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DENTON,H.R.	Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards detailed evaluation of Reg Guide 1.97 requirements & implementation plans,per request in 821217 Generic Ltr 82-33 re emergecny response facilities.

"See 50-259 for enclosures"

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TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

April 30, 1984

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

Dear Mr. Denton:

In the Matter of the	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

A detailed evaluation of Regulatory Guide 1.97 requirements and implementation plans for the Browns Ferry Nuclear Plant is enclosed. This submittal is made in response to the request made in Generic Letter 82-33 dated December 17, 1982.

If you have any questions, please get in touch with us through the Browns Ferry Project Manager.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills

L. M. Mills, Manager
Nuclear Licensing

Subscribed and sworn to before
me this 30th day of April 1984.

Paulette W. White
Notary Public
My Commission Expires 9-5-84

Enclosure
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ENCLOSURE

RESPONSE TO REGULATORY GUIDE 1.97

FOR BROWNS FERRY NUCLEAR PLANT UNITS 1, 2, AND 3

1.0 Discussion

NUREG-0737, Supplement 1, Item 6, "Regulatory Guide (RG) 1.97-Application to Emergency Response Facilities," states that each operating license holder provide data to assist control room operators in preventing and mitigating the consequences of reactor accidents. RG 1.97 provides guidance to ensure that instrumentation necessary to measure certain prescribed variables and systems during and after an accident is available to the appropriate personnel. The "BWR Owners' Group Position on NRC Regulatory Guide 1.97, Revision 2," was published July 1982. TVA participated in this BWR Owners' Group (BWROG) effort. In May 1983, RG 1.97, revision 3, was published and will be used to respond to item 6 of NUREG-0737, supplement 1. Although RG 1.97, revision 3,is being addressed by TVA, the BWROG position on revision 2 is applicable in many instances, and TVA endorses that position where applicable.

1.1 RG 1.97 Classification of Variables

1.1.1 Variable Types

Five types of variables have been identified by RG 1.97 for the purpose of aiding in the selection of accident monitoring instrumentation and applicable criteria. Classification as one type of variable does not preclude it from being designated as any other type.

1.1.1.1 Type A

A type A variable provides primary information needed to permit the control room operating personnel to take the specified manually-controlled actions for which no automatic control is provided and that is required for safety systems to accomplish their safety functions for design basis accident events.

1.1.1.2 Type B

A type B variable provides information to indicate whether plant safety functions are being accomplished.

1.1.1.3 Type C

A type C variable provides information to indicate the potential for or the actual breach of the barriers to fission product release. This includes the fuel cladding, primary coolant pressure boundary, and the containment.

1.1.1.4 Type D

A type D variable provides information to indicate the operation of individual safety systems and other systems important to safety.

1.1.1.5 Type E

A type E variable provides monitoring capability used in determining the magnitude of the release of radioactive materials and for continuously assessing such releases.

1.1.2 Category

Regulatory positions 1.3 and 1.4 of RG 1.97 provide design and qualification criteria for the instrumentation used to indicate the various variables designated. The criteria are separated into three separate groups or categories depending upon their importance to safety.

1.1.2.1 Category 1

Category 1 provides the most stringent requirements and is intended for key variables. In general, category 1 provides for full qualification, redundancy, and continuous real-time display and requires onsite (standby) power. A key variable is that single variable that most directly indicates the accomplishment of a safety function.

1.1.2.2 Category 2

Category 2 provides less stringent requirements. It does not include seismic qualification, redundancy, or continuous display and requires only a high-reliability power source (not necessarily standby power).

1.1.2.3 Category 3

Category 3 is intended to provide requirements that will ensure that high-quality off-the-shelf instrumentation is obtained and applies to backup and diagnostic instrumentation. It is also used where the state-of-the-art will not support requirements for higher-qualified instrumentation.

2.0 Design and Qualification Criteria for Browns Ferry Nuclear Plant

The types A, B, and C variables serve a primary safety function. They are used by the operator to ensure (i) the capability to shut down the reactor and maintain it in a safe shutdown condition, (ii) the integrity of the fission product boundaries, and (iii) the capability to mitigate the consequences of accidents which could result in potential offsite exposures comparable to the exposure guidelines of 10 CFR part 100. The type A variables are used for the required operator actions that are needed to give the design basis behavior for the design basis events (accidents). The types B and C variables are used to monitor whether or not the events are following the design basis behavior and to indicate the need for major contingency actions if the event goes beyond the acceptable design basis behavior. Thus, in general, most of the instrumentation for the types A, B, and C variables need to be safety grade. Where instrumentation is used as a backup, the backup need not be safety grade, therefore, category 3.

The types D and E variables, in general, do not serve a primary safety function. They are not needed for ensuring design basis behavior or for major contingency actions. These variables only supply additional information by indicating system operating status, diverse variables, and low-level radiation releases.

The variables can be used to enhance safety by allowing the operator to improve the system operation over the minimum required for design basis behavior, determining what system has failed, etc. The types D and E variables are not essential, and the instrumentation does not need to be safety grade. At the present, no types D or E variables have been identified as category 2 in accordance with the above design basis; two type D variables have been identified as category 1.

Therefore, in the opinion of TVA, there are only two design and qualification criteria, i.e., categories 1 and 3. These two categories meet the intent of RG 1.97 in that all primary information supplied by key variables (types A, B, and C) will meet the intent of category 1. Backup (types A, B, and C), diagnostic, supplemental, and confirmatory information (types D and E) will meet the intent of category 3.

The primary differences between the category requirements are in qualification, application of single failure criteria, power supply, and display requirements. Category 1 instrumentation requires seismic and environmental qualification, the application of single failure criteria, standby power supply, and display requirements. Category 3 instrumentation does not require single failure criteria or an immediate accessible display and does not always require emergency standby power. We believe this meets the intent of the regulatory guide.

2.1 Design Criteria for Categories 1 and 3 Instrumentation

All categories 1 and 3 instrumentation shall meet the following criteria except where specified in the individual instrument description in attachment A.

2.1.1 Equipment Qualification

2.1.1.1 Category 1

Category 1 instrumentation will be qualified in accordance with the methodology described in IE Bulletin 79-01B. Instrumentation whose ranges are required to extend beyond those ranges calculated in the most severe design basis accident event for a given variable will be qualified using the guidance provided in paragraph 6.3.6 of ANS-4.5, in that: "No additional qualification margin needs to be added to the extended range variable. All environmental envelopes except that pertaining to the variable measured by the information display channel shall be those associated with the design basis accident events."

Continuous indication of redundant instrument channels will be provided. Qualification applies to the complete instrumentation channel from sensor to display where the display is a direct-indicating meter or recording device. The redundant channel need not necessarily be displayed on a qualified display device, but the channel must be fully qualified from the sensor to a location which is accessible to the unit operator during accident conditions.

The seismic portion of the qualification of existing equipment is in accordance with the requirements established at the time of installation. Any new equipment will be qualified in accordance with Regulatory Guide 1.100, "Seismic Qualification of Electric Equipment for Nuclear Power Plants."

2.1.1.2 Category 3

The instrumentation will be at least high quality commercial-grade equipment.

2.1.2 Redundancy

2.1.2.1 Category 1

Category 1 instrumentation will be redundant in that no single failure within the accident-monitoring instrumentation, its auxiliary supporting features, or its power sources concurrent with the failures that are a condition or a result of a specific accident will prevent the operators from being presented the monitored variable in an unambiguous manner.

Specifically for category 1 instruments, if a failure of one accident-monitoring channel results in ambiguous information that would lead operators to defeat or fail to accomplish a required safety function, one of the following measures will be provided:

(i) Cross-checking with an independent channel that monitors a different variable bearing a known relationship to the variable being monitored.

(ii) The capability of perturbing the measured variable to determine which channel has failed by observing the response on each instrument.

(iii) The use of portable instrumentation for validation.

(iv) A third channel of instrumentation.

2.1.2.2 Category 3

No specific provision is made for providing redundant instrumentation for category 3 variables.

2.1.3 Power Source

2.1.3.1 Category 1

Category 1 variables will be powered from station standby power sources. Power sources are individually identified in attachment A.

2.1.3.2 Category 3

Category 3 instrumentation will be powered from highly reliable power sources but not necessarily standby power. Attachment A lists the power supply for each variable.

2.1.4 Channel Availability

2.1.4.1 Category 1

The instrument channel will be available prior to an accident except as provided in IEEE Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Station, paragraph 4.11, 'Exceptions'," or as specified in the technical specifications.

2.1.4.2 Category 3

No specific provision provided.

2.1.5 Quality Assurance

2.1.5.1 Category 1

Quality assurance for category 1 variables will be consistent with the Browns Ferry Nuclear Plant (BFN) FSAR.

2.1.5.2 Category 3

Quality assurance for category 3 variables will be consistent with the BFN FSAR.

2.1.6 Display and Recording

2.1.6.1 Category 1

Continuous real-time display will be provided. The indication may be on a dial, digital display, or strip chart recorder. Recording of instrumentation readout information will be provided for at least one redundant channel. The recording device need not be a qualified device as stated in paragraph 2.1.1.1. Direct and immediate trend or transient information that is essential for operator information or action, as defined for type A variables, will be continuously available and displayed on a qualified recording device.

Otherwise, it will be displayed on an individual instrument or it will be continuously updated, stored in computer memory, and displayed. Intermittent displays such as data loggers and scanning recorders may also be used if no significant transient response information is likely to be lost by such devices.

2.1.6.2 Category 3

The instrument signal may be displayed on an individual instrument or it may be processed for display on demand. Signals from effluent radioactivity monitors, area monitors, and meteorology monitors shall be recorded. Direct and immediate trend or transient information that is essential for operator information will be available. Otherwise, it may be continuously updated, stored in computer memory, and displayed on demand. Intermittent displays such as data loggers and scanning recorders may also be used if no significant transient response information is likely to be lost by such devices.

2.1.7 Range

2.1.7.1 Category 1

If two or more instruments are needed to cover a particular range, overlapping of instrument span will be provided. If the required range of monitoring instrumentation results in a loss of instrument sensitivity in the normal operating range, separate instruments will be used.

2.1.7.2 Category 3

Same as category 1.

2.1.8 Equipment Identification

2.1.8.1 Category 1

Category 1 equipment identification on the control panels will be coordinated with the efforts to address item 5 of NUREG-0737, supplement 1, "Detailed Control Room Design Review."

2.1.8.2 Category 3

No specific provisions.

2.1.9 Interfaces

2.1.9.1 Category 1

Where applicable, the transmission of signals for use other than control room display will be through isolation devices that are designated as part of the monitoring instrumentation.

2.1.9.2 Category 3

No specific provisions.

2.1.10 Servicing, Testing, and Calibration

2.1.10.1 Category 1

The inspection and testing programs for RG 1.97 instrumentation will be consistent with the applicable testing programs identified in the FSAR. Surveillance programs are maintained by the plant staff for servicing, testing, and calibration of instrumentation and controls. For those instruments where the required interval between testing is less than the normal time interval between unit shutdowns, a capability for testing during power operation is provided.

2.1.10.2 Category 3

Same as category 1.

2.1.11 Human Factors

2.1.11.1 Category 1

The instrumentation will be designed to facilitate the recognition, location, replacement, repair, or adjustment of malfunctioning components or modules.

To the extent practical, the monitoring instrumentation design will minimize the development of conditions that would cause meters, annunciators, recorders, alarms, etc., to give anomalous indications potentially

confusing to the operator. Human factors principles will be taken into consideration when determining the type and location of new displays.

