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HODGES,M.W. Region 1 (Post 820201)

SUBJECT: Forwards response to NRC 910322 request for clarification of util position on implementation of Reg Guide 1.97,Rev 3 & Suppl 1 to NUREG-0737, "Comparison of Post-Accident Instrumentation."

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ROBERT C. MECREDY
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March 13, 1992

U.S. Nuclear Regulatory Commission
Attn: Marvin W. Hodges
Director, Division of Reactor Safety
475 Allendale Road
King of Prussia, PA 19406

Subject: NUREG-0737 Supplement 1/Regulatory Guide 1.97:
Comparison of Ginna Post Accident Instrumentation
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Ref. 1. Letter from M. Hodges (NRC) to R. Mecredy (RG&E), "Ginna Station's Conformance to Regulatory Guide 1.97, revision 3," dated March 22, 1991.

Ref. 2. Letter from R. Mecredy (RG&E) to M. Hodges (NRC), same subject, dated May 16, 1991

Dear Mr. Hodges:

By letter dated March 22, 1991 (Reference 1), your office requested information clarifying RG&E's position regarding implementation of Regulatory Guide 1.97, revision 3 at Ginna Station. Reference 2 provided a detailed response to this request. As part of this response RG&E offered to provide a comparison of existing Ginna Station instrumentation attributes with the criteria provided in Regulatory Guide 1.97, revision 3. Attachments 1, 2, and 3 of this letter provide this comparison. Attachment 1 details how RG&E categorizes post accident instruments and what qualification is applied to these categories. Attachments 2 and 3 provide a comparison of the variables and criteria provided in Regulatory Guide 1.97, revision 3 Table 3 to post accident instrumentation at Ginna Station. It should be noted that this effort has resulted in reclassifying Pressurizer Safety Valve Position indication as a Type D variable (previously Type A). This new classification is consistent with Regulatory Guide 1.97 revision 3.

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As previously stated, RG&E wishes to emphasize that this comparison does not imply a commitment to Regulatory Guide 1.97. We feel that NUREG 0737 Supplement 1 is the appropriate basis for post accident instrumentation criteria at Ginna Station.

Very truly yours,

Robert C. Mecredy

BJF/215
Attachments

xc: U.S. Nuclear Regulatory Commission
Document Control Desk
Attn: Mr. Allen R. Johnson (Mail Stop 14D1)
PWR Project Directorate I-3
Washington, D.C. 20555

Ginna Senior Resident Inspector

Attachment 1

RG&E Post Accident
Instrumentation/Regulatory Guide 1.97, Rev. 3
Comparison of Classification, Categorization
and Qualification Criteria

1. Classification

Post accident instrumentation at Ginna is classified according to the following criteria:

Type A: Indication required by the operator during performance of an Emergency Operating Procedure (EOP), in response to a design basis accident, to determine if manual actions are required in order to accomplish required safety functions for which no automatic action is provided.

Type B: Indication used by the operator during performance of an Emergency Operating Procedure (EOP), in response to a design basis accident, to verify that required automatic or manual safety functions have been accomplished.

Type C: Indication used by the operator during performance of an Emergency Operating Procedure (EOP), in response to a design basis accident, to determine if any of the barriers to fission product release have been, or may be breached.

Type D: Indication used by the operator during performance of an Emergency Operating Procedure (EOP), in response to a design basis accident, to determine that a safety system or system important to safety has actuated.

Type E: Indication used by the operator to determine the magnitude of a radioactive release, and to continually assess the release.

RG&E believes this to be consistent with Regulatory Guide 1.97, revision 3.

2. Categorization

Category 1: Type A variables and key (primary) Types B and C variables make up Category 1.

Category 2: Key (primary) Types D and E variables make up Category 2

Category 3: Backup Types B, C, D and E variables make up Category 3.

RG&E believes this to be consistent with Regulatory Guide 1.97, revision 3.

3. Equipment Qualification

Environment: Those portions of Category 1 or 2 post accident instrumentation channels located in harsh environments are qualified for their design basis accident environments in accordance with the Ginna 10CFR50.49 Environmental Qualification Program. Design Basis Accident Environments are specified in the Ginna UFSAR Table 3.11-1. Those portions of post accident instrumentation channels located in mild environments do not require environmental qualification.

Seismic: Category 1 post accident instrumentation is seismically qualified in accordance with the Ginna Seismic Qualification Program (UFSAR Chapter 3.10) with the following clarifications:

1. Seismic qualification for analog indicators was generally not provided for those indicators in place before 1983 regardless of category. Only those portions of the channel that performed a safety function (i.e. RPS or ESF actuation) were qualified.

2. Seismic qualification is not considered necessary for recorders unless they provide the sole indication for a Category 1 variable.

3. Seismic qualification for inputs to the plant process computer is provided only up to the isolating device feeding the computer input. The SAS/PPCS is not seismically qualified.

4. Only the mounting of status light housings is considered seismically qualified. Light bulbs are considered "commercially rugged" and can be reasonably expected to survive an earthquake.

4. Redundancy

Redundant channels are provided for Category 1 post accident instrumentation channels. Each redundant channel is electrically independent. Physical separation between redundant channels in the field is maintained in accordance with the Ginna design criteria in effect at the time of the equipment's installation, for the classification of the equipment at that time. If the classification of installed equipment changes, the need to provide separation is analyzed on a safety impact basis. Therefore, field separation may not be provided for all category 1 redundant channels. Physical separation is not maintained in the control room. Within each redundant division of a safety system, redundant monitoring channels are not required except for steam generator wide range level.

5. Power Source

Instrumentation at Ginna generally receives power from one of eight sources.

1. Instrument Bus 1A (safety related battery backup)
2. Instrument Bus 1B (safety related emergency AC backup)
3. Instrument Bus 1C (safety related battery backup)
4. Instrument Bus 1D (non safety related)
5. Inverter MQ-483 (safety related battery backup)
6. Technical Support Center (T.S.C.) battery bus
7. 'A' 125 V dc safety related battery bus
8. 'B' 125 V dc safety related battery bus

Instrument Buses 1A, 1B, 1C, Inverter MQ-483, 'A' 125 V dc bus, and 'B' 125 V dc bus are considered safety related power sources suitable for all post accident instrumentation categories. The TSC battery bus is considered a highly reliable power source suitable for Categories 2 and 3 variables. Instrument bus 1D is considered a reliable power source suitable for Category 3 variables.

The Safety Assessment System/Plant Process Computer System (SAS/PPCS) receives power from the TSC battery.

RG&E believes this to be consistent with Regulatory Guide 1.97, revision 3.

6. Channel Availability

Instrument channel availability and allowable out of service times are in accordance with Ginna technical specification requirements for the associated system when the instrument channel operability is necessary for the functionality of the system. Specific Technical Specifications are provided in table 3.5-3 for severe post accident instrument channels.

RG&E believes this to be consistent with Regulatory Guide 1.97, revision 3.

7. Quality Assurance

RG&E maintains an approved 10CFR50 Appendix B Quality Assurance Program which is based on the ANSI/ANS 51.1 Standard. Three quality categories exist:

1. Safety Related Class (SR)
2. Safety Significant Class (SS)
3. Non-Safety Class (NS)

Criteria for safety classification is contained in the Ginna Station Quality Assurance Manual Appendix A. The Safety Related Class (SR) provides for full program control and is considered suitable for any category of post accident instrumentation. The Safety Significant Class (SS) provides augmented quality control based on the importance to safety of the device or activity and is considered suitable for categories 2 or 3 variables, and certain portions of category 1 channels (recorders, secondary indicators). The Non-Safety Class (NS) provides normal commercial grade quality control which may be suitable for some category 3 variables.

