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AUTH.NAME AUTHOR AFFILIATION
MECREDY,R.C. Rochester Gas & Electric Corp.
RECIP.NAME RECIPIENT AFFILIATION
JOHNSON,A.R. Project Directorate I-3

SUBJECT: Forwards response to RAI re NUREG 0737,suppl 1, "Emergency Response Capability" & rev to reg guide 1.97,rev 3, "Post Accident Instrumentation Comparison Table."

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ROBERT C. MECREDY
Vice President
Ginna Nuclear Production

TELEPHONE
AREA CODE 716 546-2700

October 14, 1992

U.S. Nuclear Regulatory Commission
Document Control Desk
Attn: Allen R. Johnson
Project Directorate I-3
Washington, D.C. 20555

Subject: Emergency Response Capability/NUREG 0737, Supplement 1
R. E. Ginna Nuclear Power Plant
Docket No. 50-244

Ref.(1): NRC letter, A. Johnson to R. Mecredy (RG&E), "Emergency Response Capability - Request for Additional Information", dated July 7, 1992.

(2): RG&E letter, R. Mecredy to M. Hodges (NRC), "NUREG 0737 Supplement 1/Regulatory Guide 1.97: Comparison of Ginna Post Accident Instrumentation," dated March 13, 1992.

Dear Mr. Johnson:

By letter dated July 7, 1992 (Reference 1), your office requested additional information regarding the post accident instrumentation capabilities at Ginna Station. Enclosure 1 to that letter listed sixteen items requiring response. Attachment 1 to this letter provides the requested response.

In addition your request has made evident the need for us to revise our "Regulatory Guide 1.97, revision 3/Ginna Post Accident Instrumentation Comparison Table", attachment 3, table 1 of our letter dated March 13, 1992 (Reference 2). This revision, along with a summary of changes, is provided as Attachment 2 to this letter. You will notice in this revised table that several Type A variables have been reclassified. This resulted from a detailed review of the current Ginna Emergency Operating Procedures against the variable classification criteria. The previous table reflected classifications dating back to our original submittals on the subject, over five years ago.

We hope that the information provided herein adequately addresses your concerns. We are prepared to support any further discussions required to resolve these questions.

Very truly yours,

Robert C. Mecredy

Robert C. Mecredy

BJF/246

220005

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A003

xc: Mr. Allen R. Johnson (Mail Stop 14D1)
Project Directorate I-3
Washington, D.C. 20555

U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

US NRC Ginna Senior Resident Inspector

Attachment 1

The responses below are numbered to be consistent with the Request for Additional Information (RAI), attached to USNRC letter, A.R. Johnson to R.C. Mecredy (RGE), "Emergency Response Capability - Request for Additional Information," dated July 7, 1992.

1. RCS Cold Leg

RG&E concurs with the conclusion of the RAI that one channel of environmentally qualified RCS Cold Leg Temperature should be recorded. RG&E will assess the means of providing this capability (dedicated recorder or plant process computer), the cost of the modification, and any time constraints to establish a schedule for this upgrade. At this time, we expect completion of this modification during the 1994 Refueling Outage. We would like to note that currently a channel of RCS Cold Leg Temperature (not environmentally qualified) is recorded both via a dedicated recorder and by the plant process computer.

2. Containment Sump Water Level - Narrow Range

The Ginna Containment design incorporates two sumps, Sump A (instrument sump) directly below the reactor vessel, and Sump B which is used for post-accident recirculation. Sump A extends from approximately elevation 205'0" up to the Containment basement floor level, elevation 235'8". Sump A can hold less than 50,000 gallons. The instrumentation listed under Item 33 of Table 1 of our March 13, 1992 submittal as narrow range measures liquid level in Sump A up to roughly the Containment basement floor. This sump would quickly become filled during LOCA conditions, and is therefore only useful during normal operation for detection of small leaks, and as an initial indication of a LOCA. Liquid in Sump A is not available for post-accident recirculation. Therefore it is considered Type C, category 3 post accident instrumentation.

The bottom of Sump B (elevation 227'2") is approximately eight feet below the containment basement floor (elevation 235'8"). The suction for sump recirculation operation of the Residual Heat Removal (RHR) system is in Sump B approximately one foot above the bottom. Item 23 of Table 1 of our March 13, 1992 submittal (i.e. wide range), lists instrumentation to monitor liquid level in Sump B. Two channels of five level switches

each correspond to levels of 8, 78, 113, 180, and 214 inches from the bottom of Sump B. 214 inches corresponds to approximately 500,000 gallons in Sump B. These instruments are used during an accident to verify that water is being delivered to Containment, and to verify adequate level for the operator to initiate sump recirculation if required. Therefore these channels are considered Type A category 1 post-accident instruments.

