DAIRYLAND Power COOPERATIVE · P.O. BOX 817 · 2615 EAST AV. SOUTH · LA CROSSE, WISCONSIN 54601
(608) 788-4000

July 17, 1985

In reply, please
refer to LAC-11027

DOCKET NO. 50-409

Director of Nuclear Reactor Regulation
Attn: Mr. John Zwolinski, Chief
Operating Brannch #5
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: DAIRYLAND POWER COOPERATIVE (DPC)
LA CROSSE BOILING WATER REACTOR (LACBWR)
PROVISIONAL OPERATING LICENSE NO. DPR-45
POST TMI REQUIREMENTS, SAFETY PARAMETER
DISPLAY SYSTEM
NUREG-0727 SUPPLEMENT, GENERIC LETTER NO. 82-33
REQUIREMENTS FOR EMERGENCY RESPONSE CAPABILITY

References: (1) NRC Letter, Crutchfield to Linder,
dated July 12, 1983.
(2) DPC Letter, Linder to Crutchfield, LAC-9252
dated August 11, 1983.
(3) DPC Letter, Linder to Paulson, LAC-10251
dated October 11, 1984.
(4) DPC Letter, Linder to Zwolinski, LAC-10639
dated March 15, 1985.
(5) NRC Letter, Paulson to Linder,
dated August 17, 1984.
(6) NRC Letter, Crutchfield to Linder,
dated May 14, 1984

Dear Mr. Zwolinski:

Reference 1 requested that DPC discuss how the plant deviates from the guidance in Regulatory Guide 1.97. Reference 2 stated that a report on Regulatory Guide 1.97, Revision 2 will be submitted by July 1985. In 1983, Revision 3 to Regulatory Guide 1.97 was issued. This letter will show in which areas LACBWR meets and deviates from Regulatory Guide 1.97, Revision 3, the current issue.

The enclosed table documents what instrumentation LACBWR has for the variables listed in Reg. Guide 1.97. The BWR listing in the regulatory guide is geared specifically to a General Electric BWR. Since LACBWR is an Allis-Chalmers BWR, systems differ as does the information necessary to determine whether safety functions are being maintained.

A003
1/1

LACBWR is a smaller, simpler plant than the other BWR's. Therefore, not as much information is necessary to determine the safety status of the plant. In some cases where qualified instrumentation is not available for a variable, diverse parameters can be consulted to obtain an approximate status indication.

LACBWR's small size equates to less severe consequences for a major accident than at other plants. A consequence study was submitted to the NRC in Reference 3, with additional information provided in Reference 4. The results of that study were that the radiological consequences of a major accident were acceptable as long as adequate core cooling was maintained. Therefore, the most important information needed during an accident is whether adequate core cooling exists. Other indications are of lesser importance.

Adequate core cooling is provided by any one of the following: 1) water level above the top of the core, 2) 1 High Pressure Core Spray Pump operating, 3) 1 Alternate Core Spray Pump operating with reactor pressure $\leq$ 50 psig, 4) Low Pressure Core Spray Valve open with differential pressure between the reactor and Containment Building less than 30 psid, or 5) Containment Building flooded to core midplane following a LOCA. If the control room instrumentation includes the above information, it is adequate to determine whether the radiological consequences of an accident are acceptable or not.

The control room actually contains considerably more instrumentation than is needed for just determination of adequacy of core cooling. Attachment 1 shows the instrumentation, its range, environmental qualification, redundancy and type of power supply for the variables listed in Regulatory Guide 1.97, Revision 3. All LACBWR control room instrumentation is governed by the approved Quality Assurance program to varying degrees, dependent on the function of the instrumentation.

The consequence study (Reference 3 and 4) discussed earlier detailed the possible effects of the design basis earthquake, safe shutdown methodologies, and plant modifications necessary to implement safe shutdown. The instrumentation which is installed due to resolution of the seismic topic will be qualified to perform following the design basis earthquake (DBE). Since control room instrumentation is not expected to be used following the DBE, seismic qualifications are not needed or discussed in the table.

Attachment 2 discusses the deviations from the guidance provided in Regulatory Guide 1.97. From the review of Attachments 1 and 2, DPC has concluded that sufficient instrumentation is available to determine the magnitude and severity of an accident or transient despite the deviations between LACBWR instrumentation and the Regulatory Guide 1.97 guidance. Where instrumentation is not environmentally qualified, it is not needed during a major loss of coolant and/or diverse parameters are available which provide sufficient information. Therefore, no modifications or additions are necessary due to the Regulatory Guide 1.97 review.

If there are any questions, please contact us.