To the extent practicable, the same instrumentation will be used for accident monitoring as is used for the normal operations of the plant to enable the operators to use, during accident situations, instruments with which they are most familiar.

2.1.11.2 Category 3

Same as category 1.

2.1.12 Direct Measurement

2.1.12.1 Category 1

To the extent practicable, monitoring instrumentation input will be from sensors that directly measure the desired variables.

2.1.12.2 Category 3

Same as category 1.

3.0 Variable Determination

3.1 Identification

The emergency operating procedures and/or guidelines were used, along with the guidance established in RG 1.97, as the basis for accident parameter selection. Table 1 contains a summary of the parameters, their classification, and range.

Attachment A lists variable types A through E. Each variable is listed individually with the following information included where applicable:

Identifier
Variable
Type
Category
Instrument Number
Instrument Range
Redundancy
Power Supply
Location of Display
Schedule

Attachment B contains appropriate justification for deviations from RG 1.97 guidance.

3.2 NUREG-0737 Instrumentation

Where any parameter selected for RG 1.97 was also upgraded in response to NUREG-0737, the response to the specific NUREG-0737 item will overrule the RG 1.97 criteria if they differ. The following NUREG-0737 items are applicable to this situation:

II.B.3 Postaccident Sampling

II.D.3 Valve Position Indication

II.E.4.2 Containment Isolation Dependability

II.F.1 Accident Monitoring

1. Noble Gas Monitor
2. Iodine/Particulate Sampling
3. Containment High-Range Monitor
4. Containment Pressure
5. Containment Water Level
6. Containment Hydrogen

III.D.3.3 Inplant Radiation Monitoring

4.0 Technical Support Center and Emergency Operating Facility

Types A, B, C, D, and E variables necessary for TSC and EOF functions will be provided in the TSC and EOF, respectively by the use of the data systems identified in our letter from L. M. Mills to H. R. Denton dated April 15, 1983, in response to NUREG-0737, supplement 1. Tables 2 and 3 identify those parameters for the TSC and EOF, respectively.

5.0 Schedule

TVA uses the concept of an integrated schedule for scheduling plant modifications. Each parameter listed in attachment A identifies a schedule for installing or upgrading the instrument to meet the stated configuration. If the parameter currently installed in the plant meets the criteria outlined, the "Schedule" will state "Use As Is." If the instrumentation is to be installed or upgraded, the "Schedule" will either be "In Accordance with Integrated Schedule" or "To Be Scheduled." If the design process for the modification is not complete, the modification will not have been included on the integrated schedule; therefore, "To Be Scheduled" will appear in attachment A. When the design process has progressed enough to facilitate scheduling, it will then be included on the integrated schedule. The majority of the identified modifications already exist on the integrated schedule and attachment A identifies this by "In Accordance with Integrated Schedule."

The schedule for providing the identified parameters of tables 2 and 3 will also be implemented in accordance with the BFN integrated schedule.

TABLE 1
SUMMARY OF VARIABLES

No.	Variable	RG 1.97 Type-Cat	RG 1.97 Range	TVA Type-Cat	TVA Range	Remarks
A1	Containment Hydrogen Concentration	C-1	0- to 30-percent	A-1	0- to 20-percent 0- to 100-percent	See C11
A2	Drywell Pressure	B-1	-5 to 3x design	A-1	0 psia to 300 psig	See B7, B9, C8, C10, D4, and Issue 5
A3	Drywell Air Temperature	D-2	40°F to 440°F	A-1	0 to 400°F	See D7
B1	Neutron Flux	B-1	10^{-6} percent to 100-percent	B-3	10^{-6} percent to 125 percent	See Issue 1
B2	Control Rod Position	B-3	Full in or not full in	B-3	Full in or not full in	
B3	RCS Soluble Boron Conct.	B-3	0 to 1000 ppm	B-3	Implement as E12	
B4	Coolant Level in Reactor	B-1	Bottom of core support plate to lesser of top of vessel or centerline of main steam line.	B-1	1/3 core height to 228 inches above TAF	See Issue 2
B5	BWR Core Temperature	Not required at this time				
B6	RCS Pressure	B-1	0 to 1500 psig	B-1	0 to 1500 psig	See C4 and Issue 3
B7	Drywell Pressure	B-1	0 to design	A-1	0 psia to 300 psig	See A2, B9, C8, C10, D4, and Issue 5
B8	Drywell Sump Level	B-1	Top to Bottom	B-3	0 to 150 gpm	See C6 and Issue 4
B9	Primary Containment Pressure	B-1	-5 psig to design	A-1	0 psia to 300 psig	See A2, B7, C8, C10, D4, and Issue 5

TABLE 1 (cont'd)

No.	Variable	RG 1.97 Type-Cat	RG 1.97 Range	TVA Type-Cat	TVA Range	Remarks
B10	PCIV Position	B-1	Closed - Not Closed	B-1	Closed - Not Closed	See Issue 6
C1	Rad. Conc. or Level in Primary Coolant	C-1	1/2 TS to 100 TS	Implement as E12		See Issue 7
C2	Analysis of Primary Coolant	C-3	10 µCi/ml to 10 Ci/ml	Implement as E12		
C3	BWR Core Temperature	Not required at this time				
C4	RCS Pressure	C-1	0 to 1500 psig	B-1	0 to 1500 psig	See B6, C9, and Issue 3
C5	Primary Cont. Area Radiation	C-3	1 R/hr to 10^5 R/hr	C-3	1 to 10^7 R/hr	See E1
C6	Drywell Drain Sump Level	C-1	Top to Bottom	B-3	0 to 150 gpm	See B8 and Issue 4
C7	Suppression Pool Water Level	C-1	Bottom of ECCS suction line to 5 ft. above normal water level	C-1	0 to 240 inches (1)	See D5
C8	Drywell Pressure	C-1	0 to design	A-1	0 psia to 300 psig	See A2, B7, B9, C10, D4, and Issue 5
C9	RCS Pressure	C-1	0 to 1500 psig	B-1	0 to 1500 psig	See B6, C4, and Issue 3
C10	Primary Containment Pressure	C-1	-5 to 3x design	A-1	0 psia to 300 psig	See A2, B7, B9, C8, D4, and Issue 5
C11	Cont. Hydrogen Concentration	C-1	0 to 30 vol-percent	A-1	0- to 20-percent, 0- to 100-percent	See A1

(1) Two feet from bottom of torus to five feet above normal water level.

TABLE 1 (cont'd)

No.	Variable	RG 1.97 Type-Cat	RG 1.97 Range	TVA Type-Cat	TVA Range	Remarks
C12	Cont. Oxygen Concentration	C-1	0 to 10 vol-percent	C-3	0- to 25-percent	See Issue 8
C13	Cont. Effluent Radioactivity	C-3	10^{-6} μCi/cc to 10^{-2} μCi/cc	C-3	See Issue 9	
C14	Effluent Radioactivity	C-2	10^{-6} μCi/cc 10^{-2} μCi/cc	C-3	See Issue 9	See C13
D1	Main Feedwater Flow	D-3	0- to 110-percent design	D-3	0 to 16 x 10^6 lb/hr	(0- to 119-percent design)
D2	CST Level	D-3	Top to Bottom	D-3	0 to 32 feet	(Bottom to Top)
D3	Supp. Pool Spray Flow	D-2	0- to 110-percent design	Do not implement		See D8 and Issue 10
D4	Drywell Pressure	D-2	-5 to 3x design psig	A-1	0 psia to 300 psig	See A2, B7, B9, C8, C10, and Issue 5
D5	Supp. Pool Water Level	D-2	See C7	C-1	0 to 240 inches	See C7
D6	Supp. Pool Water Temp.	D-2	40°F to 230°F	D-1	30°F to 230°F	
D7	Drywell Atmosphere Temp.	D-2	40°F to 440°F	A-1	0 to 400°F	See A3
D8	Drywell Spray Flow	D-2	0- to 110-percent design	Do not implement		See D3 and Issue 10
D9	MSIV Leakage Control				Not applicable	
D10	MS/RV Position	D-2	Closed - Not Closed	D-3	Flow indication and 0 to 600°F	
D11	Isol. Cond. Shell-Side Water Level				Not applicable	

TABLE 1 (cont'd)

No.	Variable	RG 1.97 Type-Cat	RG 1.97 Range	TVA Type-Cat	TVA Range	Remarks
D12	Isol. Cond. Valve Position				Not applicable	
D13	RCIC Flow	D-2	0- to 110-percent design	D-3	0 to 700 gpm	(0- to 117-percent design)
D14	HPCI Flow	D-2	0- to 110-percent design	D-3	0 to 6000 gpm	(0- to 120-percent design)
D15	Core Spray Flow	D-2	0- to 110-percent design	D-3	0 to 10,000 gpm	(0- to 160-percent design)
D16	LPCI Flow	D-2	0- to 110-percent design	D-3	0 to 40,000 gpm	(0- to 200-percent design)
D17	SLCS Flow	D-2	0- to 110-percent design		Do not implement, See Issue 11	
D18	SLCS Storage Tank Level	D-2	Top to Bottom	D-3	0 to 4850 gal.	(Bottom to Top)
D19	RHR System Flow	D-2	0- to 110-percent design	D-3	0 to 40,000 gpm	See D16 (0- to 200-percent design)
D20	RHR Ht. Ex. Out. Temp.	D-2	40°F to 350°F	D-3	0 to 600°F	
D21	Cooling Water Temp. to ESF	D-2	40°F to 200°F	D-3	0 to 600°F	
D22	Cooling Water Flow to ESF	D-2	0- to 110-percent design	D-3	0 to 7500 pgm	(0- to 160-percent design)
D23	High Rad. Liq. Tank Level	D-3	Top to Bottom		Do not implement, see Issue 12	
D24	Emergency Vent. Damp. Position	D-2	Open - Closed	D-3	Open - Closed	See Table D24

TABLE 1 (cont'd)

No.	Variable	RG 1.97 Type-Cat	RG 1.97 Range	TVA Type-Cat	TVA Range	Remarks
D25	Status of Standby Power	D-2		D-3	Voltmeters, Ammeters & VARs	
E1	Prim. Cont. Area Rad.	E-1	1 R/hr to 10^7 R/hr	C-3	1 to 10^7 R/hr	See C5
E2	RB or Sec. Cont. Area Rad	E-2	10^{-1} R/hr to 10^4 R/hr		Do not implement, See Issue 13	
E3	Radiation Exposure Rate	E-3	10^{-1} R/hr to 10^4 R/hr	E-3	10^{-1} to 10^3 mr/hr	See Issue 14
E4	Noble Gases and Vent Flow	E-2		E-3	See C13 and Issue 9	
E5	Particulates and Halogens	E-3	10^{-3} μCi/cc to 10^2 μCi/cc 0- to 110-percent vent design flow	E-3	See C13 and Issue 9	
E6	Airborne Radiohalogens and Particulates	E-3	10^{-9} μCi/cc to 10^{-3} μCi/cc	E-3	Laboratory analysis	
E7	Plant and Environs Radiation	E-3	Portable Instrumentation	E-3	Portable instrumentation	
E8	Plant and Environs Radioactivity	E-3	Isotopic analysis	E-3	Portable instrumentation	
E9	Wind Direction	E-3	0 to 360°	E-3	0 to 540°	
E10	Wind Speed	E-3	0 to 50 mph	E-3	0 to 45 mph, 0 to 100 mph	
E11	Atmospheric Stability	E-3	-9°F to 18°F	E-3	-30°F to 30°F	

TABLE 1 (cont'd)

No.	Variable	RG 1.97 Type-Cat	RG 1.97 Range	TVA Type-Cat	TVA Range	Remarks
E12	Primary Coolant and Sump	E-3	Grab Sample	E-3	See Issue 15	
E13	Containment Air	E-3	Grab Sample	E-3	See Issue 16	

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TABLE 2
TECHNICAL SUPPORT CENTER VARIABLES FROM
REGULATORY GUIDE 1.97

No.	Variable
A2	Drywell Pressure
A3	Drywell Air Temperature
B4	Coolant Level in Reactor
B6	Reactor Pressure

TABLE 3
EMERGENCY OPERATIONS FACILITY VARIABLES FROM
REGULATORY GUIDE 1.97

No.	Variable
A1	Containment Hydrogen Concentration
A2	Drywell Pressure
A3	Drywell Temperature
B4	Coolant Level in Reactor
B6	Reactor Pressure
C5	High Range Primary Containment Radiation
C7	Suppression Pool Water Level
C12	Containment Oxygen Concentration
C13	Containment Effluent Radioactivity (Noble Gas)*
D6	Suppression Pool Water Temperature
D13	RCIC Flow
D14	HPCI Flow
D15	Core Spray Flow
D16	LPCI Flow
E4	Noble Gas and Vent Flow (C13)*
E5	Particulates and Halogens (C13)*
E9	Wind Direction
E10	Wind Speed
E11	Atmospheric Stability

*When modifications are complete.