NRC SER dated 12/4/90 found the instrumentation provided to monitor both sump levels to be acceptable.

3. Containment Isolation Valve Position

Regulatory Guide 1.97, revision 3 recommends containment isolation valve position indication to verify "accomplishment of isolation". At Ginna, containment isolation occurs concurrent with a Safety Injection (SI) signal, i.e. when pressurizer pressure drops below a nominal 1723 psig, steam line pressure drops below a nominal 514 psig, or containment pressure exceeds a nominal 4.0 psig. Containment isolation can also be manually initiated from the control room.

Receipt of an SI signal causes the operator to enter emergency operations procedure E-0, "Reactor Trip or Safety Injection". Step 12, an immediate action step, requires the operator to verify containment isolation. This step verifies "accomplishment of isolation" well before any containment isolation valves outside containment experience a harsh environment. At no other time in the EOP's is the operator directed to monitor this position indication. Since it is not credible for penetrations once isolated to spuriously open (minimum of two failures required), it is not necessary for the operator to reverify the isolation function during recovery operation when these valves may be exposed to a harsh environment.

At some point following initial containment isolation the operator may be directed to open specific containment penetrations. In order to open penetrations the operator must first manually reset the Containment Isolation function, and then manually reset interlocks for the individual valve(s). The operator is directed to open specific valves for specific purposes, such as restoring control air to containment, or restoring RCP seal flow. The position of such valves is determined by monitoring the process functions for which the valves were opened.

Since isolation is verified prior to these valves seeing a harsh environment, RG&E does not consider it necessary to environmentally qualify this indication. Seismic qualification of the indicating lamps is being addressed under the SQUG program, which has been previously approved by the NRC for use at Ginna.

4. RHR Heat Exchanger Outlet Temperature

Following the injection phase of a design basis accident the Residual Heat Removal (RHR) System can be used to remove decay heat from the reactor core by one of three methods:

1. Normal cooldown taking suction from the loop A hot leg and discharging to the loop B cold leg;

2. Sump recirculation taking suction from the Containment Sump B and discharging into the reactor vessel upper plenum;

3. High head sump recirculation taking suction from Containment Sump B and discharging to the safety injection pump(s) suction which in turn discharges into the RCS cold legs.

In order for the RHR heat exchanger outlet temperature RTD to experience a harsh environment significant fuel failure must occur. For situations where normal cooldown (1) or high head sump recirculation (3) are used, the RHR heat exchanger outlet temperature RTD is not exposed to a harsh environment and therefore environmental qualification is not required.

Post-accident cooldown utilizing either methods 2 or 3 above is accomplished using procedure ES-1.3 "Transfer to Cold Leg Recirculation." This procedure requires manual alignment of component cooling water to the RHR heat exchangers, and manual adjustment of RHR flow. Therefore it is highly unlikely that the heat exchangers do not function. This procedure directs the operator to verify adequate core cooling using core exit thermocouples and reactor vessel level indication (step 14). Both indications are environmentally qualified. Verification of core cooling is considered an acceptable alternate means of verifying RHR system effectiveness.

5. Refueling Water Storage Tank Level

RG&E has confirmed that loss of instrument bus 1A will not cause a loss of main control board indication of RWST level channel LT-920. The portion of this channel containing the

transmitter and main control board indicator is isolated from the computer indication portion of the channel by a Foxboro model M/66B current repeater, powered from instrument bus 1C.

6. Primary System Power Operated Relief Valve Position

We have reviewed the criteria used to classify post-accident instrumentation at Ginna and have determined that we have misclassified primary system power operated relief valve (PORV) position indication as Type A. We concur with Regulatory Guide 1.97, revision 3 that the correct classification should be Type D, with Category 2 qualifications. The existing configuration meets these criteria. We would like to note that although not environmentally qualified, discharge temperature indication does provide backup indication of PORV position, and is supplied from a separate safety related power source. Seismic qualification of the indicating lamps is being addressed under the SQUG program, which has been previously approved by the NRC for use at Ginna.