Procurement of post accident instrumentation equipment currently installed was in accordance with the Quality Assurance Program in effect at the time of the procurement for the classification of the equipment at that time. Future procurement, maintenance, calibration, and design controls will be in accordance with the program as described above.

8. Display/Recording

Several types of display instrumentation are available:

1. Analog Indicators
2. Digital Indicators
3. Strip Chart Recorders
4. Safety Assessment System/Plant Process Computer System (SAS/PPCS)
5. Multipoint Recorders
6. Status Lights

All types of instrumentation may be suitable for any category of post accident instrumentation. The SAS/PPCS has the capability of providing historical trends of any available channel and is considered a suitable recording device for any category of post accident instrumentation. Variables recorded at Ginna, and the capabilities of the recording devices were provided to the NRC in response to Generic Letter 83-28 Item 1.2, "Post-Trip Review: Data and Information Capability". The acceptability of this configuration is documented by NRC SER dated November 5, 1990.

Recording of digital inputs (e.g., breaker lights, valve position) regardless of category is generally not provided.

Decisions regarding whether or not recording is provided, and what type of recording is provided is based on the Ginna Emergency Operations Procedures and the ability of the device to capture all significant transient response information associated with the specific variable.

RG&E believes this to be consistent with Regulatory Guide 1.97, Revision 3.

9. Range

Post accident instrument ranges are selected based on both normal operational requirements for accuracy and readability, and also so that the indication remains on scale for design basis accident conditions if practicable. In some situations multiple instruments with overlapping spans are provided to accomplish this. Range requirements for "beyond design basis accidents" are evaluated and are provided for on a safety benefit basis.

10. Equipment Identification

Labelling of instrumentation at Ginna is in accordance with the Ginna Human Factors Program. Common designation of post accident instrumentation is not provided. Common designation would only be appropriate where several redundant instrument channels are provided of which only a few are post accident qualified. This is generally not the case at Ginna.

11. Interfaces

For post accident instrumentation that is part of a safety related system, isolation is provided between those safety related portions of the channel and the indication. Isolation between post accident indication and other uses (controllers, alarms) is not necessarily provided.

12. Servicing, Testing, and Calibration:

Periodic checking, testing, calibration, and calibration verification are in accordance with Ginna Technical Specifications tables 4.1-1, 4.1-2, and 4.1-3 where applicable. Calibration frequencies are specified in order to maintain the functionality of the monitoring instrument, and are adjusted as dictated by historical data.

RG&E believes this to be consistent with Regulatory Guide 1.97, Revision 3.

13. Human Factors

Post accident instrumentation types and locations are in accordance with the RG&E Human Factors Program and Detailed Control Room Design Review, which has been approved by the NRC.

RG&E believes this to be consistent with Regulatory Guide 1.97, Revision 3.

14. Direct Measurement

To the extent practicable direct measurement of monitored variables is provided. When indirect measurement is used it is evaluated to ensure that unambiguous information is provided, such that resulting operator action is consistent with the action that would result if direct measurement of the variable were provided.

RG&E believes this to be consistent with Regulatory Guide 1.97, Revision 3.

Attachment 2

Explanation of Table 1 Entries

Table 1 consists of thirteen entries for each variable: a sequential number (#), the variable type (TYPE), the variable description (VARIABLE), category (CAT), range (RANGE), the equipment environmental qualification status (EEQ), seismic qualification status (SEISMIC), the quality assurance program classification of the equipment (QA), the power source for the channel (P.S.), whether or not there is control room indication of the variable (CR IND), whether or not recording is provided via discrete recorders (CHART), or the plant process computer (COMP) and any comments on the variable (COMMENTS). Entries in bold are from Regulatory Guide 1.97, revision 3. Entries below each bold entry depict Ginna Station configurations. Any entries in parenthesis represent proposed configurations not currently installed.

Specific entries are explained below:

TYPE

RG 1.97:

B,C,D,E as in Regulatory Guide 1.97, revision 3. (n.a. is entered for Type A variables since they are not provided in the guide)

Ginna:

A,B,C,D,E as described in the classification section of Attachment 1. (n.a. is entered for variables that although listed in Regulatory Guide 1.97, revision 3, are not considered post accident variables at Ginna Station).

VARIABLE

RG 1.97:

description as in Regulatory Guide 1.97, rev. 3

Ginna:

equipment identification numbers of the primary instruments which monitor the variable.

CATEGORY

RG 1.97:

1,2,3 as per RG 1.97, rev. 3

Ginna:

1,2,3 as per Ginna Station post accident instrumentation categorization (see attachment 1). If the channel is not considered post accident instrumentation at Ginna (n.a. under TYPE) then this entry represents the current level of qualification of the channel.

RANGE

RG 1.97:

'plant specific'	range not specified in Rg 1.97 rev. 3
'range'	range as specified in Rg 1.97, rev. 3

Ginna:

'range'	range of primary indicator used to monitor the variable at Ginna Station

EEQ

RG 1.97:

yes	signifies environmental qualification in accordance with RG 1.89 is recommended
no	signifies environmental qualification is not required

Ginna:

yes	signifies environmental qualification in accordance with the Ginna Station 10CFR50.49 compliance program (UFSAR Section 3.11) is provided
no	signifies environmental qualification is not provided
mild	signifies the primary device is located in a mild environment during its post accident function and therefore environmental qualification is not provided
(yes)	signifies environmental qualification in accordance with the Ginna Station 10CFR50.49 compliance program is planned but not yet complete.

SEISMIC

RG 1.97:

yes	signifies seismic qualification in accordance with Rg 1.100 is recommended
no	signifies seismic qualification is not required

Ginna:

yes	signifies seismic qualification in accordance with the Ginna Seismic qualification program is provided. Seismic qualification at Ginna is currently being resolved under USI-46.
no	signifies seismic qualification is not provided
(yes)	signifies seismic qualification is proposed but not yet provided

Seismic qualification only applies to the primary variable indication and those portions of the instrument loop necessary for this indication to function. Recorders are not seismically qualified unless they are the primary indicator. The plant process computer is not seismically qualified.

QA Category

RG 1.97:

full	Quality Assurance in accordance with RGs 1.28, 1.30, 1.38, 1.58, 1.64, 1.74, 1.88, 1.123, 1.144, and 1.146 is recommended.
partial	Quality Assurance commensurate with the importance to safety of the instrument should be provided.
comm	Quality Assurance through high quality commercial practices should be provided.

Ginna:

SR	(SAFETY RELATED) Quality Assurance in accordance with the Ginna Station 10CFR50 Appendix B QA program for safety related devices. (see attachment 1)
SS	(SAFETY SIGNIFICANT) Quality Assurance in accordance with the Ginna Station 10 CFR50 Appendix B QA program for devices important to plant safety. (see attachment 1)
NS	(NON-SAFETY) Quality Assurance provided through commercial control practices and not covered under the Ginna Station 10CFR50 Appendix B QA program.