IDENTIFIER: A1 (1)

VARIABLE: Drywell and Torus Hydrogen Concentration

TYPE: A, C

CATEGORY: 1

INSTRUMENT NUMBER: H2I-76-37, H2R-76-37, H2I-76-39, H2R-76-39

INSTRUMENT RANGE: 0 to 20%, 0 to 100% (2)

REDUNDANCY: 2 separate channels

POWER SUPPLY: Class 1E

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

<u>Operator Action</u>: Initiate containment atmospheric dilution if containment atmosphere approaches combustible limits.

<u>Purpose</u>: Maintain containment integrity, detection of potential for breach, accomplishment of mitigation and long-term surveillance.

(1) See also C11.
(2) Select range desired.

IDENTIFIER: A2

VARIABLE: Drywell Pressure (1) (2)

TYPE: A, B, C, D

CATEGORY: 1

INSTRUMENT NUMBER: PI-64-67B, XR-64-50, PI-64-160A, XR-64-159

INSTRUMENT RANGE: 0 to 80 psia, 0 to 300 psig

REDUNDANCY: 4 separate instrument loops, recorder point for XR-64-159 comes from PT-64-160B

POWER SUPPLY: Class 1E

LOCATION OF DISPLAY: Control Room

SCHEDULE: 0 to 80 psia range - In accordance with integrated schedule.

0 to 300 psig range - Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

Operator Action: Control drywell pressure by initiation of drywell sprays.

Purpose: Maintain containment integrity and maintain reactor coolant system integrity.

(1) NUREG-0737, item II.F.1.4 (wide range).
(2) See also B7, B9, C8, C10, D4 and Issue 5.

IDENTIFIER: A3

VARIABLE: Drywell Atmosphere Temperature (1)

TYPE: A, D

CATEGORY: 1

INSTRUMENT NUMBER: TI-64-52AB, XR-64-50 (2)

INSTRUMENT RANGE: 0 to 400°F

REDUNDANCY: 2 separate channels

POWER SUPPLY: Class 1E

LOCATION OF DISPLAY: Control Room

SCHEDULE: In accordance with Integrated Schedule

REMARKS:

Operator Action: Initiate sprays

Purpose: Provide indication of a potential for a breach in containment, support initiation of containment spray and verification of containment spray operation.

(1) See also D7.
(2) Signal from TM-64-52CA is recorded on XR-64-50 along with drywell pressure.

IDENTIFIER: B1

VARIABLE: Neutron Flux

TYPE: B

CATEGORY: 3 (1)

INSTRUMENT NUMBER: SRMs, IRMs, APRMs

INSTRUMENT RANGE: 10^{-8} to 10^{-3}% power (SRM), 10^{-4} to 40% power (IRM) 0 to 125% power (APRM)(2)

REDUNDANCY: 4 SRMs, 8 IRMs, 6 APRMs

POWER SUPPLY: Non-IE Battery Backed (SRM, IRM, Recorders) RPS (APRM)

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

<u>Purpose</u>: Reactivity control.

(1) See Issue 1
(2) SRMs and IRMs are inserted.

IDENTIFIER:	B2
VARIABLE:	Control Rod Position
TYPE:	B
CATEGORY:	3
INSTRUMENT NUMBER:	ZI-85-1 through ZI-85-185
INSTRUMENT RANGE:	Full in to full out
REDUNDANCY:	N/A
POWER SUPPLY:	Non-1E Battery Backed
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

Purpose: Verification of control rods full in for reactivity control.

IDENTIFIER: B3

VARIABLE: RCS Soluble Boron Concentration (1) (Grab Sample)

TYPE: (1)

CATEGORY: 3

INSTRUMENT NUMBER: N/A

INSTRUMENT RANGE: N/A

REDUNDANCY: N/A

POWER SUPPLY: N/A

LOCATION OF DISPLAY: N/A

SCHEDULE: N/A

REMARKS:

Purpose: Verification of reactivity control after initiation of standby liquid control.

(1) See E12. This variable is encompassed by variable E12 which is satisfied by the Post-Accident Sampling Facility (PASF) in response to NUREG-0737, item II.B.3.

IDENTIFIER:	B4
VARIABLE:	Coolant Level in Reactor
TYPE:	B
CATEGORY:	1
INSTRUMENT NUMBER:	LI-3-52, LI-3-62A, LI-3-58A, LI-3-58B, LI-3-55
INSTRUMENT RANGE:	-100 to +200 inches with zero at TAF (LI-3-62A) -155 to +60 inches with zero at instrument zero (LI-3-58A, LI-3-58B) 0 to 400 inches with zero at instrument zero (LI-3-55)(1)(2)
REDUNDANCY:	2 separate channels
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	In accordance with integrated schedule.

REMARKS:

Purpose: Core cooling

(1) Total range is 1/3 core height to 228 inches above the top of active fuel (TAF)
(2) See Issue 2A and 2B

IDENTIFIER:	B5
VARIABLE:	BWR Core Temperatures
TYPE:	Not required at this time (1)
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

(1) See also C3.

IDENTIFIER:	B6
VARIABLE:	RCS Pressure [1]
TYPE:	B, C
CATEGORY:	1
INSTRUMENT NUMBER:	PI-3-74A and PI-3-74B [2]
INSTRUMENT RANGE:	0 to 1500 psig
REDUNDANCY:	2 separate channels
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	In accordance with integrated schedule

REMARKS:

<u>Purpose</u>: Core cooling, maintain reactor coolant system integrity, detection of potential for or actual breach of reactor pressure boundary.

(1) See also C4 and C9.
(2) See Issue 3.

IDENTIFIER:	B7
VARIABLE:	Drywell Pressure [1] [2]
TYPE:	See A, B, C, D
CATEGORY:	1
INSTRUMENT NUMBER:	PI-64-67B, XR-64-50, PI-64-160A, XR-64-159
INSTRUMENT RANGE:	0 to 80 psia, 0-300 psig
REDUNDANCY:	4 separate instrument loops, recorder point for XR-64-159 comes from PT-64-160B
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	0 to 80 psia range - In accordance with integrated schedule. 0 to 300 psig range - Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

<u>Purpose</u>: Detection of potential for or actual breach of the reactor coolant system integrity, accomplishment of mitigation and verification.

(1) NUREG-0737, item II.F.1.4 (wide range).
(2) See also A2, B9, C8, C10, D4 and Issue 5.

IDENTIFIER: B8

VARIABLE: Drywell Sump Level (1) (2)

TYPE: B, C

CATEGORY: 3 (3)

INSTRUMENT NUMBER: FQ-77-6, FQ-77-16, FR-77-6

INSTRUMENT RANGE: 0 to 150 GPM

REDUNDANCY: N/A

POWER SUPPLY: Non-1E Battery Backed

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

Purpose Detection of potential for or actual breach of the reactor coolant system integrity, accomplishment of mitigation and verification.

(1) Drywell Equipment Drain Sump Flow Integrator, Drywell Floor Drain Sump Flow Integrator, Drywell Total Flow Recorder.
(2) See also C6.
(3) See Issue 4.

IDENTIFIER: B9

VARIABLE: Primary Containment Pressure (1) (2)

TYPE: A, B, C, D

CATEGORY: 1

INSTRUMENT NUMBER: PI-64-67B, XR-64-50, PI-64-160A, XR-64-159

INSTRUMENT RANGE: 0 to 80 psia, 0 to 300 psig

REDUNDANCY: 4 separate instrument loops, recorder point for XR-64-159 comes from PT-64-160B

POWER SUPPLY: Class 1E

LOCATION OF DISPLAY: Control Room

SCHEDULE: 0 to 80 psia range - In accordance with integrated schedule.

0 to 300 psig range - Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

Purpose: Detection of potential for or actual breach of primary containment, accomplishment of mitigation and verification.

(1) NUREG-0737, item II.F.1.4.
(2) See also A2, B7, C8, C10, D4 and Issue 5.

IDENTIFIER:	B10
VARIABLE:	Primary Containment Isolation Valve Position
TYPE:	B
CATEGORY:	1
INSTRUMENT NUMBER:	Status lights on control boards [1]
INSTRUMENT RANGE:	Closed - Not closed
REDUNDANCY:	Redundant indication not required on each redundant isolation valve.
POWER SUPPLY:	[1]
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

<u>Purpose</u>: Provide indication that containment isolation has been accomplished.

[1] See Issue 6 for list of valves and power supplies.

IDENTIFIER:	C1
VARIABLE:	Radiation Level in Circulating Primary Coolant
TYPE:	([1])
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A

REMARKS:

([1]) Implement as E12. See Issue 7.

IDENTIFIER:	C2
VARIABLE:	Analysis of Primary Coolant (Gamma Spectrum)
TYPE:	([1])
CATEGORY:	3
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A

REMARKS:

([1]) This variable is encompassed in variable E12 which is satisfied by the Post-Accident Sampling Facility (PASF) in response to NUREG-0737, item II.B.3.

IDENTIFIER:	C3
VARIABLE:	BWR Core Temperature
TYPE:	Not required at this time. See B5
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

IDENTIFIER:	C4
VARIABLE:	RCS Pressure (1)
TYPE:	B, C
CATEGORY:	1
INSTRUMENT NUMBER:	PI-3-74A and PI-3-74B
INSTRUMENT RANGE:	0 to 1500 psig
REDUNDANCY:	2 separate channels
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	In accordance with integrated schedule

REMARKS:

<u>Purpose</u>: Detection of potential for or actual breach of the reactor coolant pressure boundary, accomplishment of mitigation and long term surveillance.

(1) See also B6, C9 and Issue 3.

IDENTIFIER:	C5
VARIABLE:	High Range Primary Containment Radiation (1) (2)
TYPE:	C, E
CATEGORY:	3
INSTRUMENT NUMBER:	RR-90-272CD, RR-90-273CD
INSTRUMENT RANGE:	1 to 10^7 R/hr
REDUNDANCY:	N/A
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	In accordance with integrated schedule

REMARKS:

Purpose: Detection of a breach in the reactor coolant pressure boundary.