7. Main Steam Flow

We have reviewed the criteria used to classify post-accident instrumentation at Ginna and have determined that we have misclassified Main Steam Flow indication as a Type A variable. We concur with Regulatory Guide 1.97, revision 3, that the correct classification should be Type D, with Category 2 qualifications. The existing configuration meets these criteria.

The nomenclature 1A/1C entered in Table 1 of our March 13, 1992 submittal as the power source for two channels of main steam flow, and six channels of main feedwater flow (Item 68) represents the Advanced Digital Feedwater Control System (ADFCS) power supply system which auctioneers from instrument buses 1A and 1C. This design has been shown to maintain the independence of the two buses.

8. Letdown Outlet Flow

Regulatory Guide 1.97, revision 3 defines design flow as "the maximum flow anticipated in normal operation". The maximum letdown flow anticipated during normal operation (isolation valve for the largest of three flow restricting orifices open) is 60 gpm. Therefore the range of the instrument listed, 0 - 100 gpm, provides indication of 0 - 167% design flow as

defined in Regulatory Guide 1.97, revision 3, and therefore exceeds the recommended range. Our entry in Table 1, Item 76 of our March 13, 1992 submittal will be modified to reflect this.

9. High-Level Radioactive Liquid Tank Level

Waste drain tank level (LT-1001) indication is provided at the Waste Disposal Panel in the Auxiliary building. In addition high tank level alarms at the panel, and consequently at the main control board (Waste Disposal Panel annunciator). Any operator action based on LT-1001 requires manipulation at the Waste Disposal Panel, and therefore an operator would be dispatched to the panel where the indication is available. We consider this alarm to provide adequate control room Waste Drain Tank level indication. Waste drain tank level indication is also available at a remote terminal in the Technical Support Center.

10. Status of Standby Power

Bulk Nitrogen header pressure (PT-1066) is displayed at the Waste Disposal Panel. In addition low header pressure is alarmed at the panel and consequently at the main control board. Any operator action based on PT-1066 would require local action, and therefore an operator would be dispatched to the panel where the indicator is available.

While the Nitrogen Gas header monitored by PT-1066 does provide nitrogen gas blankets to several radioactive decay tanks, it is not an energy source as described in Regulatory Guide 1.97, revision 3. Therefore RG&E will remove it from its list of post accident instrumentation (Table 1, Item 83).

11. Particulates and Halogens

The range deviations for containment vent and plant vent particulate and halogen monitors were evaluated and found acceptable in NRC SER dated December 4, 1990, same subject (Item 3.3.22). The associated TER states that the regulatory guide basis assumes one common vent whereas Ginna Station has two vents. The ranges monitored are adequate to measure all credible releases through the vents. The ability to obtain post-accident effluent grab samples (i.e. SPING monitor filter changeout) from the plant vent and containment vent, thereby extending the monitored range, was evaluated during NRC inspection 50-244/88-20 and found to be acceptable.

12. Plant and Environs Radiation

The provided range deviations for portable sampling were evaluated and found acceptable in NRC SER dated December 4, 1990, same subject. As stated in the accompanying TER "Because of the potential for personnel exposure, the licensee would not use portable instrumentation to assess radiation levels greater than the provided ranges."

13. Redundancy and Separation

When modifying safety related electrical circuits, including post-accident category 1 instruments, RG&E attempts to comply with IEEE Standard 384-1981, section 6.1 separation criteria if practicable. Deviations from this criteria are addressed in the modification specific safety analysis. RG&E does not consider that separation of individual redundant circuits in the control room would provide any significant benefit, given the existing original design configuration, which does not provide for separation. RG&E has demonstrated the ability to achieve safe shutdown in the event of a complete loss of the control room in response to Appendix R. We believe that this adequately addresses credible multiple failures of redundant equipment in the control room.

14. Equipment Identification

As stated in our March 13, 1992 submittal RG&E feels that the appropriate place to address control board instrumentation labeling and demarcation is in our Detailed Control Room Design Review (DCRDR). This review was performed in accordance with NUREG-0700, and has been reviewed and approved by the NRC. Labeling, demarcation, and color coding of control board instruments is in accordance with the Ginna DCRDR, and the Ginna Human Factors Manual. No requirement exists for commonality of identification of post-accident monitoring instrumentation.