POWER SUPPLY

RG 1.97:

1E	power provided in accordance with RG 1.32 with battery backup if momentary loss cannot be tolerated should be provided
rel	a high reliability power source with battery backup if momentary loss cannot be tolerated should be provided.
n.p.	no provision made in RG 1.97 rev. 3

Ginna:

1A	A safety related power supply (1E) provided from instrument bus 1A. Safety related battery A supply precludes momentary loss of power.
1B	A safety related power supply (1E) provided from instrument bus 1B. No battery backup is provided. Emergency onsite power is provided by Emergency Diesel Generator A.
1C	A safety related power supply (1E) provided from instrument bus 1C. Safety related battery B supply precludes momentary loss of power.
MQ-483	A safety related power supply from inverter MQ-483. Safety related battery A supply precludes momentary loss of power.

1D	A non safety related power supply from instrument bus 1D. No battery backup is provided, nor emergency onsite source.
TSC	A highly reliable onsite power source with battery backup to preclude momentary loss of power
ADC	Safety Related battery bus A
BDC	Safety Related battery bus B

C.R. IND

RG 1.97:

yes	continuous realtime display should be provided
no	continuous display in the control room is not necessary

Ginna:

yes	Control Room indication, separate from a recorder is provided
no	Control Room indicator (other than plant process computer or recorder) is not provided.

note: the equipment identification number is provided if appropriate.

RECORDER

RG 1.97:

'plant specific'	recorder shall be provided if trend information on the variable is used by operators during post accident recovery.
no	recording is not required

Entries for Ginna are subdivided between CHART and COMP:

CHART

Ginna:

yes	a control room recorder is provided. The equipment identification number is provided if appropriate
no	no recorder is provided

COMP

Ginna:

yes	the variable is available on the plant process computer. (The point identification is given if appropriate)
no	the instrument does not input to the computer.

BJF/021

Attachment 3
Table 1
Comparison of Ginna Post Accident Instrumentation to Regulatory Guide 1.97, Revision 3 Criteria

#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
1	n.a.	Aux Feedwater Flow	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	FT-2001 (MDAFW/SGA)	1	0 - 275 gpm (0-138%)	mild	yes	SR	1A	FI-2021A	no	F2021	two per redundant function provided
		FT-2013 (MDAFW/SGA)	1	0 - 275 gpm (0-138%)	mild	yes	SR	1C	FI-2029	no	F2029	
		FT-2002 (MDAFW/SGB)	1	0 - 275 gpm (0-138%)	mild	yes	SR	1C	FI-2022A	no	F2022	
		FT-2014 (MDAFW/SGB)	1	0 - 275 gpm (0-138%)	mild	yes	SR	1A	FI-2030	no	F2030	
		FT-2006 (TDAFW/SGA)	1	0 - 500 gpm (0-125%)	mild	yes	SR	1C	FI-2023A	no	F2023	
		FT-2007 (TDAFW/SGB)	1	0 - 500 gpm (0-125%)	mild	yes	SR	1A	FI-2024A	no	F2024	also satisfies #69
2	n.a.	Standby Aux. Feed	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	FT-4084	1	0-250 gpm (0-125%)	mild	yes	SR	1A	FI-4084	no	F4084	one per redundant function provided
		FT-4085	1	0-250 gpm (0-125%)	mild	yes	SR	1C	FI-4085	no	F4085	
3	n.a.	Core Exit Thermocouples	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	T1 - T39	1	0-2300 °F	yes	yes	SR	1A 1C	CETA CETB	no	yes	39 CET's are provided. Technical Specifications require a minimum of four operable per quadrant. 19 CET's are associated with the A train and 20 with the B Train. also satisfies #'s 30,37
4	n.a.	Containment High Radiation Monitor	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	R29	1	1 R/hr - 1E7 R/hr	yes	yes	SR	1A	RM-29	yes	R29	
		R30	1	1 R/hr - 1E7 R/hr	yes	yes	SR	1C	RM-30	yes	R30	also satisfies item #84
5	n.a.	Containment Hydrogen Monitor	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	CONTH2MONT-1A	1	0-10 %	yes	yes	SR	1A	no	yes*	CVHA	* although the recorders are the only control room indication of Containment H2 concentration, they are not considered the primary indicator. The H2 Monitor panels in the Relay room provide primary indication. also satisfies item #46
		CONTH2MONT-1B	1	0-10 %	yes	yes	SR	1C	no	yes*	CVHB	

Comparison of Ginna Post Accident Instrumentation to Regulatory Guide 1.97, Revision 3 Criteria

#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
6	n.a	Containment Pressure	1	Plant Specific	yes	yes	full	1E	yes	Plant Specific	
	A	PT-945	1	0-60 psig	yes	yes	SR	1A	PI-945	no	P0945	*These recorders are proposed to be removed
		PT-946	1	10-200 psia	yes	yes	SR	1B	PI-946	yes*	no	with inputs to the SAS/PPCS provided
		PT-947	1	0-60 psig	yes	yes	SR	1C	PI-947	no	P0947	instead.
		PT-948	1	10-200 psia	yes	yes	SR	1C	PI-948	yes*	no	
		PT-949	1	0-60 psig	yes	yes	SR	1B	PI-949	no	P0949	
		PT-950	1	10-200 psia	yes	yes	SR	MQ-483	PI-950	no	no	also satisfies items #35,41
7	n.a.	Condensate Storage Tank Level	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	LT-2022A (tank A)	1	0-24 ft	mild	yes	SR	1A	LI-2022A	no	L2022A	The transmitters are not located in a Seismic
		LT-2022B (tank B)	1	0-24 ft	mild	yes	SR	1C	LI-2022B	no	no	Category 1 building. The tanks are connected by a locked open 10" line.
8	n.a.	Pressurizer Pressure	1	Plant Specific	yes	yes	full	1E	yes	plant	specific	
	A	PT-429	1	1700-2500 psig	yes	yes	SR	1A	PI-429	PR-429	P0429	PR-429 has the capability of recording any
		PT-430	1	1700-2500 psig	yes	yes	SR	1B	PI-430	PR-429	P0430	one of the four channels at a time (switch
		PT-431	1	1700-2500 psig	yes	yes	SR	1C	PI-431	PR-429	P0431	selectable). Although channel PT-449 is not
		PT-449	1	1700-2500 psig	yes	yes	SR	1D	PI-449	PR-429	P0449	powered from a safety related supply, it is maintained as a catagory 1 variable in all other aspects. Its protection signals are failsafe.
9	n.a.	Pressurizer Level	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	LT-426	1	0-100 %	yes	yes	SR	1A	LI-426	LR-428	L0426	Level instrumentation does not cover the
		LT-427	1	0-100 %	yes	yes	SR	1B	LI-427	LR-428	L0427	hemispherical top and bottom of the
		LT-428	1	0-100 %	yes	yes	SR	1C	LI-428	LR-428	L0428	pressurizer.
												also satisfies item #60
10	n.a.	Pressurizer PORV's Position Indication	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	ZS-430 (PORV)	1	open / close	yes	yes	SR	BDC	yes	no	V0430	* The RTD downstream of these valves,
		ZS-431C (PORV)	1	open / close	yes	yes	SR	BDC	yes	no	V0431	TE-438, is available in the control room and
		TE-438 (discharge)	3*	0 °F - 300 °F	no	yes	SS	1A	yes	no	no	is considered backup indication of valve position.