(1) NUREG-0737, item II.F.1.3.
(2) See also E1.

IDENTIFIER:	C6
VARIABLE:	Drywell Drain Sump Level (1) (2)
TYPE:	B, C
CATEGORY:	3 (3)
INSTRUMENT NUMBER:	FQ-77-6, FQ-77-16, FR-77-6
INSTRUMENT RANGE:	0 to 150 GPM
REDUNDANCY:	N/A
POWER SUPPLY:	Non-1E Battery Backed
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

Purpose: Detection of a breach in the reactor coolant pressure boundary, accomplishment of mitigation, verification and long-term surveillance.

(1) Drywell Equipment Drain Sump Flow Integrator, Drywell Floor Drain Sump Flow Integrator, Drywell Total Flow Recorder.
(2) See also B8.
(3) See Issue 4.

IDENTIFIER:	C7
VARIABLE:	Suppression Pool Water Level (1) (2)
TYPE:	C, D
CATEGORY:	1
INSTRUMENT NUMBER:	LI-64-159A, XR-64-159
INSTRUMENT RANGE:	0 to 240 inches (3)
REDUNDANCY:	2 separate channels
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

Purpose: Maintain containment integrity, detection of breach in reactor primary boundary.

(1) See also D5.
(2) NUREG-0737, item II.F.1.5
(3) Two feet from bottom of torus to five feet above normal water level.

IDENTIFIER: C8

VARIABLE: Drywell Pressure (1) (2)

TYPE: A, B, C, D

CATEGORY: 1

INSTRUMENT NUMBER: PT-64-67B, XR-64-50, PI-64-160A, XR-64-159

INSTRUMENT RANGE: 0 to 80 psia, 0 to 300 psig

REDUNDANCY: 4 separate instrument loops, recorder point for XR-64-159 comes from PT-64-160B

POWER SUPPLY: Class 1E

LOCATION OF DISPLAY: Control Room

SCHEDULE: 0 to 80 psia range - In accordance with integrated schedule.

0 to 300 psig range - Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

Purpose: Detection of a breach in the reactor coolant pressure boundary.

(1) NUREG-0737, item II.F.1.4.
(2) See also A2, B7, B9, C10, D4, and Issue 5.

IDENTIFIER:	C9
VARIABLE:	RCS Pressure [1]
TYPE:	B, C
CATEGORY:	1
INSTRUMENT NUMBER:	PI-3-74A and PI-3-74B
INSTRUMENT RANGE:	0 to 1500 psig
REDUNDANCY:	2 separate channels
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	In accordance with integrated schedule

REMARKS:

Purpose: Detection of a potential for breach in the primary containment and accomplishment of mitigation.

(1) See also B6, C4 and Issue 3.

IDENTIFIER:	C10
VARIABLE:	Primary Containment Pressure [1] [2]
TYPE:	A, B, C, D
CATEGORY:	1
INSTRUMENT NUMBER:	PI-64-67B, XR-64-50, PI-64-160A, XR-64-159
INSTRUMENT RANGE:	0 to 80 psia, 0 to 300 psig
REDUNDANCY:	4 separate instrument loops, recorder point for XR-64-159 comes from PT-64-160B
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	0 to 80 psia - In accordance with integrated schedule 0 to 300 psig - Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

Purpose: Detection of a potential for or actual breach of primary containment and accomplishment of mitigation.

(1) NUREG-0737, item II.F.1.4.
(2) See also A2, B7, B9, C8, D4 and Issue 5.

IDENTIFIER:	C11 [1]
VARIABLE:	Containment Hydrogen Concentration
TYPE:	A, C
CATEGORY:	1
INSTRUMENT NUMBER:	H2M-76-37, H2R-76-37, H2M-76-39, H2R-76-39
INSTRUMENT RANGE:	0 to 20%, 0 to 100% [2]
REDUNDANCY:	Two independent channels
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

<u>Purpose</u>: Detection of potential for breach in primary containment.

(1) See also A1.
(2) Select range desired.

IDENTIFIER:	C12
VARIABLE:	Containment Oxygen Concentration
TYPE:	C
CATEGORY:	3 ([1])
INSTRUMENT NUMBER:	02I-76-41A, 02I-76-43A, 02R-76-41, 02R-76-43
INSTRUMENT RANGE:	0 to 25%
REDUNDANCY:	N/A
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

Purpose: Detection of a potential breach in the containment.

([1]) See Issue 8.

IDENTIFIER: C13

VARIABLE: Containment Effluent Radioactivity - Noble Gas [1] [2]

TYPE: C

CATEGORY: 3

INSTRUMENT NUMBER: Not yet assigned

INSTRUMENT RANGE: [1]

REDUNDANCY: N/A

POWER SUPPLY: Not yet assigned

LOCATION OF DISPLAY: Control Room

SCHEDULE: In accordance with integrated schedule

REMARKS:

<u>Purpose</u>: Detection of a breach of the containment:

[1] See Issue 9.
[2] NUREG-0737 items II.F.1.1 and II.F.1.2.

IDENTIFIER:	C14
VARIABLE:	Effluent Radioactivity - Noble Gas (1) (2)
TYPE:	C
CATEGORY:	3 (1)
INSTRUMENT NUMBER:	Not yet assigned
INSTRUMENT RANGE:	(1)
REDUNDANCY:	N/A
POWER SUPPLY:	Not yet assigned
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	In accordance with integrated schedule
REMARKS:	

Purpose: Detection of a breach of the containment.

(1) See C13 and Issue 9.
(2) NUREG-0737 items II.F.1.1 and II.F.1.2.

IDENTIFIER: D1

VARIABLE: Main Feedwater Flow

TYPE: D

CATEGORY: 3

INSTRUMENT NUMBER: FI-3-78A (Line A), FI-3-78B (Line B), FR-3-78 (Line A&B)

INSTRUMENT RANGE: 0 to 8 x 16^6 lb/hr, 0 to 8 x 10^6 lb/hr, 0 to 16 x 10^6 lb/hr (1)

REDUNDANCY: N/A

POWER SUPPLY: Non-1E Battery Backed

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

<u>Purpose</u>: Verify operation of feedwater system and analysis of coolant flow.

(1) 0 to 119% design flow

IDENTIFIER: D2

VARIABLE: Condensate Storage Tank Level

TYPE: D

CATEGORY: 3

INSTRUMENT NUMBER: LI-2-161 (Unit 2), LI-2-165 (Unit 3), LI-2-169 (Unit 1) (1)

INSTRUMENT RANGE: 0 to 32 feet (2)

REDUNDANCY: N/A

POWER SUPPLY: Non-1E Battery Backed

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

<u>Purpose</u>: Provide indication of available water for cooling.

(1) All indicators are located in unit 1.
(2) Bottom to Top

IDENTIFIER:	D3
VARIABLE:	Suppression Pool Spray Flow ([1])
TYPE:	N/A
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

([1]) Do not implement. See D8 and Issue 10.

IDENTIFIER:	D4
VARIABLE:	Drywell Pressure ([1]) ([2])
TYPE:	A, B, C, D
CATEGORY:	1
INSTRUMENT NUMBER:	PI-64-67B, XR-64-50, PI-64-160A, XR-64-159
INSTRUMENT RANGE:	0 to 80 psia, 0 to 300 psig
REDUNDANCY:	4 separate instrument loops, recorder point for XR-64-159 comes from PT-64-160B
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	0 to 80 psia range - In accordance with integrated schedule. 0 to 300 psig range - Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

Purpose: To monitor operation of the primary containment related systems.

([1]) NUREG-0737, item II.F.1.4.
([2]) See also A2, B7, B9, C8, C10 and Issue 5.

IDENTIFIER:	D5
VARIABLE:	Suppression Pool Water Level (1)
TYPE:	C, D
CATEGORY:	1
INSTRUMENT NUMBER:	LI-64-159A, XR-64-159
INSTRUMENT RANGE:	0 to 240 inches (2)
REDUNDANCY:	2 separate channels
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

Purpose: To monitor operation of the primary containment related systems.

(1) See also C7.
(2) Two feet from bottom of torus to five feet above normal water level.

IDENTIFIER:	D6
VARIABLE:	Suppression Pool Water Temperature
TYPE:	D
CATEGORY:	1
INSTRUMENT NUMBER:	TI-64-161, TR-64-161 (Div. I) TI-64-162, TR-64-162 (Div. II)
INSTRUMENT RANGE:	30° to 230°F
REDUNDANCY:	2 divisions
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Unit 1 use as is, units 2 and 3 in accordance with integrated schedule.

REMARKS:

<u>Purpose</u>: Maintain containment integrity, maintain reactor coolant system integrity.

IDENTIFIER:	D7
VARIABLE:	Drywell Atmosphere Temperature (1)
TYPE:	A, D
CATEGORY:	1
INSTRUMENT NUMBER:	TI-64-52AB, XR-60-50 (2)
INSTRUMENT RANGE:	0 to 400°F
REDUNDANCY:	2 separate channels
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	In accordance with integrated schedule

REMARKS:

Purpose: To monitor operation of primary containment related systems.

(1) See also A3.
(2) Signal from TM-64-52CA is recorded on XR-64-50 along with drywell pressure.

IDENTIFIER:	D8
VARIABLE:	Drywell Spray Flow (1)
TYPE:	N/A
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

(1) Do not implement. See D3 and Issue 10.

IDENTIFIER:	D9
VARIABLE:	Main Steam Line Isolation Valves Leakage Control System Pressure [1]
TYPE:	N/A
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

[1] Browns Ferry does not have a MSIV Leakage Control System - Not applicable.

IDENTIFIER:	D10
VARIABLE:	Safety/Relief Valve Position (1)
TYPE:	D
CATEGORY:	3 (1)
INSTRUMENT NUMBER:	Tailpipe Thermocouples and Acoustic Monitors
INSTRUMENT RANGE:	0 to 600°F, Flow Indication
REDUNDANCY:	Two diverse instrumentation systems
POWER SUPPLY:	Non-1E Battery Backed, Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

<u>Purpose</u>: Detection of an accident; boundary integrity indication, verification of vessel pressure control.

(1) This instrumentation was provided in response to NUREG-0737, item II.D.3. The two instrumentation systems provide highly reliable indication of S/RV position which is used primarily for diagnostic purposes and thus Category 3 classification.

IDENTIFIER:	D11
VARIABLE:	Isolation Condenser System Shell-Side [1]
TYPE:	N/A
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

[1] Not applicable to Browns Ferry.

IDENTIFIER:	D12
VARIABLE:	Isolation Condenser System Valve Position ([1])
TYPE:	N/A
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

([1]) Not applicable to Browns Ferry.

IDENTIFIER:	D13
VARIABLE:	RCIC Flow
TYPE:	D
CATEGORY:	3 (1)
INSTRUMENT NUMBER:	FIC-71-36A
INSTRUMENT RANGE:	0 to 700 GPM (2)
REDUNDANCY:	N/A
POWER SUPPLY:	Non-1E Battery Backed
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

Purpose: To monitor operation.

(1) See Section 1.2.
(2) 0 to 117% design flow

IDENTIFIER: D14

VARIABLE: HPCI Flow

TYPE: D

CATEGORY: 3 [1]

INSTRUMENT NUMBER: FIC-73-33

INSTRUMENT RANGE: 0 to 6000 GPM [2]

REDUNDANCY: N/A

POWER SUPPLY: Class 1E

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

Purpose: To monitor operation.