While we concur with the RAI that the Type A post-accident instruments do constitute the minimum set of required indications to be monitored following a design basis event, they do not necessarily constitute the most appropriate instruments to be monitored for any specific event or at any given time. For example the initial actions required of the control board operator during emergency operations involve monitoring instruments to verify proper actuation of automatic safety systems (Type D variables). Depending on the situation, this could include category 3 instruments. We

believe that a common designation for specific post-accident instruments does not provide useful information, could lead to confusion, and may actually distract the operator from monitoring other more appropriate instruments.

We have reviewed the list of Ginna post-accident Category 1 Types A, B and C instruments. Of the variables monitored, non-qualified indication exists for only three. Of these three, two are clearly distinguishable from qualified channels due to range (Containment Pressure channel PT-944 has a range of 0 to 5 psig), and labeling (Pressurizer Level channel LI-433A is labeled "PRZR Cold Calib Level" and is only used for filling the pressurizer). Unqualified channels for RCS Cold Leg Temperature will be evaluated, and means provided to ensure that operators are aware that these channels may not provide correct indication if exposed to a harsh environment. We anticipate this change can be made within six months of issuance of Ginna Regulatory Guide 1.97 SER.

15. Interfaces

Due to the original design of Ginna Station, some existing RG 1.97 designated Category 1 and 2 instruments are not isolated from other circuits and components which would have less stringent design criteria. In the original design of the plant all instrument indication was considered non-safety related. Consequently indicators were normally designed to share the same instrument loop with controllers, annunciators, and plant process computer (PPCS) inputs. Qualification of these various components including the indicators was comparable, i.e. control grade. This portion of the instrument loop is isolated from what was then considered the safety-related portion of the channel if applicable (i.e. RPS or ESFAS).

With the replacement of the PPCS at Ginna, qualified isolation panels (MUX panels) were installed for all inputs to the PPCS. However, separation of redundant input cables to these panels was not upgraded. Circuit separation is discussed in the response to question 13. Isolation from control circuits for Category 2 indications would only be a concern if the control functions were subject to a harsh environment, since seismic qualification and redundancy is not required for Category 2. There is no harsh environment for the equipment at Ginna Station. The degree of redundancy for Category 1 indications minimizes the potential for complete loss of indication. Generally only one channel of these variables provides a controlling function. Also, generally these loops are contained within the control room, where fault levels are minimized. Given the demonstrated ability to safely shutdown the plant outside the control room, and the limited benefit which is considered to be available by additional electrical

isolation in the control room, given existing separation conditions (see question 13), RG&E does not feel that a detailed analysis of each individual loop can be justified.

For the reasons discussed above, RG&E does not feel that categorical isolation of all existing category 1 and 2 indication loops, from control functions is warranted. When it can be accommodated during a major modification, pro-active efforts are made to isolate and upgrade Category 1 indicators in accordance with current standards. We consider this a good faith effort to meet the intent of the Regulatory Guide.

16. Commitment to R.G. 1.97

RG&E has provided documentation comparing Ginna Station post-accident instrumentation to the recommendations of Regulatory Guide 1.97, revision 3. Deviations from the guidance have been explicitly identified, with supporting justification. RG&E post-accident instrumentation is identified in the Ginna UFSAR. As such, any modifications to the equipment must have a safety evaluation performed in accordance with 10CFR50.59. This assures that future modifications to the post-accident instrumentation will not degrade its performance. As described in our responses to question 13 and 15, RG&E attempts to comply with current standards for separation, redundancy, and isolation. Design criteria and safety analyses for modifications document acceptability of alternative standards if "current criteria" cannot be met.

BJF/031

ATTACHMENT 2
Table 1, revision 1
Comparison of Ginna Post-Accident Instrumentation
to Regulatory Guide 1.97, Revision 3 Criteria

Summary of Changes

ITEM(s)	CHANGE	REASON FOR CHANGE
1. 2,4,5,10, 17,21	Deleted as Type A variables	Review of variables against current emergency procedures, and classification criteria established that these variables no longer meet the classification criteria for Type A.
2. 27	Added RCS Hot Leg Channels	Formerly Type A variables
3. 41	Corrected range cited in note to 10 psia to 300% design	The range provided satisfies all recommendations
4. 46	Added Containment hydrogen concentration channels	Formerly Type A variable. New equipment identification number represents change in plant nomenclature
5. 51, 52	Changed loop designators for channels LT-934, PT-936, and PT-940.	Designation change does not affect equipment attributes.
6. 55	Added High Pressure Injection (SI) Flow Channels	Formerly Type A variable
7. 59	Added Pressurizer PORV position indication	Formerly Type A variable
8. 67	Added Main Steam Flow channels; corrected category for FT-498, FT-499	Formerly Type A variable. Category changed to reflect lack of environmental qualification of these 2 channels
9. 69	Added standby auxiliary feedwater flow channels	Formerly Type A variable
10. 76	Corrected channel range	See Attachment 1, Item 8.
11. 80	Added note regarding location of indication	NRC RAI requested this clarification