Comparison of Ginna Post Accident Instrumentation to Regulatory Guide 1.97, Revision 3 Criteria

#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA		P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
11	n.a	RCS Cold Leg Temperature	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	TE-409B-1 (Loop A)	1	0-700 °F	yes	yes	SR	1A	TI-409B-1	no	no	
		TE-410B-1 (Loop B)	1	0-700 °F	yes	yes	SR	1C	TI-410B-1	no	no	
												also satisfies item #28
12	n.a.	RCS Hot Leg Temperature	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	TE-409A-1 (Loop A)	1	0-700 °F	yes	yes	SR	1A	TI-409A-1	no	T0409A	
		TE-410A-1 (Loop B)	1	0-700 °F	yes	yes	SR	1C	TI-410A-1	no	T0410A	
												also satisfies item #27
13	n.a.	RCS Pressure	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	PT-420	1	0-3000 psig	yes	yes	SR	1A	PI-420	PR-420	P0420	
		PT-420A	1	0-3000 psig	yes	yes	SR	1C	PI-420A	PR-420A	P0420A	
												also satisfies items #29,40
14	n.a.	RHR Flow (low pressure injection)	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	FT-626	1	0 - 4000 gpm	yes	yes	SR	1C	FI-626	FR-626	F0626	* FT-931A and FT-931B are RHR suction
		(FT-xxx)	(1)	(0 - 4000gpm)	(yes)	(yes)	(SR)	(1A)	(yes)	(no)	(yes)	flows from the Containment sump.
		FT-931A (Loop A)*	1	0 - 2200 gpm	yes	yes	SR	1C	FI-931A	no	no	A redundant flow transmitter to FT-626
		FT-931B (Loop B)*	1	0 - 2200 gpm	yes	yes	SR	1B	FI-931B	no	no	utilizing the same primary element is proposed.
												also satisfies items #49, 56
15	n.a.	Reactor Vessel Level Indication System	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	LT-490A	1	0 - 100 %	yes	yes	SR	1A	LI-490A	no	L0496A	RVLIS receives 'correction' inputs from sensor
		LT-490B	1	0 - 100 %	yes	yes	SR	1C	LI-490B	no	L0496B	line temperature, RCP status, and RHR flow. Where both channels have common inputs the input signals to each channel are isolated.
												also satisfies item #31

Comparison of Ginna Post Accident Instrumentation to Regulatory Guide 1.97, Revision 3 Criteria

#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
16	n.a.	Refueling Water Storage Tank	1	Plant Specific	yes	yes	full	1E	yes	Plant Specific		
	A	LT-920	1	0 - 100 %	mild	yes	SR	1C*	LI-920	no	L0920	* Computer indication of this channel also
		LT-921	1	0 - 100 %	mild	yes	SR	1A	LI-921	no	L0921	requires power from 1A.
												also satisfies item #57
17	n.a.	Safety Injection Flow (HI Press. Injection)	1	Plant Specific	yes	yes	full	1E	yes	Plant Specific		
	A	FT-924 (SIP B)	1	0-1000 gpm	yes	yes	SR	1A	FI-924	no	F0924A	
		FT-925 (SIP A)	1	0-1000 gpm	yes	yes	SR	1B, 1C	FI-925	no	F0925A	
												also satisfies item #55
18	n.a.	Steam Generator Wide Range Level	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	Two per Steam Generator required for two loop plants
	A	LT-504 (SG A)	1	0-100 %	yes	yes	SR	1A	LI-504	LR-504	L0504	Two per Steam Generator provided.
		LT-505 (SG A)	1	0-100 %	yes	yes	SR	1C	LI-505	LR-505	L0505	
		LT-506 (SG B)	1	0-100 %	yes	yes	SR	1A	LI-506	LR-506	L0506	
		LT-507 (SG B)	1	0-100 %	yes	yes	SR	1C	LI-507	LR-507	L0507	
												also satisfies item #65
19	n.a.	Steam Generator Narrow Range Level	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	LT-461 (SG A)	1	0-100 %	yes	yes	SR	1A	LI-461	yes*	L0461	* Median of 3 channels per generator is
		LT-462 (SG A)	1	0-100 %	yes	yes	SR	1C	LI-462	yes*	L0462	recorded.
		LT-463 (SG A)	1	0-100 %	yes	yes	SR	1D	LI-463	yes*	L0463	Although channels LT-463 and LT-471 are not
		LT-471 (SG B)	1	0-100 %	yes	yes	SR	1D	LI-471	yes*	L0471	powered from a safety related supply, they are
		LT-472 (SG B)	1	0-100 %	yes	yes	SR	1A	LI-472	yes*	L0472	maintained as catagory 1 variables in all other
		LT-473 (SG B)	1	0-100 %	yes	yes	SR	1B	LI-473	yes*	L0473	aspects. also satisfies item #65
20	n.a.	Steam Generator Pressure	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	PT-468 (SG A)	1	0-1400 psig	yes	yes	SR	1A	PI-468	no	P0468	
		PT-469 (SG A)	1	0-1400 psig	yes	yes	SR	1B	PI-469	no	P0469	
		PT-478 (SG B)	1	0-1400 psig	yes	yes	SR	1C	PI-478	no	P0478	
		PT-479 (SG B)	1	0-1400 psig	yes	yes	SR	MQ-483	PI-479	no	P0479	
		PT-482 (SG A)	1	0-1400 psig	yes	yes	SR	1C	PI-482A	no	P0482	
		PT-483 (SG B)	1	0-1400 psig	yes	yes	SR	1B	PI-483A	no	P0483	also satisfies item #66

