLES

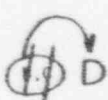

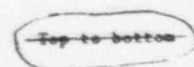
Measured Variable	Range	Type	Purpose	Near Term GL Group Generic Comments
SECONDARY SYSTEMS (Continued)				
Safety/Relief Valve Positions or Main Steam Flow	Closed-not closed	B,D	To indicate integrity of secondary system (vis-a-vis pipe break).	Plant specific.
Radioactivity in Condenser Air Removal System	10^{-7} to 10^5 $\mu\text{Ci/cc}$ Xe-133 calibration	E	To indicate leakage from the primary to the secondary system and measure of noble gas release rate to atmosphere.	Plant specific. See RG 1.101.
Radioactivity in Effluent from Steam Generator Safety Relief Valves or Atmospheric Dump Valves	10^{-7} to 10^5 $\mu\text{Ci/cc}$ (alternatively, ambient background to 2 Ci/sec/Mwth) Xe-133 calibration	E	An indication of release from the secondary system and measure of noble gas release rate to atmosphere.	Plant specific-Delete-this instrument is beyond the state of the art and actual sample is preferred measurement.
AUXILIARY SYSTEMS				
Containment Spray Flow	0 to 110% design flow ¹	D	For indication of system operation.	
Flow in NPI System	0 to 110% design flow ¹	D	For indication of system operation.	
Flow in LPI System	0 to 110% design flow ¹	D	For indication of system operation.	
Emergency Coolant Water Storage Tank Level	Top to bottom	D	To determine the amount of water discharged by the ECCS. This provides indication of the nature of the accident, indication of the performance of the ECCS, and indication of the necessity for operator action.	
Condensate Storage Tank Level	Plant specific		(For those plants where the condensate storage tank is the principal source of auxiliary feedwater.) To ensure water supply for auxiliary feedwater pumps.	 Type BA requirements have been eliminated consistent with appropriate use of the variable.
Accumulator Tank Level	 NARROW RANGE	D	To indicate whether the tanks have injected to the reactor coolant system.	Narrow range is only instrument currently available.

Table 2 (Continued)

PWR VARIABLES




Measured Variable	Range	Type	Purpose	Near Term OL Group Generic
AUXILIARY SYSTEMS (Continued)				
Accumulator Isolation Valve Positions	Closed-not closed	D	To indicate state of the isolation valves (per Regulatory Guide 1.47).	
RHR System Flow	0 to 110% design flow ¹	D	For indication of system operation.	
RHR Heat Exchanger Out Temperature	32°F to 150°F	D	For indication of system operation.	
Component Cooling	32°F to 200°F	D	For indication of system operation.	
Component Cooling Water Flow	0 to 110% design	D	For indication system operation.	
Flow in Ultimate Heat Sink Loop	0 to 110% design flow ¹	D	For indication of system operation.	
Temperature in Ultimate Heat Sink Loop	30°F to 150°F	D	For indication of system operation.	
Ultimate Heat Sink Level	Plant specific	D	To ensure adequate source of cooling water.	
Heat Removal by the Containment Fan Coolers	Plant specific	 D	To indicate system operation.	Type B requirements have been eliminated consistent with appropriate use of the variable.
Boric Acid Charging Flow	0 to 110% design flow ¹	 D	To provide indication of reactor cooling and inventory control in order to maintain adequate concentration for shutdown margin.	Type B requirements have been eliminated consistent with appropriate use of the variable.
Letdown Flow	0 to 110% design flow ¹	D	For indication of reactor coolant inventory control and boron concentration control.	
Sump Level in Spaces of Equipment Required for Safety	To corresponding level of safety equipment failure	 E	To monitor environmental conditions of equipment in closed spaces.	Type D requirements have been eliminated consistent with appropriate use of the variable.
RADWASTE SYSTEMS				
High-Level Radioactive Liquid Tank Level	Top to bottom	E	Available volume to store primary coolant.	

Table 2 (Continued)

PWR VARIABLES

Measured Variable	Range	Type	Purpose	Near Term OL Group General Comments
RADWASTE SYSTEMS (Continued)				
Radioactive Gas Storage Tank Pressure	0 to 150% of design pressure ²	E	Available capacity to store waste gases.	
VENTILATION SYSTEMS				
Emergency Ventilation Damper Position	Open-closed status	D	To ensure proper ventilation under accident conditions.	
Temperature of Space in Vicinity of Equipment Required for Safety	30°F to 180°F	D	To monitor environmental conditions of equipment in closed spaces.	NRC has issued an equipment temperature monitoring position. See NRC Temp. Position.
POWER SUPPLIES				
Status of Class 1E Power Supplies and Systems	Voltages and currents	D	To ensure an adequate source of electric power for safety systems.	
Status of Non-Class 1E Power Supplies and Systems	Voltages and currents	E	To indicate an adequate source of electric power.	
RADIATION EXPOSURE RATES INSIDE BUILDINGS OR AREAS WHERE ACCESS IS REQUIRED TO SERVICE SAFETY-RELATED EQUIPMENT				
Radiation Exposure Rates	10^{-3} to 10^4 R/hr for photons (permanently installed monitors)	E	For measurement of high-range radiation exposure rates at various locations.	Plant specific. See RG 1.101.
AIRBORNE RADIOACTIVE MATERIALS RELEASED FROM THE PLANT				
Effluent Radioactivity - Noble Gases	(Normal plus accident range for noble gas)	E	ANS-4.5, Section 6.2.6. To provide operator with information regarding release of radioactive noble gases on continuous basis.	Plant specific. See RG 1.101.
Containment	10^{-7} to 10^5 μ Ci/cc Xe-133 calibration			Plant specific. See RG 1.101.