ITEM(s)	CHANGE	REASON FOR CHANGE
12. 83	Deleted channel PT-1066.	The channel does not monitor a "power source" as described in RG 1.97, revision 3. See Attachment 1, Item 10.
13. 84	Added containment high radiation channels	Formerly Type A variable.

BJF/032

Attachment 2
Table 1, revision 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		deleted										
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		deleted										
5		deleted										

Attachment 2
Table 1, revision 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
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		deleted										

Attachment 2
Table 1, revision 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
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*	* Currently two channels, TE-450, TE-451 are recorded (chart and PPCS). These channels are not post accident environmentally qualified. A modification to provide recording (PPCS or chart) of one qualified channel is proposed. also satisfies item #28
		TE-410B-1 (Loop B)	1	0-700 °F	yes	yes	SR	1C	TI-410B-1	no*	no*	
12		deleted										
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 monitor RHR flow to Containment Spray and SI pumps suction. **A redundant flow transmitter to FT-626 utilizing the same primary element is proposed. also satisfies items #49, 56
		(FT-xxx)**	(1)	(0 - 4000gpm)	(yes)	(yes)	(SR)	(1A)	(yes)	(no)	(yes)	
		FT-931A (Loop A)*	1	0 - 2200 gpm	yes	yes	SR	1C	FI-931A	no	no	
		FT-931B (Loop B)*	1	0 - 2200 gpm	yes	yes	SR	1B	FI-931B	no	no	
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 line temperature, RCP status, RHR flow, SI flow, CETs, RCS pressure, and Tcold. Where both channels have common inputs the input signals to each channel are isolated. also satisfies item #31
		LT-490B	1	0 - 100 %	yes	yes	SR	1C	LI-490B	no	L0496B	

Attachment 2
Table 1, revision 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
16	n.a.	Refueling Water Storage Tank Level	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		deleted										
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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Table 1, revision 1
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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
21		deleted										
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 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
		TI-410A	1	0 - 100 °F subcooled	yes	yes	SR	1C	TI-410A	no	*TSUBB	
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 inch indication corresponds to approximately 500,000 gallons. also satisfies items #34, 43
		LC-943 (A-E)	1	8, 78, 113, 180 ,214 in	yes	yes	SR	1C	yes	no	yes	
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 type B indication at Ginna and is therefore considered catagory 3. * A two pen recorder is provided with switchable inputs from all channels. ** Protection portions of channels only.
		N-35, N-36 (IR)	3	1E-11 to1E-3Amps (IR)	no	yes	SR**	1A/1B	NI-35, 36	yes*	yes	
		N-41A,B; N-42A,B;	3	0 to 100%power (PR)	no	yes	SR**	1A/1B	NI-41, 42	yes*	yes	
		N-43A,B; N-44A,B (PR)	3		no	yes	SR**	1C/1D	NI-43, 44 (B suffix for MCB ind.)	yes*	yes	
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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Table 1, revision 1
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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER 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	
	B	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	
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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Table 1, revision 1
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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	LI-2039	no	L2039	NRC SER dated December 4, 1990 found the instrumentation provided to be acceptable. also satisfies item #42
		LT-2044 (Sump A)	3	0 - 30 ft	no	no	SS	1A	LI-2044	no	L2044	
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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Table 1, revision 1
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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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Table 1, revision 1
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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 10psia to 300% 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	*SPING monitors are powered from a dedicated transformer from MCC D (Safety Related).
		R-15A (SPING)	2	1E-6 to 1E5 µCi/cc	mild	no	SS	*	yes	yes	R15A	