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA		P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
21	n.a.	Steam Flow	1	Plant Specific	yes	yes	full	1E	yes	Plant Specific		
	A	FT-464 (SG A)	1	0 - 3.8E6 pph	yes	yes	SR	1A	FI-464	yes*	F0464	*Median of 3 channels per SG is recorded.
		FT-465 (SG A)	1	0 - 3.8E6 pph	yes	yes	SR	1B	FI-465	yes*	F0465	FT-475 power source is non-1E, however it
		FT-474 (SG B)	1	0 - 3.8E6 pph	yes	yes	SR	1C	FI-474	yes*	F0474	satisfies all other Catagory 1 criteria. RG&E
		FT-475 (SG B)	1	0 - 3.8E6 pph	yes	yes	SR	1D	FI-475	yes*	F0475	considers this acceptable because its protective
		FT-498 (SG A)	1	0 - 3.8E6 pph	no	yes	SS	1A/1C	FI-498	yes*	F0498	function is failsafe.
		FT-499 (SG B)	1	0 - 3.8E6 pph	no	yes	SS	1A/1C	FI-499	yes*	F0499	also satisfies item #67
22	n.a.	RCS Subcooling Monitor	1	Plant Specific	yes	yes	full	1E	yes	Plant Specific		
	A	TI-409A	1	0 - 100 °F subcooled	yes	yes	SR	1A	TI-409A	no	*TSUBA	*Ginna EOP's provide the means for
		TI-410A	1	0 - 100 °F subcooled	yes	yes	SR	1C	TI-410A	no	*TSUBB	determining subcooling based on CET's and RCS pressure. The SAS/PPCS also calculates subcooling using these variables. Both capabilities exceed the range recommended in RG 1.97, rev 3. Also satisfies item #32
23	n.a.	Containment Sump Wide Range Level	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	LC-942 (A-E)	1	8, 78, 113, 180 ,214 in	yes	yes	SR	1A	yes	no	yes	Five discrete level switches per channel, 214
		LC-943 (A-E)	1	8, 78, 113, 180 ,214 in	yes	yes	SR	1C	yes	no	yes	inch indication corresponds to approximately 500,000 gallons.
												also satisfies items #34, 43
24	B	Neutron Flux	1	1E-6 % -100 %power	yes	yes	full	1E	yes	Plant	Specific	
	B	N-31, N-32 (SR)	3	1E-1 to 1E6cps (SR)	no	yes	SR**	1A/1B	NI-31, 32	yes*	yes	Neutron flux indication is considered a backup
		N-35, N-36 (IR)	3	1E-11 to1E-3Amps (IR)	no	yes	SR**	1A/1B	NI-35, 36	yes*	yes	type B indication at Ginna and is therefore
		N-41A,B; N-42A,B;	3	0 to 100%power (PR)	no	yes	SR**	1A/1B	NI-41, 42	yes*	yes	considered catagory 3.
		N-43A,B; N-44A,B (PR)	3		no	yes	SR**	1C/1D	NI-43, 44 (B suffix for MCB ind.)	yes*	yes	* A two pen recorder is provided with switchable inputs from all channels. ** Protection portions of channels only.
25	B	Control Rod Position	3	full in or not full in	no	no	comm.	n.p.	no	no		
	B	Microprocessor Rod Position Indication System (MRPI)	3	rod position indicated in twelve step increments, as well as indication of rods full in or not full in	no	no	SS	*	yes	no	yes	* The MRPI system is powered from a dedicated transformer from a safety related 480V MCC.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA		P.S.	C.R. IND.	RECORDER CHART	COMP	COMMENTS
26	B	RCS Boron Concentration	3	0 to 6000 ppm	no	no	comm.	n.p.	no	no		
	B	AI-6053 (Post Accident Sampling System (PASS) Boron Analyzer)	3	50±50 - 6000±300 ppm	no	no	SS	*	no	no	no	* The PASS instrument panel is powered from 480 V bus 13 (non SR) via panel SB14. NRC SER dated April 14, 1986 deferred the range and accuracy capabilities of post accident sampling systems to NUREG-0737, Item II.B.3. The Ginna PASS meets these criteria.
27	B	RCS Hot Leg Water Temperature	1	50 °F - 700 °F	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #12, RG&E Type A variable.
28	B	RCS Cold Leg Water Temperature	1	50 °F - 700 °F	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #11, RG&E Type A variable.
29	B	RCS Pressure	1	0 - 3000 psig	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #13, RG&E Type A variable.
30	B	Core Exit Temperature	3	200 °F - 2300 °F	no	no	comm.	n.p.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* see item #3, RG&E Type A variable.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA		P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
31	B	Coolant Inventory	1	Hot Leg bot.- flange	yes	yes	full	1E	yes	plant	specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #15, RG&E Type A variable.
32	B	RCS Degrees of Subcooling	2	200°Fsub-35°Fsuper	yes	no	partial	rel.	no		no	
	A	*	*	*	*	*	*	*	*	*	*	* see item #22, RG&E Type A variable.
33	B	Containment Sump Level Narrow Range	2	Plant Specific	yes	no	partial	rel.	no		no	
	C	LT-2039 (Sump A)	3	0 - 30 ft	no	no	SS	1A	I.I-2039	no	L2039	NRC SER dated December 4, 1990 found the instrumentation provided to be acceptable.
		LT-2044 (Sump A)	3	0 - 30 ft	no	no	SS	1A	I.I-2044	no	L2044	also satisfies item #42
34	B	Containment Sump Level Wide Range	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #23, RG&E Type A variable.
35	B	Containment Pressure	1	-5 psig to design	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #6, RG&E Type A variable. note: The Ginna containment pressure indication covers a range of 10 psia to 300 % design pressure.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
36	B	Contain. Isolation Valve Position	1	closed / not closed	yes	yes	full	1E	yes	Plant	Specific	one per redundant function reqd. Check valve position ind. is not reqd.
	B	see UFSAR Table 6.2.13 for list of containment isolation valves.	3	open / closed	no	yes	SS	ADC, BDC	yes	no	yes	Isolation valves outside containment go closed prior to being exposed to a harsh environment and therefore environmental qualification is not reqd.. RG&E has taken exception to the need to qualify indication for valves inside containment. Ref. letter RG&E-NRC 5/6/91.
37	C	Core Exit Temperature	1	200°F to 2300°F	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #3, RG&E Type A variable.
38	C	RCS Radiation Level	1	.5 - 100X Tech Spec	yes	yes	full	1E	yes	Plant	Specific	
	n.a.	Post Accident Sampling System (PASS), Manual Radiation Isotopic Spectroscopy after sample taken	3	0.01mR - 1.0E04 R/hr	n.a.	n.a.	SS	n.a.	no	no	no	NRC SER dated April 14, 1986 found the instrumentation provided to be acceptable. see note 1.
39	C	Gamma Analysis of Primary Coolant	3	1.0E-5 - 10 Ci/ml	no	no	comm.	n.p.	no		no	
	C	Post Accident Sampling System (PASS), Manual Radiation Isotopic Spectroscopy after sample taken	3	1.0E-5 - 10 Ci/ml. Range can be extended by dilution techniques.	n.a.	n.a.	SS	n.a.	no	no	no	NRC SER dated April 14, 1986 found the instrumentation provided to be acceptable.
40	C	RCS Pressure	1	0 - 3000 psig	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #13, RG&E Type A variable.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
41	C	Containment Pressure	1	-5 psig to design	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #6, RG&E Type A variable. note: The Ginna containment pressure indication covers a range of 0psig to 333% design pressure.
42	C	Containment Sump Level Narrow Range	2	top to bottom	yes	no	partial	rel.	no		no	
	C	*	*	*	*	*	*	*	*	*	*	* see item #33, RG&E Type C variable. NRC SER dated December 4, 1990 found the instrumentation provided to be acceptable.
43	C	Containment Sump Level Wide Range	1	Plant Specific	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #23, RG&E Type A variable.
44	C	Containment Area Radiation	3	1 to 1.0E4 R/hr	no	no	comm.	n.p.	no		no	
	E	R-2	3	0.01 - 1.0E5 R/hr	no	yes	SS	1B	yes	yes	R02	NRC SER dated April 14, 1986 found the instrumentation provided to be acceptable.
45	C	Condenser Air Exh. Noble Gas Radioact.	2	1E-6 to 1E5 µCi/cc	yes	no	part.	rel.	no		no	
	E	R-15	2	1E-6 to 1E-3 µCi/cc	mild	no	SS	1D	yes	yes	R15	
		R-15A (SPING)	2	1E-6 to 1E5 µCi/cc	mild	no	SS				R15A	

