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PDR

ROUTING AND TRANSMITTAL SLIP

Date 11/19/82

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REMARKS

With reference to Revision 3 of Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," which is scheduled for review by the CRGR on November 24, 1982, enclosed are 10 copies of three pages which contain additional modifications for consideration. These additional changes are identified by vertical bars at the edges.

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

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b. For type E

(1) The planned paths for effluent release;

(2) Plant areas and inside buildings where access is required to service equipment necessary to mitigate the consequences of an accident;

(3) Onsite locations where unplanned releases of radioactive materials should be detected; and

(4) The variables that should be monitored in each location identified in (1), (2), and (3) above.

2.4 The determination of performance requirements for system operation monitoring and effluent release monitoring information display channels should include, as a minimum, identification of:

a. The range of the process variable.
b. The required accuracy of measurement.
c. The required response characteristics.
d. The time interval during which the measurement is needed.
e. The local environment(s) in which the information display channel components must operate.
f. Any requirement for rate or trend information.
g. Any requirements to group displays of related information.
h. Any required spatial distribution of sensors.

2.5 The design and qualification criteria for system operation monitoring and effluent release monitoring instrumentation should be taken from the criteria provided in regulatory positions 1.3 and 1.4 of this guide. Tables 1 and 2 of this regulatory guide should be considered as the minimum number of instruments and their respective ranges for systems operation monitoring (Type D) and effluent release monitoring (Type E) instrumentation for each nuclear power plant.

D. IMPLEMENTATION

~~All plants going into operation after June 1983 should meet the provisions of this guide.~~

~~Plants currently operating should meet the provisions of this guide, except as modified by NUREG-0737 and the Commission Memorandum and Order (GLI-80-21), by June 1982.~~

~~Plants scheduled to be licensed to operate before June 1, 1982, should meet the requirements of NUREG-0737 and the Commission Memorandum and Order (GLI-80-21) and the schedules of these documents or prior to the issuance of a license to operate, whichever date is later. The balance of the provisions of this guide should be completed by June 1982.~~

~~The difficulties of procuring and installing additions or modifications to in-place instrumentation have been considered in establishing these schedules.~~

~~Exceptions to provisions and schedules will be considered for extraordinary circumstances.~~

~~All plants in operation before June 1983 should meet the provisions of this guide as given in the Enclosure to SECY-82-111, dated March 11, 1982.~~

This guide is applicable to all plants for which the construction permit is issued on or after June 1, 1983. For operating plants and for plants with a construction permit or operating license issued before June 1, 1983, the applicant or licensee should develop a plan for implementing this guide and negociate a schedule with the NRC Project Manager on a plant-specific basis as outlined in Supplement 1 to NUREG-0737.

TABLE 2 (Continued)

Variable	Range	Category (see Regulatory Position 1.3)	Purpose
TYPE B (Continued)			
Core Cooling (Continued)			
Core Exit Temperature[1]	200°F to 2300°F ~~(for operating plants 200°F to 1650°F)~~	3[3]	Verification
Coolant ~~Level in Reactor~~ Inventory	Bottom of ~~core~~ hot leg to top of vessel*	1 ~~(Direct-indicating or recording device not needed)~~	Verification; accomplishment of mitigation
Degrees of Subcooling	200°F subcooling to 35°F superheat	2 (With confirmatory operator procedures)	Verification and analysis of plant conditions
Maintaining Reactor Coolant System Integrity			
RCS Pressure[1]	0 to 3000 psig (4000 psig for CE plants)	1[2]	Function detection; accomplishment of mitigation
Containment Sump Water Level[1]	Narrow range (sump), Wide range ~~(bottom of containment to 690,000 gallon level equivalent)~~ (Plant specific)	2 1	Function detection; accomplishment of mitigation; verification
Containment Pressure[1]	0 to design pressure[4] (psig)	1	Function detection; accomplishment of mitigation; verification
Maintaining Containment Integrity			
Containment Isolation Valve Position (excluding check valves)	Closed–not closed	1	Accomplishment of isolation
Containment Pressure[1]	~~-10 psig~~ -5 psig to design pressure[4]	1	Function detection; accomplishment of mitigation; verification

[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-allowable values for material design stress.

*A measurement to trend the voids in the reactor coolant system with reactor coolant pumps running should also be provided for all plants. For B&W reactors, a measurement to detect voids in the hot leg candy cane when reactor coolant pumps are not running should be provided.

TABLE 2 (Continued)

TYPE C Variables: those variables that provide information to indicate the potential for being breached or the actual breach of the barriers to fission product releases. The barriers are (1) fuel cladding, (2) primary coolant pressure boundary, and (3) containment.

Variable	Range	Category (see Regulatory Position 1.3)	Purpose
Fuel Cladding			
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
Radioactivity Concentration or Radiation Level in Circulating Primary Coolant	1/2 Tech Spec limit to 100 times Tech Spec limit, ~~R/hr~~	1	Detection of breach
Analysis of Primary Coolant (Gamma Spectrum)	10 μCi/~~gm~~ ml to 10 Ci/~~gm~~ ml or TID-14844 source term in coolant volume	3[5]	Detail analysis; accomplishment of mitigation; verification; long-term surveillance
Reactor Coolant Pressure Boundary			
RCS Pressure[1]	0 to 3000 psig (4000 psig for CE plants)	1[2]	Detection of potential for or actual breach; accomplishment of mitigation; long-term surveillance
Containment Pressure[1]	-5 psig ~~10 psia~~ to design pressure[4] ~~psig~~ (~~-5 psig~~ for subatmospheric containments) (-10 psig)	1	Detection of breach; accomplishment of mitigation; verification; long-term surveillance
Containment Sump Water Level[1]	top to bottom Narrow range (sump), Wide range ~~(bottom of containment to 600,000 gal level equivalent)~~ (Plant specific)	2 1	Detection of breach; accomplishment of mitigation; verification; long-term surveillance
Containment Area Radiation[1]	1 R/hr to 10^4 R/hr	3[6,7]	Detection of breach; verification
Effluent Radioactivity - Noble Gas Effluent from Condenser Air Removal System Exhaust[1]	10^{-6} μCi/cc to 10^{-2} μCi/cc	3[8]	Detection of breach; verification

[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, and
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 ~~accuracy~~ response accuracy ~~of +20 percent or any specific photon energy from 0.6 MeV to 3 MeV. Overall system accuracy should be~~ within a factor of 2 over the entire range. (a dose rate)

[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 2. Effluent concentrations may be expressed 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.

(or in terms of integrated gamma MeV per unit time.)