(1) See Section 1.2.
(2) 0 to 120% design flow

IDENTIFIER:	D15
VARIABLE:	Core Spray System Flow
TYPE:	D
CATEGORY:	3 (1)
INSTRUMENT NUMBER:	FI-75-21, FI-75-49
INSTRUMENT RANGE:	0 to 10,000 GPM (2)
REDUNDANCY:	N/A
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

Purpose: To monitor operation

(1) See Section 1.2.
(2) 0 to 160% design flow

IDENTIFIER: D16

VARIABLE: LPCI Flow

TYPE: D

CATEGORY: 3 (1)

INSTRUMENT NUMBER: FI-74-50, FI-74-64, FR-74-64

INSTRUMENT RANGE: 0 to 40,000 GPM (2)

REDUNDANCY: N/A

POWER SUPPLY: Class 1E, Non-1E Battery Backed (Recorder)

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

Purpose: Monitor operation

(1) See Section 1.2.
(2) 0 to 200% design flow

IDENTIFIER:	D17
VARIABLE:	SLCS Flow (1)
TYPE:	N/A
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

(1) Do not implement. See Issue 11.

IDENTIFIER:	D18
VARIABLE:	SLCS Storage Tank Level
TYPE:	D
CATEGORY:	3 (1)
INSTRUMENT NUMBER:	LI-63-1A
INSTRUMENT RANGE:	0 to 4,850 gallons (2)
REDUNDANCY:	N/A
POWER SUPPLY:	Class 1E
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

Purpose: To monitor operation

(1) See Section 1.2.
(2) Bottom to Top, 4850 gallons is tank overflow.

IDENTIFIER:	D19
VARIABLE:	RHR System Flow
TYPE:	See D16
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

<u>Purpose</u>: To monitor operation.

IDENTIFIER:	D20
VARIABLE:	RHR Heat Exchanger Outlet Temperature
TYPE:	D
CATEGORY:	3 (1)
INSTRUMENT NUMBER:	TRS-74-80 (2)
INSTRUMENT RANGE:	0 to 600°F
REDUNDANCY:	N/A
POWER SUPPLY:	Non-1E Battery Backed
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is
REMARKS:	

Purpose: To monitor operation

(1) See Section 1.2.
(2) Multipoint recorder displaying this variable and D21.

IDENTIFIER: D21

VARIABLE: Cooling Water Temperature to ESF Components (1)

TYPE: D

CATEGORY: 3 (2)

INSTRUMENT NUMBER: TRS-74-80 (3)

INSTRUMENT RANGE: 0 to 600° F

REDUNDANCY: N/A

POWER SUPPLY: Non-1E Battery Backed

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

Purpose: To Monitor Operation

(1) Interpreted as RHRSW to RHR heat exchangers.
(2) See Section 1.2.
(3) Multipoint recorder displaying this variable and D20.

IDENTIFIER: D22

VARIABLE: Cooling Water Flow to ESF System Components (1)

TYPE: D

CATEGORY: 3 (2)

INSTRUMENT NUMBER: FI-23-36, FI-23-42, FI-23-48, FI-23-54 (3), FI-67-3A, FI-67-6A, FI-67-9A, FI-67-12A (4)

INSTRUMENT RANGE: 0 to 7,500 GPM (5)

REDUNDANCY: N/A

POWER SUPPLY: Class 1E, Non-1E Battery Backed

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

Purpose: To monitor operation

(1) Interpreted as RHRSW flow to RHR heat exchangers and EECW header flow.
(2) See Section 1.2.
(3) One per unit for a total of 12.
(4) Common for the three units but each has indication in each unit.
(5) 0 to 160% design flow

IDENTIFIER:	D23
VARIABLE:	High Radioactivity Liquid Tank Level - Radwaste Systems
TYPE:	([1])
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

([1]) Do not implement. See Issue 12.

IDENTIFIER: D24

VARIABLE: Emergency Ventilation Damper Position

TYPE: D

CATEGORY: 3 (1)

INSTRUMENT NUMBER: Status Lights on Control Boards (2)

INSTRUMENT RANGE: Open-Closed

REDUNDANCY: N/A

POWER SUPPLY: (2)

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

Purpose: To monitor operation of the ventilation system.

(1) See Section 1.2.
(2) See Table D24.

Dampers Having Status Lights in Control Room

Table D24

Numbers	Description	Power Supply
	Control Room	
FCO-31-150B	Air supply to relay room and units 1 and 2 control room air handling units	(1)
FCO-31-150D	Fresh air supply to unit 3	(1)
FCO-31-150E	Toilet room exhaust fan inlet isolation	(1)
FCO-31-150F	Unit 3 toilet room exhaust fan inlet isolation	(1)
FCO-31-151	Control room	(1)
FCO-31-152	Control room	(1)
	Refueling Zone	
FCO-64-3A	Refueling zone exhaust fan A	(1)
FCO-64-3B	Refueling zone supply fan A	(1)
FCO-64-4A	Refueling zone exhaust fan B	(1)
FCO-64-4B	Refueling zone supply fan B	(1)
FCO-64-5	Refueling zone air supply outlet isolation	(2)
FCO-64-6	Air supply inboard isolation	(2)
FCO-64-7	Outside air isolation (unit 1 only)	(2)
PdCO-64-8	Static pressure	(2)
FCO-64-9	Exhaust duct outboard isolation	(2)
FCO-64-10	Exhaust duct inboard isolation	(2)
FCO-64-44	Refueling zone exhaust to SBGT (unit 1 only)	(2)
FCO-64-45	Refueling zone exhaust to SBGT (unit 1 only)	(2)
FCO-64-60A	Stair hall exhaust fan supply (units 1 and 3)	(1)
FCO-64-60B	Elevator machine room exhaust (units 1 and 3)	(1)
FCO-64-60C	Refuel toilet room exhaust (unit 1)	(1)
FCO-64-60D	Change room exhaust (unit 1)	(1)
FCO-64-63	Refuel zone outside air (unit 1)	(2)
PdCO-64-64	Static limiter (unit 1)	(2)
FCO-64-65A	Equipment access airlock inlet outboard (unit 1 only)	(1)
FCO-64-65B	Equipment access airlock inlet inboard (unit 1 only)	(1)
FCO-64-65C	Equipment access airlock exhaust inboard (unit 1 only)	(1)
FCO-64-65D	Equipment access airlock exhaust outboard (unit 1 only)	(1)

Dampers Having Status Lights in Control Room (Continued)

Table D24 (Continued)

Numbers	Description	Power Supply
	Reactor Building	
FCO-64-11A	Reactor building exhaust fan A	(1)
FCO-64-11B	Reactor building supply fan A	(1)
FCO-64-12A	Reactor building exhaust fan B	(1)
FCO-64-12B	Reactor building supply fan B	(1)
FCO-64-13	Reactor zone air supply outboard isolation	(2)
FCO-64-14A/B	Reactor zone air supply inboard isolation	(2)
FCO-64-15	Reactor zone outside air isolation	(2)
PdCO-64-16	Reactor zone static pressure	(2)
FCO-64-40	Reactor zone exhaust to SBGT	(2)
FCO-64-41	Reactor zone exhaust to SBGT	(2)
FCO-64-42	Reactor zone exhaust duct inboard isolation	(2)
FCO-64-43	Reactor zone exhaust duct outboard isolation	(2)
	Standby Gas Treatment	
FCO-65-3	A train inlet	(2)
FCO-65-4	A train decay heat removal	(2)
FCO-65-16	SBGT Filter Bank A outlet	(2)
FCO-65-17	SBGT Fan Inlet	(2)
FCO-65-22	SBGT Filter Bank A and B Bypass	(2)
FCO-65-25	SBGT Filter Bank B Inlet	(2)
FCO-65-26	SBGT Filter Bank B Decay Heat	(2)
FCO-65-38	SBGT Filter Bank B Outlet	(2)
FCO-65-39	SBGT Fan B Inlet	(2)
FCO-65-51	C train inlet	(2)
FCO-65-52	C train decay heat removal	(2)
FCO-65-67	C train outlet	(2)

(1) Station Power

(2) Class 1E

IDENTIFIER: D25

VARIABLE: Status of Standby Power [1]

TYPE: D

CATEGORY: 3 [2]

INSTRUMENT NUMBER: Diesel generator voltage, amperes and VARS [3]

INSTRUMENT RANGE:

REDUNDANCY: N/A

POWER SUPPLY: Station Power

LOCATION OF DISPLAY: Control Room

SCHEDULE: Use as is

REMARKS:

Purpose: To monitor operation

(1) Plant specific.
(2) See Section 1.2.
(3) No unique identifiers.

IDENTIFIER: E1

VARIABLE: Primary Containment Area Radiation (1) (2)

TYPE: C, E

CATEGORY: 3

INSTRUMENT NUMBER: RR-90-272CD, RR-90-273CD

INSTRUMENT RANGE: 1 to 10^7 R/hr

REDUNDANCY: N/A

POWER SUPPLY: Class 1E

LOCATION OF DISPLAY: Control Room

SCHEDULE: Unit 1, use as is, units 2 & 3 in accordance with integrated schedule.

REMARKS:

Purpose: Detection of significant releases; release assessment, long term surveillance and emergency plan actuation.

(1) See also C5.
(2) NUREG-0737, item II.F.1.3.

IDENTIFIER:	E2
VARIABLE:	Reactor Building or Secondary Containment Area Radiation
TYPE:	([1])
CATEGORY:	N/A
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A
REMARKS:	

([1]) Do not implement - See Issue 13.

IDENTIFIER:	E3
VARIABLE:	Radiation Exposure Rate (1)
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	RR-90-1 (2)
INSTRUMENT RANGE:	0.1 to 1,000 mr/hr
REDUNDANCY:	N/A
POWER SUPPLY:	Non-1E Battery Backed (Recorder) Class 1E (Monitors)
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

Purpose: Detection of significant releases, release assessment and long term surveillance.

(1) Inside buildings or areas where access is required to service equipment important to safety. See Issue 14.
(2) Multipoint recorder. See Table E3 for list of points.

TABLE E3

AREA RADIATION MONITORING POINTS

Points	Area
1	Fuel Storage Pool Area
2	Service Floor Area
3	New Fuel Storage Pool Area
4	M-G Set Area
5	Generator Operation Floor
6	Reactor Feed Pump Operation Floor
7	Turbine Operation Floor
8	Main Control Room
9	Cleanup Area
11	Steam Jet Air Ejector Area
12	Feedwater Heater Area
13	North Cleanup System
14	South Cleanup System
15	Decontamination Area
16	Hotwell Pumps Area
17	Condenser Corridor
18	Condensate Area
19	Outside Steam Line Cavity
20	Control Rod Drive Hydraulic Control Unit West
21	Control Rod Drive Hydraulic Control Unit East
22	TIP Room (10 to 10^6 mr/hr)
23	TIP Drive Room
24	HPCI
25	RHR West
26.	Core Spray - RCIC
27	Core Spray Room
28	RHR East
29	Suppression Pool Area
30	Stack Room
31	South West Booster Pump

IDENTIFIER:	E4
VARIABLE:	Noble Gas and Vent Flow Rate (1)
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A

REMARKS:

Purpose: Detection of significant releases.

(1) See C13 and Issue 9.

IDENTIFIER:	E5
VARIABLE:	Particulates and Halogens [1]
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	N/A

REMARKS:

Purpose: Detection of significant releases.

(1) Particulates and halogens are measured by laboratory analyses of the particulate and carbon filters in the offgas stack exhaust radiation monitors. See C13 and Issue 9.