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA		P.S.	C.R. IND.	RECORDER CHART	COMP	COMMENTS
46	C	Containment H2 Concentration	1	0-10 %	yes	yes	full	1E	yes	Plant Specific		
	A	*	*	*	*	*	*	*	*	*	*	* see item #5, RG&E Type A variable.
47	C	Containment Effluent Noble Gas at Release	2	1E-6 to 1E-2 µCi/cc	yes	no	partial	rel.	no	no		
	C	R-12 (Cont. Purge Vent)	2	1E-6 to 1E-2 µCi/cc	mild	no	SR	1A	yes	yes	yes	* SPING Monitors are powered via a dedicated transformer from MCC D (Safety Related). SPING monitors R-12A (Cont. Purge Vent) and R-14A (Plant Exhaust Vent) are also available to monitor noble gas releases as well as particulates and iodine.
		R-14 (Plant Exh. Vent)	2	1E-6 to 1E-1 µCi/cc	mild	no	SS	1A	yes	yes	yes	
		R-31 (SG Steam Line A)	2	1E-1 to 1E3 µCi/cc	mild	no	SS	*	(yes)	no	yes	
		R-32 (SG Steam Line B)	2	1E-1 to 1E3 µCi/cc	mild	no	SS	*	(yes)	no	yes	
48	C	Containment Effluent Noble Gas at Pen.etc.	2	1E-6 to 1E-2 µCi/cc	yes	no	SS	rel.	no	no		
	C	*	*	*	*	*	*	*	*	*	*	* see item #47. These monitors are considered to provide adequate monitoring of all credible releases.
49	D	RHR System Flow	2	0 - 110 % design	yes	no	partial	rel.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* see item #14, RG&E Type A variable.
50	D	RHR Heat Exchanger Outlet Temperature	2	40 °F - 350 °F	yes	no	partial	rel.	no	no		
	n.a.	TE-627	3	50 °F - 400 °F	no	no	SS	TSC	no	no	T0627	NRC SER dated 12/4/90 found the range provided acceptable.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	COMP	COMMENTS
51	D	Accumulator Tank Level	2	10 % - 90 %	yes	no	partial	n.p.	no	no		
	n.a.	LT-934 (Loop B)	3	±7 inches from nominal	no	no	SS	1C	LI-934	no	no	NRC SER dated 12/4/90 foun1 the instrumentation provided acceptable. The catagory 3 designation is consistent with RG&E's catagory determination philosophy.
		LT-935 (Loop A)	3	±7 inches from nominal	no	no	SS	1C	LI-935	no	no	
		LT-938 (Loop B)	3	±7 inches from nominal	no	no	SS	1B	LI-938	no	no	
		LT-939 (Loop B)	3	±7 inches from nominal	no	no	SS	1B	LI-939	no	no	
52	D	Accumulator Tank Pressure	2	0 - 750 psig	yes	no	partial	n.p.	no	no		
	n.a.	PT-936 (Loop B)	3	0 - 800 psig	no	no	SS	1C	PI-936	no	no	NRC SER dated 12/4/90 deferred resolution of these deviations to generic staff review of this issue. The catagory 3 designation is consistent with RG&E's catagory determination philosophy.
		PT-937 (Loop A)	3	0 - 800 psig	no	no	SS	1C	PI-937	no	no	
		PT-940 (Loop A)	3	0 - 800 psig	no	no	SS	1B	PI-940	no	no	
		PT-941 (Loop B)	3	0 - 800 psig	no	no	SS	1B	PI-941	no	no	
53	D	Accumulator Iso. Valve Position	2	open / closed	yes	no	partial	n.p.	no	no		
	n.a.	MOV-841 (Loop A)	3	open / closed	no	yes	SS	ADC	yes	no	no	Valves are locked open and de-energized.
		MOV-865 (Loop B)	3	open / closed	no	yes	SS	BDC	yes	no	no	NRC SER dated 12/4/90 found the instrumentation provided acceptable.
54	D	Boric Acid Charging Flow	2	0 - 110 % design	yes	no	partial	rel.	no	no		
	n.a.	FT-128	2	0 - 75 gpm	mild	no	SS	1D	FI-128B	no	F0128	NRC SER dated 4/14/86 found the instrumentation provided acceptable
55	D	High Pressure Injection (SI) Flow	2	0 - 110 % design	yes	no	partial	rel.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* see item #17, RG&E Type A variable.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA		P.S.	C.R. IND.	RECORDER CHART	COMP	COMMENTS
56	D	Low Pressure Injection (RHR) Flow	2	0 - 110 % design	yes	no	partial	rel.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* see item #14, RG&E Type A variable.
57	D	RWST Level	2	top to bottom	yes	no	partial	rel.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* see item #16, RG&E Type A variable.
58	D	RCP Status	3	motor current	no	no	comm.	n.p.	no	no		
	D	4.16 kV Bus ammeters and RCP breaker status lights	3	0 - 1200 A	no	no	SS	n.a.	yes	no	yes	
59	D	Pressurizer PORVs and Safeties Position	2	closed / not closed	yes	no	partial	rel.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* Pressurizer PORV's position indication is considered a Type A variable see item #10.
	D	ZT-434 (Safety Valve)	2	open - close (inches)	yes	yes	SS	1A	yes	no	no	** The RTD's downstream of these valves, TE-436 and TE-437, are available in the control room and are considered backup indication of valve position.
		ZT-435 (Safety Valve)	2	open - close (inches)	yes	yes	SS	1A	yes	no	no	
		TE-436,TE-437 (Safeties)	3**	0 °F - 400 °F	no	yes	SS	1A	TI-436	no	no	
60	D	Pressurizer Level	1	top to bottom	yes	yes	full	1E	yes	Plant	Specific	
	A	*	*	*	*	*	*	*	*	*	*	* see item #9, RG&E Type A variable. note: level indication does not cover the hemispherical top and bottom portions of the pressurizer.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
61	D	**Pressurizer Heaters Status**	2	electric current	yes	no	partial	rel.	no		no	
	D	control bank breaker status lights	2	closed / auto / on	mild	no	SS	ADC	yes	no	no	NRC SER dated 12/4/90 found the instrumentation provided acceptable.
		backup bank breaker status lights	2	closed / auto / on	mild	no	SS	BDC	yes	no	no	
		480V Bus voltage and kW demand	2	0 - 1500 kW	mild	no	SS	n.a.	yes	no	yes	
62	D	**Pressurizer Relief (Quench) Tank Level**	3	top to bottom	no	no	comm.	n.p.	no		no	
	D	LT-442	3	0 - 100 %	no	no	SS	1B	LI-442	no	L0442	
63	D	**Pressurizer Relief (Quench) Tank Temp.**	3	50 °F - 750 °F	no	no	comm.	n.p.	no		no	
	D	TE-439	3	(50 °F - 400 °F)	no	no	SS	1A	TI-439	no	T0439	NRC SER dated 12/4/90 found the instrument range acceptable.
64	D	**Pressurizer Relief (Quench) Tank Press.**	3	0 psig to design	no	no	comm.	n.p.	no		no	
	D	PT-440	3	0 - 150 psig	no	no	SS	1B	PI-440A I I-440B	no	P0440	rupture disk setpoint is 100 psig.
65	D	**Steam Generator Wide Range Level**	1	tube sht - separators	yes	yes	full	1E	yes	Plant	Specific	two per generator required for two loop plants
	A	*	*	*	*	*	*	*	*	*	*	* see item #18, RG&E Type A variable.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
66	D	Steam Generator Pressure	2	atm. - 20% > safety	yes	no	partial	rel.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* see item #20, RG&E Type A variable.
67	D	Main Steam Flow (or SG safety valve pos.)	2	0 - 110 % design	yes	no	partial	rel.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* see item #21, RG&E Type A variable.
68	D	Main Feedwater Flow	3	0 - 110 % design	no	no	comm.	n.p.	no	no		
	D	FT-466 (SG A)	3	0 - 3.8E6 pph	no	no	SS	1A/1C	FI-466	yes*	F0466	* Recorders FR-465 (SG A) and FR-475 (SG
		FT-467 (SG A)	3	0 - 3.8E6 pph	no	no	SS	1A/1C	FI-467	yes*	F0467	B) record median flow of the 3 channels.
		FT-476 (SG B)	3	0 - 3.8E6 pph	no	no	SS	1A/1C	FI-476	yes*	F0476	Main Feedwater Flow transmitters receive
		FT-477 (SG B)	3	0 - 3.8E6 pph	no	no	SS	1A/1C	FI-477	yes*	F0477	power from the Digital Feedwater Control
		FT-500 (SG A)	3	0 - 3.8E6 pph	no	no	SS	1A/1C	FI-500	yes*	F0500	System (ADFCS). Power for the system is
		FT-503 (SG B)	3	0 - 3.8E6 pph	no	no	SS	1A/1C	FI-503	yes*	F0503	auctioncered from buses 1A and 1C.
69	D	Auxiliary Feedwater Flow	2	0 - 110 % design	yes	no	partial	rel.	no	no		
	A	*	*	*	*	*	*	*	*	*	*	* see item #1, RG&E Type A variable.
70	D	Condensate Storage Tank Level	1	Plant Specific	yes	yes	full	1E	yes	Plant Specific		
	A	*	*	*	*	*	*	*	*	*	*	* see item #7, RG&E Type A variable.