Table 2 (Continued)

PWR VARIABLES

Measured Variable	Range	Type	Purpose	Near Term OL Group General Comments
Secondary Containment (Reactor shield building annulus)	10^{-7} to 10^4 $\mu\text{Ci/cc}$ XE-133 calibration		Provisions should be made to monitor all potential pathways for release of gaseous radioactive materials to the environs in conformance with General Design Criterion 64. <u>Note:</u> Monitoring of individual effluent streams only is required where such streams are released directly to 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 this guide provided such monitoring has a range adequate to measure worst-case releases.	Plant specific. See RG 1.101.

Table 2 (Continued)

PWR VARIABLES

Measured Variable	Range	Type	Purpose	Near Term OL Group Generic Comments
AIRBORNE RADIOACTIVE MATERIALS RELEASED FROM THE PLANT (Continued)				
Auxiliary Building including buildings containing primary system gases, e.g., waste gas decay tank	10^{-7} to 10^0 $\mu\text{Ci/cc}$ Xe-133 calibration			See Reg. Guide 1.101 for radiation monitoring.
Other Release Points (including fuel handling area if separate from Auxiliary building)	10^{-7} to 10^2 $\mu\text{Ci/cc}$ Xe-133 calibration (permanently installed monitors)			
Effluent Radioactivity - High-Rate Radiohalogens and Particulates	10^{-3} to 10^2 $\mu\text{Ci/cc}$ (permanently installed monitors)	E	To provide the operator with information regarding release of radioactive halogens and particulates. Continuous collection of representative samples followed by monitoring (measurements) of samples for radiohalogens and for particulates.	
Environ Radioactivity - Exposure Rate	10^{-8} to 10^2 R/hr (60 keV to 3 MeV) (permanently installed monitors)	E	ANS-4.5, Section 6.3.4. For estimating release rates of radioactive materials released during an accident from unidentified release paths (not covered by effluent monitors) - continuous readout capability. (Approximately 16 to 20 locations - site dependent.)	
Environ Radioactivity - Radiohalogens and Particulates	10^{-8} to 10^{-3} $\mu\text{Ci/cc}$ for both radiohalogens and particulates (permanently installed samplers)	E	For estimating release rates of radioactive materials released during an accident from unidentified release paths (not covered by effluent monitors). Continuous collection of representative samples followed by monitoring (measurements) of the samples. (Approximately 16 to 20 locations - site dependent.)	

Table 2 (Continued)

PWR VARIABLES

Measured Variable	Range	Type	Purpose	Near Term OL Group Generic Comments
AIRBORNE RADIOACTIVE MATERIALS RELEASED FROM THE PLANT (Continued)				
Plant and Environs Radioactivity (portable instruments)	High Range 0.1 to 104 R/hr photons 0.1 to 104 rads/hr betas and low-energy photons	E	During and following an accident, to monitor radiation and airborne radioactivity concentrations in many areas throughout the facility and the site environs where it is impractical to install stationary monitors capable of covering both normal and accident levels.	See Reg. Guide 1.101 for radiation monitoring.
	100-channel gamma-ray spectrometer	E	During and following an accident, to rapidly scope and composition of gamma-emitting sources.	
POSTACCIDENT SAMPLING CAPABILITY				
Primary Coolant Sumps Containment Air	As required based on Regulatory Guide 1.4 guidelines	E	ANS-4.5, Section 6.3.2. To provide means for safe and convenient sampling. These provisions should include:	We agree that these capabilities are a licensee function, however, they do not fit the "type" definitions A through E as stated in this guide.
POSTACCIDENT ANALYSIS CAPABILITY (ON-SITE)				
	1. gamma-ray spectrum 2. pH 3. hydrogen 4. oxygen 5. boron	E	1. Shielding to maintain radiation doses ALARA, 2. Sample containers with container-sampling port connector compatibility, 3. Capability of sampling under primary system pressure and negative pressure, 4. Handling and transport capability, and 5. Pre-arrangement for analysis and interpretation.	We agree that these capabilities are a licensee function, however, they do not fit the "type" definitions A through E as stated in this guide.
METEOROLOGY				
Wind Direction	0 to 360° (±5° accuracy with a deflection of 15° Starting speed 0.4 mps (1 mph))	E	For determining effluent transport direction for emergency planning, dose assessment, and source estimates	See Reg. Guide 1.23

Table 2 (Continued)

PWR VARIABLES

Measured Variable	Range	Type	Purpose	Near Term OL Group Generic Comments
See Reg. Guide 1.23				
METEOROLOGY (Continued)				
Wind Speed	0 to 30 mps (67 mph) (10.22 mps (0.5 mph) accuracy for wind speeds less than 11 mps (25 mph), with a starting threshold of less than 0.45 mps (1 mph))	E	For determining effluent travel speed and dilution for emergency planning, doses assessments, and source estimates.	
Temperature	-50°F to 120°F (10.9°F accuracy)	E	For determining nature of precipitation and ground deposition for emergency planning.	
Vertical Temperature Difference	-9°F to +9°F (10.3°F accuracy per 164-foot intervals)	E	For determining effluent diffusion rates for emergency planning, dose assessments, and source estimates.	Height requirements appear unreasonable.
Precipitation	Recording rain gage with range sufficient to ensure accuracy of total accumulation within 10% of recorded value - 0.01" resolution	E	For determining effluent transport and ground deposition for emergency planning.	