IDENTIFIER:	E6
VARIABLE:	Airborne Radiohalogens and Particulates (1)
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	(1)
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	In accordance with integrated schedule

REMARKS:

Purpose: Release assessment and analysis.

(1) Laboratory analysis. This has been addressed in TVA response to NUREG-0737 item II.B.3, "Post-Accident Sampling Facility." See E12.

IDENTIFIER: E7

VARIABLE: Plant and Environs Radiation (1)

TYPE: E

CATEGORY: 3

INSTRUMENT NUMBER: N/A

INSTRUMENT RANGE: N/A

REDUNDANCY: N/A

POWER SUPPLY: N/A

LOCATION OF DISPLAY: N/A

SCHEDULE: Use as is

REMARKS:

Purpose: Release assessment and analysis.

(1) Portable radiation monitors will be used to measure radiation and airborne radioactivity concentrations in areas of concern.

IDENTIFIER:	E8
VARIABLE:	Plant and Environs Radioactivity (1)
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	N/A
INSTRUMENT RANGE:	N/A
REDUNDANCY:	N/A
POWER SUPPLY:	N/A
LOCATION OF DISPLAY:	N/A
SCHEDULE:	Use as is

REMARKS:

Purpose: Release assessment and analysis.

(1) Portable equipment.

IDENTIFIER:	E9
VARIABLE:	Wind Direction
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	XR-90-102-2, XR-90-103, XR-90-104 (1)
INSTRUMENT RANGE:	0 to 540°
REDUNDANCY:	N/A
POWER SUPPLY:	Non-1E Battery Backed
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is
REMARKS:	

Purpose: Release assessment.

(1) See E10 and E11.

IDENTIFIER:	E10
VARIABLE:	Wind Speed
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	XR-90-102-1, XR-90-103, XR-90-104 [1]
INSTRUMENT RANGE:	0 to 45 mph, 0 to 100 mph
REDUNDANCY:	N/A
POWER SUPPLY:	Non-1E Battery Backed
LOCATION OF DISPLAY:	Control room
SCHEDULE:	Use as is
REMARKS:	

<u>Purpose</u>: Release assessment

[1] See E9 and E11.

IDENTIFIER:	E11
VARIABLE:	Atmospheric Stability
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	TDR-90-103, TDR-90-104 ([1])
INSTRUMENT RANGE:	-30°F to 30°F
REDUNDANCY:	N/A
POWER SUPPLY:	Non-1E Battery Backed
LOCATION OF DISPLAY:	Control Room
SCHEDULE:	Use as is

REMARKS:

Purpose: Release assessment.

([1]) Meteorological parameter displays in the control room include wind direction (E9), wind speed (E10) and temperature differentials taken from the meteorological tower. The ΔT can be converted to an atmospheric stability class by comparison to a reference.

To initially determine offsite doses, the operators use tables in the REP Implementing Procedures. The REP-IP tables assume conservative meteorological conditions and give offsite doses at various distances (1 to 10 miles) using measured plant release rates. The Radiological Health Staff in Muscle Shoals will then routinely perform accident dose calculations using actual meteorological conditions to provide more realistic offsite doses.

IDENTIFIER: E12

VARIABLE: Primary Coolant and Sump (1)

TYPE: E

CATEGORY: 3

INSTRUMENT NUMBER: N/A

INSTRUMENT RANGE: (1)

REDUNDANCY: N/A

POWER SUPPLY: (1)

LOCATION OF DISPLAY: (1)

SCHEDULE: In accordance with Integrated Schedule

REMARKS:

Purpose: Release assessment.

(1) See Issue 15. This variable is satisfied by the PASF in response to NUREG-0737, item II.B.3.

IDENTIFIER:	E13
VARIABLE:	Containment Air (1)
TYPE:	E
CATEGORY:	3
INSTRUMENT NUMBER:	See A1, C11, C12, E12, and Issue 13
INSTRUMENT RANGE:	See A1, C11, C12, E12, and Issue 13
REDUNDANCY:	N/A
POWER SUPPLY:	See A1, C11, C12, and E12
LOCATION OF DISPLAY:	Control room for H_2 and O_2
SCHEDULE:	Use as is for H_2 and O_2, see E12 for gamma spectrum.

REMARKS:

Purpose: Release assessment; verification and analysis.

(1) Grab sample - See Issue 16.

Issue 1 Variable B1

Neutron Flux

Issue Definition

Regulatory Guide (RG) 1.97 requires Category 1 instrumentation to monitor neutron flux for reactivity control. Category 1 instrumentation indicates that the variable being monitored is a key variable. In RG 1.97, a key variable is defined as "...that single variable (or minimum number of variables) that most directly indicates the accomplishment of a safety function ...." The following discussion supports the position that the neutron monitoring instrumentation, as it currently exists, fully satisfies the intent of the guide for reactivity control.

Discussion

The source range monitors (SRMs), intermediate range monitors (IRMs), and average power range monitors (APRMs) provide neutron monitoring over the range of 10^{-8}-percent power to 125-percent power with the SRMs and IRMs inserted. The only event that would require the long-term monitoring of neutron flux is an anticipated transient without scram (ATWS) event. The neutron monitoring system is qualified for ATWS conditions.

The drywell atmosphere after an ATWS event remains similar to the condition during normal operation. The SRM and IRM drives and electronics are qualified for the normal drywell environment and thus for ATWS conditions. That is, during an ATWS, the SRMs and IRMs are expected to be inserted and be functional.

Most portions of the neutron monitoring systems (SRMs, IRMs, and APRMs) are designed, procured, installed and tested to standards more stringent than Category 3. However, some portions, notably the SRM and IRM drive mechanisms and controls and the neutron monitoring system power sources, do not meet Category 1 requirements. Since there is a large number of neutron monitoring system channels (4 SRMs, 8 IRMs and 6 APRMs plus individual LPRM channels) that have a proven level of high reliability and the ATWS mitigation features have a lower importance to safety systems, a Category 3 classification for neutron flux instrumentation is considered appropriate.

Conclusions

. Neutron monitoring instrumentation meets standards much more stringent than Category 3 but do not meet Category 1 requirements. But, due to the proven reliability of the instrumentation and the large number of channels, the system as it is currently installed, meets the intent of the guide.

Issue 2A and 2B Variable B4

Coolant Level in Reactor

Issue Definition A

Regulatory Guide 1.97 requires redundant instruments for Category 1 variables. For reactor coolant level, redundant instruments would be available with a range from 1/3 core height to 228 inches above the top of active fuel (TAF). Contrary to that, redundancy is not provided for the full range.

Discussion A

Three instrument ranges are being used to cover the total range: post-accident flooding (-100 to +200 inches with zero at TAF), emergency system flooding (-155 to +60 inches with zero, at instrument zero), and shutdown vessel flooding (0 to 400 inches with zero at instrument zero). Redundancy is provided for the postaccident flooding and the emergency system flooding ranges. Only one instrument is provided for the shutdown vessel flooding range. This range takes its reference leg from the top of the reactor head. In order to provide a second channel, an additional head penetration would be needed. No manual or automatic functions are initiated from the shutdown flooding range. Providing an additional channel would not result in any improvement in plant safety since no action is taken. A redundant channel, therefore, will not be implemented.

Conclusion A

The redundancy provided for two of the three instrument ranges satisfies the intent of the guide and no redundant channel will be provided for the shut-down vessel flooding range.

Issue Definition B

Regulatory Guide 1.97 states that recording of instrumentation readout information be provided for at least one redundant channel. Contrary to that, no recorder from a qualified instrument channel will be provided.

Discussion B

Two independent qualified channels for indication are provided in the control room for the postaccident flooding range and the emergency system flooding range. They will not, however, have a recording device from a qualified channel in the control room. This information is not essential for the operator's direct and immediate trend or transient information. However, a level recorder from a nonqualified instrument loop is provided for both ranges. These ranges will also be included in the database for the Safety Parameter Display System (SPDS).

Conclusion B

Two independent control room indicators from qualified instrument loops for the postaccident flooding range and the emergency system flooding range is sufficient for operator's use during accident conditions. These ranges will also be input to the SPDS.

Issue 3

Variable B6

RCS Pressure

Issue Definition

Regulatory Guide 1.97 states that recording of instrumentation readout information will be provided for at least one redundant channel. Contrary to that, no recorder from a qualified instrument channel will be provided for RSC pressure.

Discussion

Reactor pressure is a Category 1 Type B variable. Two independent qualified channels for indication are provided in the control room. This parameter will not, however, have a recording device from a qualified channel in the control room. This information is not essential for the operator's direct and immediate trend or transient information. It does, however, have a pressure recorder displayed in the control room that gets its signal from a nonqualified instrument loop that the operators use during normal operation. Reactor pressure will also be included in the database for the Safety Parameter Display System (SPDS).

Conclusions

Two independent control room indicators from a qualified instrument loop for reactor pressure is sufficient for operator's use during accident conditions. The reactor pressure will also be input to the SPDS.

Issue 4 Variables B8 and C6

Equipment Drain Sump Flow Integrator (Identified Leakage)

Floor Drain Sump Flow Integrator (Unidentified Leakage)

Common Flow Recorder (Total Leakage)

Issue Definition

Regulatory Guide (RG) 1.97 requires Category 1 instrumentation to monitor drywell sump level and drywell drain sump level. These designations refer to the drywell equipment and floor drain tank levels. Category 1 instrumentation indicates that the variable being monitored is a key variable. In RG 1.97, a key variable is defined as "...that single variable (or minimum number of variables) that most directly indicates the accomplishment of a safety function...." The following discussion supports the alternative position that the equipment drain sump flow integrator satisfies the intent of the drywell sump level of RG 1.97 and the floor drain sump flow integrator satisfies the intent of the drywell drain sump level of RG 1.97. The instrumentation should be classified as Category 3 instrumentation.

Discussion

The BWR Mark I drywell for Browns Ferry has two drain sumps. One drain is the equipment drain sump, which collects identified leakage; the other is the floor drain sump, which collects unidentified leakage. The drywell leak detection system is designed to indicate, measure, and record leakage rates within the drywell. Although the level of the sumps can be a direct indication of breach of the reactor coolant system boundary, the indication is ambiguous because there is water in the sumps during normal operation. There is other instrumentation in the drywell leak detection system that would better indicate the amount of leakage through the drywell equipment and floor drains, and there is other instrumentation required by RG 1.97 that also indicates leakage into the drywell.

The drywell leak detection system has a preset level in the sump which starts the sump pumps and pumps the effluent to the radwaste system. The effluent flow rate is integrated with respect to time to determine the number of gallons removed from the sump. If the pumps run too long or too frequent, an annunciator alarms alerting the operator of the abnormal leak rate. The instrumentation necessary in the control room to provide the operator with the leakage amount is (1) the drywell equipment drain sump flow integrator, (2) the drywell floor drain sump flow integrator, and (3) a common flow recorder. Thus, these three instruments indicate the amount of drywell leakage.

Regulatory Guide 1.97 requires instrumentation to function during and after an accident. The drywell sump systems are deliberately isolated at the primary containment penetration upon receipt of a Group 2 isolation signal to establish containment integrity. The sump systems isolate on a reactor

low water level signal and a high drywell pressure signal. This fact renders the sump flow recorders irrelevant. Therefore, by design, this instrumentation serves no useful accident monitoring function and should be classified as Category 3.