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA		P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
71	D	Containment Spray Flow	2	0 - 110 % design	yes	no	partial	rel.	no	no		
	n.a..	none	*	*	*	*	*	*	*	*	*	* indirect indication of Containment Spray flow is available using SI flow and RHR flow. NRC SER dated 12/4/90 found this acceptable.
72	D	Containment Fan Heat Removal	2	Plant Specific	yes	no	partial	rel.	no	no		
	n.a.	none	*	*	*	*	*	*	*	*	*	* indirect indication of Containment Fan heat removal is available using containment air temperature, sump temperature and containment pressure. NRC SER dated 12/4/90 found this acceptable.
73	D	Containment Air Temperature	2	40 °F - 400 °F	yes	no	partial	rel.	no	no		
	D	TE-6031 (elev. 245' 0")	2	0 °F - 300 °F	(yes)	(yes)	SS	**	no	yes*	yes	6 Environmentally qualified Containment Air Temperature RTD's are being installed during the 1992 Refueling outage. NRC SER dated 12/4/90 found the range deviation to be acceptable. * recorded at ILRT panel ** 1E supply from MCC 1D (B train)
		TE-6035 (elev. 261' 9")	2	0 °F - 300 °F	(yes)	(yes)	SS	**	no	yes*	yes	
		TE-6036 (elev. 261' 9")	2	0 °F - 300 °F	(yes)	(yes)	SS	**	no	yes*	yes	
		TE-6037 (elev. 261' 9")	2	0 °F - 300 °F	(yes)	(yes)	SS	**	no	yes*	yes	
		TE-6038 (elev. 261' 9")	2	0 °F - 300 °F	(yes)	(yes)	SS	**	no	yes*	yes	
		TE-6045 (elev. 286' 4")	2	0 °F - 300 °F	(yes)	(yes)	SS	**	no	yes*	yes	
74	D	Containment Sump Temperature	2	50 °F - 250 °F	yes	no	partial	rel.	no	no		
	n.a.	TE-490 A/B (Sump A)	2	0 °F - 360 °F	yes	yes	SR	1A/1C	no	no	yes	TE-490A/B and TE-491A/B are dual element RTD's. The 'A' elements are powered from bus 1A and the 'B' elements are powered from bus 1C. Each element is available on the PPCS as a separate point.
		TE-491 A/B (≈4.3' above basement floor)	2	0 °F - 360 °F	yes	yes	SR	1A/1C	no	no	yes	
75	D	Reactor Water Makeup Flow (CVCS)	2	0 - 110 % design	yes	no	partial	rel.	no	no		
	n.a.	FT-111	2	5 - 75 gpm (0 - 100 %)	mild	no	SS	1D	no	FR-110	no	NRC SER dated 12/4/90 found the instrument range acceptable.

Table 1

Comparison of Ginna Post Accident Instrumentation to Regulatory Guide 1.97, Revision 3 Criteria

#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
76	D	Letdown Flow (CVCS)	2	0 - 110 % design	yes	no	partial	rel.	no		no	
	n.a.	FT-134	2	0 - 100gpm (0 - 100 %)	mild	no	SS	1D	FI-134	no	F0134	
77	D	Volume Control Tank Level	2	top to bottom	yes	no	partial	rel.	no		no	
	n.a.	LT-112	2	0 - 100 %	mild	no	SS	1B	LI-112	no	L0112	
78	D	CCW Temperature to ESF System	2	40 °F - 200 °F	yes	no	partial	rel.	no		no	
	n.a.	TE-621 (Component Cooling Water heat exchanger temperature)	2	0 °F - 225 °F	mild	no	SS	1B	TI-621	no	T0621	NRC SER dated 12/4/90 found the instrumentation provided to be acceptable.
79	D	CCW Flow to ESF System	2	40 °F - 200 °F	yes	no	partial	rel.	no		no	
	n.a.	FT-619 (Component Cooling Water System flow)	2	0 - 7000 gpm	mild	no	SS	1C	no	no	F0619	The CCW System is prealigned with flows to various ESF components manually adjusted using local flow indicating switches. RG 1.97 states that the purpose of this variable is to monitor operation. The instrumentation provided meets this intent.
80	D	Hi Level Radioactive Liquid Tank Level	3	top to bottom	no	no	comm.	n.p.	no		no	
	D	LT-1001 (Waste Drain Tank)	3	≈ 0 - 100 %	no	no	SS	*	no	no	no	* Normally fed from 480 V bus 14 (Train A) with a manual backup to 480 V bus 16 (Train B)
		LT-1003 (Reactor Coolant Drain Tank)	3	≈ 0 - 100 %	no	no	SS	*	no	no	L1003	

Table 1

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
81	D	Radioactive Gas Holdup Tank Pressure	3	0 - 150 % design	no	no	comm.	n.p.	no	no		
	n.a.	PT-1036 (Tank 1)	3	0 - 150psig (0 - 100%)	no	no	SS	*	no	no	no	Design of each tank, and its safety valve setpoint is 150 psig. Normal radgas pump operating pressure is <100 psig. NRC SER dated 12/4/90 found this range deviation acceptable. * Normally fed from 480 V bus 14 with a manual backup to 480 V bus 16.
		PT-1037 (Tank 2)	3	0 - 150psig (0 - 100%)	no	no	SS	*	no	no	no	
		PT-1038 (Tank 3)	3	0 - 150psig (0 - 100%)	no	no	SS	*	no	no	no	
		PT-1039 (Tank 4)	3	0 - 150psig (0 - 100%)	no	no	SS	*	no	no	no	
82	D	Emerg.Ventilation Damper Position	2	open / closed	yes	no	partial	rel.	no	no		
	D	ZT-7970 (mini-purge)	3	open / closed	no	yes	SS	ADC	yes	no	no	Mini-purge valves are locked closed and only openned for containment pressure control. These valves are in their safety related position prior to any adverse conditions and do not change position throughout any accident. Therefore EQ is not deemed necessary.
		ZT-7971 (mini-purge)	3	open / closed	no	yes	SS	ADC	yes	no	no	
		ZT-7445 (mini-purge)	3	open / closed	no	yes	SS	ADC	yes	no	no	
		ZT-7478 (mini-purge)	3	open / closed	no	yes	SS	ADC	yes	no	no	
83	D	Stdby power / Energy Imp. to Safety Status	2	Plant Specific	yes	no	partial	rel.	no	no		
	D	EDG A, B: V, kW, A	3	0-500V,0-3000A,0-2MW	mild	no	SS	n.a.	yes	no	yes	
		125VDC A, B: V, A	3	0-150 V, 0-50 A	mild	no	SS	n.a.	yes	no	yes	
		PT-2023 (Instrument Air)	3	0 - 160 psig	mild	no	NS		PI-2023	no	no	
		PT-1066 (Nitrogen Gas)	3	0 - 150 psig	mild	no	NS		no	no	no	
		PT-455 (PORV, SI Acc)	2	0 - 1000 psig	mild	no	SS	1B	PI-455	no	no	
		PT-456 (PORV, SI Acc)	2	0 - 1000 psig	mild	no	SS	1A	PI-456	no	no	
84	E	Containment High Radiation Monitor	1	1 - 1E7 R/hr	yes	yes	full	1E	yes	Plant Specific		
	A	*	*	*	*	*	*	*	*	*	*	* see item #4, RG&E Type A variable.
85	E	Rad. Exposure Rate-Access rqd. areas	3	1E-1 - 1E4 R/hr	no	no	comm.	n.p.	no	no		
	D	Various Microprocessor based monitors located, and qualified to satisfy NUREG-0654	3	0.1 - 1E7 mR/hr	no	no	SS	various	yes	yes	yes	