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER COMP	COMMENTS
46	C	Containment H2 Concentration	1	0-10 %	yes	yes	full	1E	yes	Plant	Specific	
	C	HMSLCPA	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.
		HMSLCPB	1	0-10 %	yes	yes	SR	1C	no	yes*	CVHB	
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 tranformer from MCC D (Safety Related).
		R-14 (Plant Exh. Vent)	2	1E-6 to 1E-1 µCi/cc	mild	no	SS	1A	yes	yes	yes	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-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	RECORDER COMP	COMMENTS
51	D	Accumulator Tank Level	2	10 % - 90 %	yes	no	partial	n.p.	no	no		
	n.a.	LT-934 (Loop A)	3	±7 inches from nominal	no	no	SS	1C	LI-934	no	no	NRC SER dated 12/4/90 found the instrumentation provided acceptable. The category 3 designation is consistent with RG&E's category determination philosophy.
		LT-935 (Loop A)	3	±7 inches from nominal	no	no	SS	1B	LI-935	no	no	
		LT-938 (Loop B)	3	±7 inches from nominal	no	no	SS	1C	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 A)	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 category 3 designation is consistent with RG&E's category determination philosophy.
		PT-937 (Loop A)	3	0 - 800 psig	no	no	SS	1B	PI-937	no	no	
		PT-940 (Loop B)	3	0 - 800 psig	no	no	SS	1C	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. NRC SER dated 12/4/90 found the instrumentation provided acceptable.
		MOV-865 (Loop B)	3	open / closed	no	yes	SS	BDC	yes	no	no	
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		
	D	FT-924 (SIP B)	2	0-1000 gpm	yes	yes	SR	1A	FI-924	no	F0924A	
		FT-925 (SIP A)	2	0-1000 gpm	yes	yes	SR	1B, 1C	FI-925	no	F0925A	

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#	TYPE	VARIABLE	CAT.	RANGE	EEQ	SEISMIC	QA	P.S.	C.R. IND.	RECORDER CHART	RECORDER 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	
	D	ZS-430 (PORV)	2	open / close	yes	yes	SR	BDC	yes	no	V0430	* The RTD's downstream of these valves, TE-438 (PORVs) and TE-436 and TE-437 (Safeties), are available in the control room and are considered backup indication of valve position.
		ZS-431C (PORV)	2	open / close	yes	yes	SR	BDC	yes	no	V0431	
		TE-438 (discharge temp.)	3*	0 °F - 300 °F	no	yes	SS	1A	TI-438	no	no	
		ZT-434 (Safety Valve)	2	open - close (inches)	yes	yes	SS	1A	yes	no	no	
		ZT-435 (Safety Valve)	2	open - close (inches)	yes	yes	SS	1A	yes	no	no	
		TE-436,TE-437(dis temp)	3*	0 °F - 400 °F	no	yes	SS	1A	yes, yes	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 PI-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		
	D	FT-464 (SG A)	2	0 - 3.8E6 pph	yes	yes	SR	1A	FI-464	yes**	F0464	* denotes auctioneered power supply from the
		FT-465 (SG A)	2	0 - 3.8E6 pph	yes	yes	SR	1B	FI-465	yes**	F0465	Advanced Digital Feedwater Control System
		FT-474 (SG B)	2	0 - 3.8E6 pph	yes	yes	SR	1C	FI-474	yes**	F0474	(ADFCS).
		FT-475 (SG B)	2	0 - 3.8E6 pph	yes	yes	SR	1D	FI-475	yes**	F0475	**Median of 3 channels per SG is recorded.
		FT-498 (SG A)	3	0 - 3.8E6 pph	no	yes	SS	1A/1C*	FI-498	yes**	F0498	
		FT-499 (SG B)	3	0 - 3.8E6 pph	no	yes	SS	1A/1C*	FI-499	yes**	F0499	
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	auctioneered 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.
	D	FT-4084 (Standby**)	2	0-250 gpm (0-125%)	mild	yes	SR	1A	FI-4084	no	F4084	** Ginna Station has a manual standby
	D	FT-4085 (Standby**)	2	0-250 gpm (0-125%)	mild	yes	SR	1C	FI-4085	no	F4085	auxiliary feedwater, which duplicates the capacity of the motor driven main auxiliary feedwater system.
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	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.

Attachment 2
Table 1, revision 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 - 167 %)	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	0 - 110% design	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	Indication of both tank levels are available at the radwaste panel, and remotely at a terminal in the Technical Support Center. * 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	

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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-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		
	E	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	
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	

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#	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	

Attachment 2
Table 1, revision 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 - 50 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 2

Table 1, revision 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 is 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.