However, as stated previously, there is other instrumentation required by RG 1.97 that also indicates leakage into the drywell. They are:

1. Drywell pressure - variable A2, Category 1
2. Drywell temperature - variable A3, Category 1
3. Primary containment area radiation - variable C4, Category 3

<u>Conclusions</u>

Based on the above discussions, the drywell equipment drain sump flow integrator, drywell floor drain sump flow integrator, and the common flow recorder satisfy the function of providing an indication of increasing drywell leakage before containment isolation. This instrumentation should be classified as Category 3.

Issue 5 Variable B9

Primary Containment Pressure

Issue Definition

Regulatory Guide 1.97 requires Category 1 instrumentation to monitor primary containment pressure. Category 1 instrumentation indicates that the variable being monitored is a key variable, where a key variable is defined as "... that single variable (or minimum number of variables) that most directly indicates the accomplishment of a safety function ...." The following discussion supports the position that the drywell pressure satisfies the intent of providing the primary containment pressure.

Discussion

Primary containment pressure is monitored by the drywell pressure instrumentation which is classified as Category 1 Type A variable. The drywell and torus pressure may not be equal at all times; however, the drywell vacuum breakers have been designed to give assurance that torus pressure does not exceed drywell pressure by more than 2 psi. Also, the drywell pressure cannot exceed the torus pressure by greater than 1.5 psi due to the vent piping connections below the torus water level. Drywell/torus differential pressure is bounded by $1.5 < \Delta P < 2$ psi. Therefore, drywell pressure can be used as an indication of torus pressure and drywell pressure provides the key variable for monitoring primary containment pressure.

Conclusion

The key variable for primary containment pressure is provided by drywell pressure which is a Category 1, Type A variable.

Primary Containment Isolation Valve Position

Issue Definition

Regulatory Guide 1.97 requires Category 1 indication of the primary containment isolation valve position for the verification of accomplishing containment isolation. Table 6.1 lists the isolation valves which will have their position indicated in the control room. Table 6.2 lists the isolation valves excluding check valves, which will not have their position indicated in the control room.

Discussion

Table 6.2 lists the valves which will not have control room position indication. The notes for this table provide the basis for this position.

Conclusions

The present configuration as listed in tables 6.1 and 6.2 fully satisfies the intent of RG 1.97.

TABLE 6.1

Primary Containment Isolation Valves Having Control Room Position Indication

Valve Name	Valve Number	Power Supply	Control Room Panel	Notes
Main Steam Line Isolation Valve	1-14	Class 1E	9-3	
Main Steam Line Isolation Valve	1-15	Class 1E	9-3	
Main Steam Line Isolation Valve	1-26	Class 1E	9-3	
Main Steam Line Isolation Valve	1-27	Class 1E	9-3	
Main Steam Line Isolation Valve	1-37	Class 1E	9-3	
Main Steam Line Isolation Valve	1-38	Class 1E	9-3	
Main Steam Line Isolation Valve	1-51	Class 1E	9-3	
Main Steam Line Isolation Valve	1-52	Class 1E	9-3	
Main Steam Line Drain Valves	1-55	Class 1E	9-3	
Main Steam Line Drain Valves	1-56	Class 1E	9-3	
Control Air	32-62	Class 1E	9-20	
Control Air	32-63	Class 1E	9-20	
Sampling and Water Quality	43-13	Class 1E	9-15	
Sampling and Water Quality	43-14	Class 1E	9-5	
Heating and Ventilation Air Flow	64-17	RPS	9-3	(1)
Heating and Ventilation Air Flow	64-16	RPS	9-3	(1)
Heating and Ventilation Air Flow	64-19	RPS	9-3	(1)
Heating and Ventilation Air Flow	64-20	Class 1E	9-3	
Heating and Ventilation Air Flow	64-21	Class 1E	9-3	
Heating and Ventilation Air Flow	64-29	RPS	9-3	(1)
Heating and Ventilation Air Flow	64-30	RPS	9-3	(1)

TABLE 6.1

Primary Containment Isolation Valves Having Control Room Position Indication
(Continued)

Valve Name	Valve Number	Power Supply	Control Room Panel	Notes
Heating and Ventilation Air Flow	64-31	RPS	9-3	(1)
Heating and Ventilation Air Flow	64-32	RPS	9-3	(1)
Heating and Ventilation Air Flow	64-33	RPS	9-3	(1)
Heating and Ventilation Air Flow	64-34	RPS	9-3	(1)
Heating and Ventilation Air Flow	64-139	Class 1E	9-3	
Heating and Ventilation Air Flow	64-140	Class 1E	9-3	
Reactor Water Cleanup	69-1	Class 1E	9-4	
Reactor Water Cleanup	69-2	Class 1E	9-4	
Reactor Water Cleanup	69-12	Class 1E	9-4	
Reactor Core Isolation Cooling	71-2	Class 1E	9-3	
Reactor Core Isolation Cooling	71-3	Class 1E	9-3	
Reactor Core Isolation Cooling	71-6A	Class 1E	9-3	
Reactor Core Isolation Cooling	71-6B	Class 1E	9-3	
Reactor Core Isolation Cooling	71-7A	Class 1E	9-3	
Reactor Core Isolation Cooling	71-7B	Class 1E	9-3	
Reactor Core Isolation Cooling	71-14	Non-1E Battery Backed	9-3	
Reactor Core Isolation Cooling	71-32	Non-1E Battery Backed	9-3	
Reactor Core Isolation Cooling	71-39	Class 1E	9-3	
Reactor Core Isolation Cooling	71-40	Class 1E	9-3	(2)
High Pressure Coolant Injection	73-2	Class 1E	9-3	
High Pressure Coolant Injection	73-3	Class 1E	9-3	

TABLE 6.1

Primary Containment Isolation Valves Having Control Room Position Indication

Valve Name	Valve Number	Power Supply	Control Room Panel	Notes
High Pressure Coolant Injection	73-6A	Class 1E	9-3	
High Pressure Coolant Injection	73-6B	Class 1E	9-3	
High Pressure Coolant Injection	73-17A	Class 1E	9-3	
High Pressure Coolant Injection	73-17B	Class 1E	9-3	
High Pressure Coolant Injection	73-23	Class 1E	9-3	
High Pressure Coolant Injection	73-44	Class 1E	9-3	
High Pressure Coolant Injection	73-45	Class 1E	9-3	(2)
High Pressure Coolant Injection	73-81	Class 1E	9-3	
Residual Heat Removal	74-47	Class 1E	9-3	
Residual Heat Removal	74-48	Class 1E	9-3	
Residual Heat Removal	74-53	Class 1E	9-3	
Residual Heat Removal	74-54	Class 1E	9-3	
Residual Heat Removal	74-57	Class 1E	9-3	
Residual Heat Removal	74-58	Class 1E	9-3	
Residual Heat Removal	74-60	Class 1E	9-3	
Residual Heat Removal	74-61	Class 1E	9-3	
Residual Heat Removal	74-67	Class 1E	9-3	
Residual Heat Removal	74-68	Class 1E	9-3	(2)
Residual Heat Removal	74-71	Class 1E	9-3	
Residual Heat Removal	74-72	Class 1E	9-3	

TABLE 6.1

Primary Containment Isolation Valves Having Control Room Position Indication
(Continued)

Valve Name	Valve Number	Power Supply	Control Room Panel	Notes
Residual Heat Removal	74-74	Class 1E	9-3	
Residual Heat Removal	74-75	Class 1E	9-3	
Residual Heat Removal	74-77	Class 1E	9-3	
Residual Heat Removal	74-78	Class 1E	9-3	
Residual Heat Removal	74-102	Class 1E	9-3	
Residual Heat Removal	74-103	Class 1E	9-3	
Residual Heat Removal	74-119	Class 1E	9-3	
Residual Heat Removal	74-120	Class 1E	9-3	
Core Spray	75-25	Class 1E	9-3	
Core Spray	75-26	Class 1E	9-3	(2)
Core Spray	75-53	Class 1E	9-3	
Core Spray	75-54	Class 1E	9-3	(2)
Core Spray	75-57	Class 1E	9-3	
Core Spray	75-58	Class 1E	9-3	
Containment Inerting	76-17	RPS	9-3	(1)
Containment Inerting	76-18	RPS	9-3	(1)
Containment Inerting	76-19	RPS	9-3	(1)
Containment Inerting	76-24	RPS	9-3	(1)

TABLE 6.1

Primary Containment Isolation Valves Having Control Room Position Indication
(Continued)

Valve Name	Valve Number	Power Supply	Control Room Panel	Notes
Drywell Equipment Drain Valves	77-2A	RPS	9-4	(1)
Drywell Equipment Drain Valves	77-2B	RPS	9-4	(1)
Drywell Floor Drain Valves	77-15A	RPS	9-4	(1)
Drywell Floor Drain Valves	77-15B	RPS	9-4	(1)
Containment Atmospheric Dilution	84-8A	Class 1E	9-54	
Containment Atmospheric Dilution	84-8B	Class 1E	9-54	
Containment Atmospheric Dilution	84-8C	Class 1E	9-54	
Containment Atmospheric Dilution	84-8D	Class 1E	9-54	
Containment Atmospheric Dilution	84-19	Class 1E	9-55	
Containment Atmospheric Dilution	84-20	RPS	9-55	(1)
Containment Radiation Monitoring	90-254A	Class 1E	9-2	
Containment Radiation Monitoring	90-254B	Class 1E	9-2	
Containment Radiation Monitoring	90-255	Class 1E	9-2	
Containment Radiation Monitoring	90-257A	Class 1E	9-2	
Containment Radiation Monitoring	90-257B	Class 1E	9-2	

Notes: (1) Valve fails close on loss of power.
(2) This is a check valve which is not required to have control room position indication.

Table 6.2

Primary Containment Isolation Valves Not Having Control Room Position Indication (Excluding Check Valves)

Name	Valve Number	Note
Demineralized Water	2-1383	1
Compressed Air	33-1070	1
Sampling and Water Quality	43-28A	2
Sampling and Water Quality	43-28B	2
Sampling and Water Quality	43-29A	2
Sampling and Water Quality	43-29B	2
High Pressure Coolant Injection	73-24	3
Residual Heat Removal	74-722	1
Containment Inerting System	76-49	4
Containment Inerting System	76-50	4
Containment Inerting System	76-51	4
Containment Inerting System	76-52	4
Containment Inerting System	76-53	4
Containment Inerting System	76-54	4
Containment Inerting System	76-55	4
Containment Inerting System	76-56	4
Containment Inerting System	76-57	4
Containment Inerting System	76-58	4
Containment Inerting System	76-59	4
Containment Inerting System	76-60	4
Containment Inerting System	76-61	4
Containment Inerting System	76-62	4
Containment Inerting System	76-63	4
Containment Inerting System	76-64	4
Containment Inerting System	76-65	4
Containment Inerting System	76-66	4
Containment Inerting System	76-67	4
Containment Inerting System	76-68	4

1. This valve is locked closed.

2. Local control pushbutton energizes two valves (A and B) simultaneously. Valves are normally closed.

3. Valves locked open. Isolation provided by a check valve.

4. Isolation signal indicated on control room panel 9-54 for system A and 9-55 for system B. Keylock provides an isolation override. One handswitch per system controls all valves in that system from their respective control room panel. These valves are part of the H_2/O_2 monitoring system which is needed for post-accident monitoring.