Comparison of Ginna Post Accident Instrumentation to Regulatory Guide 1.97, Revision 3 Criteria

#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
86	E	Airborne Rad Release Noble Gas and Flow	2	1E-6 - 1E5 µCi/cc	yes	no	partial	rel.	no		no	
	C	*	*	*	*	*	*	*	*	*	*	* see item #47, RG&E Type C variable
87	E	Airborne Rad Release Part. and Halogens	3	1E-3 - 1E2 µCi/cc	no	no	comm.	n.p.	no		no	
	E	R-12A (Cont. Vent)	3	1E-5-10µCi/cc halogens, 1E-6-1µCi/cc particulate	no	no	SR	*	yes	yes	R12A	* SPING Radiation monitors are powered from a dedicated supply from MCC D (Safety Related).
		R-14 A (Plant Exh. Vent)	3	5E-5-50µCi/cc halogens, 2.5E-5-25µCi/cc part.	no	no	SR	*	yes	yes	R14A	
88	E	Airborne Radio. and Part.(portable samp.)	3	1E-9 - 1E-3 µCi/cc	no	no	comm.	n.p.	no		no	
	E	Various fixed and portable samplers	3	1E-12 -1E-3 µCi/cc (Aliquot or diluted sample)	no	no	SS	n.a.	no	no	no	
89	E	Plant and Environ. Radiation (portable)	3	1E-3 - 1E4 R(rad)/hr	no	no	comm.	n.p.	no		no	beta radiations and photons
	E	Various portable instrumentation	3	1E-6 - 1E3 R/hr gamma 1E-3 - 1E3 R/hr beta	no	no	SS	n.a.	no	no	no	
90	E	Plant and Environ. Radioactivity (port.)	3	Isotopic analysis	no	no	comm.	n.p.	no		no	
	E	Multichannel Gamma Ray Spectrometer	3	1E-8 - 10 µCi	no	no	SS	n.a.	no	no	no	

Table 1

Comparison of Ginna Post Accident Instrumentation to Regulatory Guide 1.97, Revision 3 Criteria

#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC QA		P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
91	E	Wind Direction	3	0 - 360°	no	no	comm.	n.p.	no		no	
	E	wind direction (met tower)	3	0 - 360°	no	no	SS	*	no	RK-32	WD033 WD150 WD250	* the weather tower currently receives power directly via an offsite supply.
92	E	Wind Speed	3	0 - 67 mph	no	no	comm.	n.p.	no		no	
	E	wind speed at 33, 150, 250 ft elevations (met tower)	3	0 - 100 mph	no	no	SS	*	no	RK-32	WS033 WS150 WS250	* the weather tower currently receives power directly via an offsite supply.
93	E	Estimation of Atmospheric Stab.	3	based on vert. ΔT	no	no	comm.	n.p.	no		no	
	E	RTD's at 33, 150, 250 ft elevations (met tower)	3	-8 - 20 °F between each elevation	no	no	SS	*	yes**	no	WDT1 WDT2	* the weather tower currently receives power directly via an offsite supply. ** Temperatures at each elevation are displayed in the control room.
94	E	Accident Sampling: RCS and Sump	3	various	no	no	comm.	n.p.	no		no	gross activity, gamma spectrum, boron, chloride, dissolved H_2, O_2,, pH
	E	gross activity (grab samp)	3	1 - 1E6μCi/cc (dilution)	no	no	SS	*	no	no	no	* The PASS panel is powered from 480 V bus 13 (non SR) via panel SB14. NRC review of the PASS capability was documented under NUREG-0737 Item II.B.3 (SER dated 4/14/84). NRC SER dated 12/4/90 concludes that the minor range deviations are acceptable.
		gamma spectrum	3	mutichannel analyser	no	no	SS	*	no	no	no	
		boron content	3	50 - 6000 ppm	no	no	SS	*	no	no	no	
		chloride content	3	5 ppb - 100 ppm	no	no	SS	*	no	no	no	
		dissolved hydrogen	3	10 - 2000 cc/Kg	no	no	SS	*	no	no	no	
		dissolved oxygen , pH	3,3	0.1 - 20ppm, 1 - 13 pH	no,no	no,no	SS,SS	*, *	no, no	no, no	no, no	
95	E	Accident Sampling: Containment Air	3	various	no	no	comm.	n.p.	no		no	Hydrogen content, oxygen content, gamma spectrum
	E	Hydrogen content	3	0 - 10 % (PASS)	no	no	SS	n.a.	no	no	no	Hydrogen concentration is also available using the installed Type A Hydrogen Monitors, see item #5.
		Oxygen content	3	0 - 30 % (PASS)	no	no	SS	n.a.	no	no	no	
		Gamma Spectrum	3	multichannel analysis	no	no	SS	n.a.	no	no	no	

Attachment 3

Table 1

Comparison of Ginna Post Accident Instrumentation to Regulatory Guide

1.97, Revision 3 Criteria

Notes

1. Radioactivity Concentration or Radiation Level in Circulating Primary Coolant (Isotopic Analysis)

The original design basis for implementation of NUREG-0737 Topic II.B.3, involves sampling requirements to perform a radiological analysis within a three hour time period for "certain radionuclides in the reactor coolant...". The NUREG-0737 Clarification, dated October 31, 1980, (2)(d), states "Alternatively, have inline monitoring capabilities to perform all or part of the above analysis". Ginna's response involved the selection of semi-automated manual dilution techniques involving sample withdrawl and preparation of the sample aliquot by the Post-Accident Sampling System, not a inline monitoring capability. The remote-manual sampling and dilution capabilities of the existing installed equipment are equivalent to Category 3, Type C attributes.

The Ginna Post-Accident Sampling System (PASS) is equipped with remote-manual abilities to acquire a Reactor Coolant System (RCS) sample, then manipulate the sample by diluting it approximately 1000:1. The dilutant may then be manually delivered to either of two diverse counting facilities at Ginna Station for multichannel spectrometer isotopic analyses. The PASS panel is utilized by Health Physics technicians at least once per week to produce routine proceduralized analyses when the unit is on-line.

Regulatory Guide 1.97 guidance for radiation concentration determinations states that Category 1, Type C attributes apply to this measurement variable with the purpose stated to be detection of breach (Fuel Cladding Topic). Fuel cladding breach detection is not within the Ginna licensing basis but is acknowledged to be a concern during Functional Restoration activities. Functional restoration activity beyond the Ginna licensing basis. No EOP activity involved with design basis DBA occurrences requires that the radiation concentration determination in RCS be performed, and there's no consequent operator action requirement.