Variable C1

Radioactivity Concentration or Radiation Level in Circulating Primary Coolant

Issue Definition

Regulatory Guide (RG) 1.97 specifies that the status of the fuel cladding be monitored during and after an accident. The specified variable to accomplish this monitoring is variable C1--radioactivity concentration or radiation level in circulating primary coolant. The range is given as "1/2 Tech Spec Limit to 100 times Tech Spec Limit, R/hr." In Table 2 of RG 1.97, instrumentation for measuring variable C1 is designated as Category 1. The purpose for monitoring this variable is given as "detection of breach", referring, in this case, to breach of fuel cladding.

Discussion

As stated above, the purpose of monitoring this variable is given as detecting a breach in the fuel cladding. The critical actions that must be taken to prevent and mitigate a gross breach of fuel cladding are (1) shut down the reactor and (2) maintain water level. Monitoring variable C1, as directed in RG 1.97, will have no influence on either of these actions, and no operator action based on this variable has been identified. The variable, therefore, should be Category 3.

Regulatory Guide 1.97 specifies measurement of the radioactivity of the circulating primary coolant as the key variable in monitoring fuel cladding status during isolation of the NSSS. The words "circulating primary coolant" are interpreted to mean coolant, or a representative sample of such coolant, that flows past the core. A basic criterion for a valid measurement of the specified variable is that the coolant being monitored is coolant that is in active contact with the fuel, that is, flowing past the failed fuel. Monitoring the active coolant (or a sample thereof) is the dominant consideration. The post-accident sampling facility (PASF), in response to NUREG-0737, provides a representative sample which can be monitored.

The subject of concern in the RG 1.97 requirement is assumed to be an isolated NSSS that is shut down. This assumption is justified as current monitors in the condenser off-gas and main steam lines provide reliable and accurate information on the status of fuel cladding when the plant is not isolated. Further, the post-accident sampling facility (PASF) will provide an accurate status of coolant radioactivity, and hence cladding status, once the PASF is activiated. In the interim between NSSS isolation and operation of the PASF, monitoring of the primary containment radiation and containment hydrogen will provide information on the status of the fuel cladding.

Conclusions

The designation of instrumentation for measuring variable C1 should be Category 3, because no planned operator actions are identified and no operator actions are anticipated based on this variable serving as the key variable. This variable will be monitored as Type E Category 3. See Variable E12.

Drywell and Torus Oxygen Concentration

Issue Definition

Regulatory Guide 1.97 has designated the containment and drywell oxygen concentration as a Category 1 variable for the detection of potential for a breach in the containment. The following discussion supports the position that the drywell and torus oxygen concentration should be classified as Category 3.

Discussion

The function of detection of a potential for a breach in the containment is also monitored by the following variables;

(1) Drywell pressure - Type A, Category 1
(2) Drywell and Torus Hydrogen Concentration - Type A, Category 1
(3) Reactor pressure - Type B, Category 1

The torus and drywell oxygen concentration is not used to initiate a safety function or to key the operator to perform a manual action. Browns Ferry's primary containment is operated with an oxygen deficient (i.e., inerted) atmosphere as one part of those measures for combustible gas control. The Containment Atmospheric Dilution (CAD) system is used following a postulated loss-of-coolant accident (LOCA) to dilute the containment atmosphere with nitrogen to maintain the hydrogen and oxygen concentrations below combustible levels. Hydrogen concentration is used at Browns Ferry to alert the operators to manually initiate the CAD System (H_2 concentration is a Type A variable). The O_2 concentration is used only as a surveillance instrument. NRC approved this configuration for units 1, 2, and 3 in technical specification amendments 38, 36, and 12 respectively.

Conclusion

Oxygen concentration is not a key variable and should be classified as Category 3.

Issue 9 Variables C13 and C14

Containment Effluent Radioactivity - Noble Gas (C13)

Effluent Radioactivity - Noble Gas (C14)

Issue Definition

Regulatory Guide 1.97 lists item C13 as containment effluent radioactivity - noble gases (from identified release points including Standby Gas Treatment System Vent) and item C14 as effluent radioactivity - noble gas (from buildings or areas where penetrations and hatches are located). These two variables have been addressed by NUREG-0737 item II.F.1.1.

Discussion

TVA has committed to installing a system to monitor the Browns Ferry stack for high-range noble gas with particulate and iodine collection on appropriate collection media in response to NUREG-0737, item II.F.1.1 and II.F.1.2.

The Browns Ferry plant is designed to have one designated release point; namely, the stack. The secondary containment features of the plant will isolate and/or realign to cleanup systems which exhaust to the designated release point. Therefore, there is a very low probability of a major release of activity within other plant zones such as the turbine building. If an accidental release does occur in other areas, a high-radiation alarm is received and the effluent vent dampers (variable D24) and fans can be quickly isolated. Since release paths such as the turbine building vents do not have cleanup systems, the isolation and/or shutdown of these ventilation system exhausts are stopped, it is not possible to determine quantitative releases.

Conclusions

The variables C13 and C14 are encompassed by the scope of the above described system and will be installed as Category 3 variables.

Issue 10 Variables D3 and D8

Suppression Pool Spray Flow

Drywell Spray Flow

Issue Definition

Regulatory Guide 1.97 specifies flow measurements of suppression pool spray (variable D3) and drywell spray (variable D8) for monitoring the operation of the primary containment-related systems. Instrumentation for measuring these variables is designated Category 2, with a range of 0 to 110 percent of design flow. These flows relate to spray flow for controlling pressure and temperature of the drywell and suppression pool. The following discussion supports the position that these variables are not needed.

Discussion

The drywell sprays can be used to control the pressure and temperature of the drywell. Likewise, the suppression pool sprays can be used to control the pressure and temperature in the torus. The flow to the sprays is monitored by a flow element which is common to both the drywell spray flow and the suppression pool spray flow. This flow element is monitored as variable D16, LPCI flow. The operator can determine that the indicated flow is the flow that is being diverted to the sprays by observing the position (in the main control room) of the valves in the RHR line. The effectiveness of these flows can be verified by pressure and temperature changes of the drywell and the torus. The drywell pressure and drywell temperature instrumentation have been classified as Category 1.

Conclusion

The current plant design, in conjunction with operating practice, provides for operator information that is sufficient for determining the existence of spray flows to the drywell and suppression pool without the use of a dedicated flow-measuring instrument. Dedicated instruments, therefore, are not needed.

Issue 11 Variable D17

Standby Liquid Control System (SLCS) Flow

Issue Definition

Regulatory Guide (RG) 1.97 requires a Category 2, Type D instrument for indicating standby liquid control system (SLCS) flow in the control room. The purpose of this instrument is to monitor the operation of the standby liquid control system. The following discussion justifies TVA's position that SLCS flow is not needed in the control room.

Discussion

The SLCS flow, as discussed in RG 1.97, is to monitor the operation of the (SLCS). The SLCS tank level is monitored in the control room along with pump operation. When the squib valves are opened and SLCS pumps started, the total contents of the tank are pumped to the reactor. Flow through the line to the reactor is indicated by an annunciator and a white light. The actual amount of flow to the reactor is not relevant since the total volume of the tank is to be pumped. SLCS operation is adequately monitored by (1) tank level decreasing, (2) pump operability indication, and (3) neutron flux response. The indication of the amount of flow is not necessary to ensure system operation.

Conclusion

The SLCS flow is not a necessary parameter for monitoring system operation and will not be implemented at Browns Ferry.

Issue 12 Variable D23

High Radioactivity Liquid Tank Level - Radwaste System

Issue Definition

Regulatory Guide 1.97 states that high radioactivity liquid tank level (i.e., liquid level of the floor drain collector tank of the radwaste system) is a Type D Category 3 and is used to monitor the operation of the system. The following discussion supports the position that the variable is not needed for post-accident monitoring.

Discussion

The radioactive waste systems are designed to dispose of the radioactive process wastes generated during plant operation. The system is designed to prevent the inadvertent release of significant quantities of radioactive material from the restricted area of the plant so that resulting exposures are within the guideline values of 10CFR20. The radwaste facility is located in the Radwaste Building. The Radwaste Building has been designed to withstand a design basis earthquake (DBE). Should the floor drain collector tank fail or overfill before isolation, the spilled liquid would be retained in the building. Because the leaks or spills from the radwaste system are retained within the radwaste building and have little or no effect on the site boundary dose rate and the radwaste system is not required after a DBA, the level of the floor drain collector tank is not required to monitor the operation of the system.

Conclusions

The level of the floor drain collector tank is not required for post-accident monitoring. It does not add to the safe operation of the system nor is it necessary to maintain offsite release rates below the guidelines. It, therefore, will not be implemented.

Issue 13 Variable E2

Reactor Building or Secondary Containment Area Radiation

Issue Definition

Regulatory Guide 1.97 specifies that "Reactor building or secondary containment area radiation" should be monitored over the range of 10^{-1} to 10^{4} R/h as a Category 2 variable. The reason for monitoring this parameter is for detection of a significant release from the primary containment.

Discussion

The use of local radiation monitors to detect a breach or leakage through primary containment penetrations is inappropriate. In general, radiation in the secondary containment will be largely a function of radioactivity in primary containment and in the fluids flowing in ECCS piping, which will cause direct radiation shine on the area monitors. Also, because of the amount of piping and the number of electrical penetrations and hatches and their widely scattered locations, local area radiation monitors could give ambiguous indications. The proper way to detect a breach of containment is by using the stack noble gas monitors (C13 and C14).

Conclusions

Variables C13 and C14 satisfy the intent of this parameter; therefore, the reactor building area radiation monitors will not be implemented.

Issue 14 Variable E3

Radiation Exposure Rate

Issue Definition

Regulatory Guide 1.97 specifies in Table 2, variable E3, that radiation exposure rate (inside buildings or areas where access is required to service equipment important to safety) be monitored over the range of 10^{-1} to 10^4 R/hr for detection of significant releases, for release assessment, and for long-term surveillance.

Discussion

In general, access is not required to any area of the secondary containment in order to service equipment important to safety in a post-accident situation. If and when accessibility is reestablished in the long term, it will be done by a combination of portable radiation survey instruments and post-accident sampling of the secondary containment atmosphere. The existing lower range (.1 to 10^3 mr/hr) area radiation monitors would be used only in those instances in which radiation levels were very mild.

Conclusions

Since access to a harsh environment area to service safety-related equipment during an accident is not required, this parameter should be modified to allow credit for existing area radiation monitored with lower range.

Issue 15 Variable E12

Primary Coolant and Sump

Issue Definition

Regulatory Guide 1.97 requires installation of the capability of obtaining grab samples of the containment sumps, ECCS pump-room sumps, and other similar auxiliary building sumps for the purpose of release assessment, verification, and analysis.

Discussion

Primary coolant and sump monitoring were addressed in TVA's response to NUREG-0737, item II.B.3, post-accident sampling facility (PASF). Gross activity, gamma spectrum, boron content, chloride content, dissolved hydrogen, dissolved oxygen, and pH determination are made available. Grab samples are taken from the reactor coolant and containment atmosphere. It is TVA's position that NUREG-0737, item II.B.3, satisfies the intent of this item.

Conclusions

NUREG-0737, item II.B.3, satisfies the intent of variable E12. It, therefore, will not be implemented.

Containment Air - Grab Sample

Issue Definition

Regulatory Guide 1.97 specifies the capability to obtain containment air grab samples for hydrogen content, oxygen content, and gamma spectrum analysis.

Discussion

The hydrogen and oxygen concentration of the containment air is monitored by variables A1 and C11 for hydrogen and C12 for oxygen. The gamma spectrum analysis is provided by the post-accident sampling facility in response to NUREG-0737, item II.B.3.

Conclusions

The above discussion satisfies the intent of variable E13.