Yours truly,

DAIRYLAND POWER COOPERATIVE

James W. Taylor
General Manager

FL:LSG:RMB:sks

cc: J. G. Keppler, Region III
NRC Resident Inspector
Walter Paulson, LACBWR Project Manager

Type B †††

Instrument	Category †††	Range	Qualification	Redundance	Power Source	Display
Reactivity Control						
Nuclear Instrumentation Intermediate Range	1					
N3†		10^{-6} to 10% Full Power 10^{-11} to 10^{-4} Amps	Mild	N4	1A Inverter	Control Room
N4†		10^{-6} to 10% Full Power 10^{-11} to 10^{-4} Amps	Mild	N3	1B Inverter	Control Room
Power Range	1					
N5†		10^{-6} to 150% Full Power	Mild	N6	1B Inverter	Control Room
N6†		10^{-6} to 150% Full Power	Mild	N5	1B Inverter	Control Room
N7†		1 to 150% Full Power	Mild	N5,6,8	1B Inverter	Control Room
N8†		1 to 150% Full Power	Mild	N5,6,7	1B Inverter	Control Room
Control Rod Position Primary	3	0-85 inches	Mild	Not Required Secondary, Rods Full In	Rx Building MCC1A	Control Room
Secondary		15 lamps (steps)	Mild	Not Required Primary, Rods Full In	1B Inverter Rx Plant 125 VDC	Control Room
Rod Full In		On/Off	Mild	Not Required Primary, Secondary	1B Inverter Rx Bldg. MCC1A	Control Room
RCS Soluble Boron Concentration Grab Sample	3	0.1-10 ppm - sample can be diluted for extended range	Mild	NA	Station Power	Radio-Chemistry Lab
Core Cooling						
Reactor Water Level	1					
Safety Channel 1		-30 to +30 inch	Harsh	Channel 2,3	1B Inverter	Control Room
Safety Channel 2		-30 to +30 inch	Harsh	Channel 1,3	1A Inverter	Control Room
Safety Channel 3		-30 to +30 inch	Harsh	Channel 1,2	1C Inverter	Control Room
Core Temperature *	NA	NA	NA	NA	NA	NA

* Not Plant Specific
† Recorded Continuously
†† Stored In Computer Memory
††† As Defined In Regulatory Guide 1.97

WP1.4.6

Type B

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Reactor Coolant System Integrity						
Reactor Pressure	1					
Safety Channel 1†		0-1600 psig	Mild	S.S. Channel 2	1A Inverter	Control Room
Safety Channel 2		0-1600 psig	Mild	S.S. Channel 1	1B Inverter	Control Room
HPCS ††		0-1400 psig	Harsh	S.S. Channel 1 and 2	1B Inverter	Control Room
Narrow Range †		1200-1400 psig	Mild	S.S. Channel 1 and 2 HPCS	1B Inverter	Control Room
Drywell Pressure *	NA	NA	NA	NA	NA	NA
Drywell Sump Level -	1	0-12'	Mild		1B Inverter	Control Room
Containment Retention		0-12'	Mild		1B Inverter	Control Room
Tank Level (2 Channels)			Mild	Level Switch High Alarm	120V Reg. TBMCC1A 125V Rx Plant DC	Control Room
Containment Integrity						
Containment Pressure	1					
Channel 2		0-70 psig	Mild	Channel 1 **	1A Inverter	Control Room
Channel 1 †,††		-5 to 200 psig	Mild	Channel 2 **	1B Inverter	Control Room
Primary Containment Isolation Valve Position	1					
Containment Ventilation		Open-Closed	Mild	Two Inlet Two Outlet	1B Inverter	Control Room
4" Vent Header		Open-Closed	Mild	External Valve	1B Inverter	Control Room
Decay Heat Blowdown		Slide-Wire 0-100%	Mild	None	1B Inverter	Control Room
Retention Tank Discharge		Open-Closed	Mild		1B Inverter	Control Room
				Liquid Waste Flow Indication (0-99.9 GPM)	1B Inverter	Control Room

* Not Plant Specific
** Redundant For Analyzed Accident Range
† Recorded Continuously
†† Stored In Computer Memory

WP1.4.6

Type B

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Primary Containment Isolation Valve Position (cont'd)	1					
Main Steam Isolation Valve (MSIV)		Open-Closed	Mild		Rx Plant 125 VDC	Control Room
				External Valve (Turbine Building MSIV)	TBMCC 1A	Control Room
				Slide Wire on Rx Bldg. MSIV (0-100%)	1B Inverter	Control Room
Shutdown Condenser Leg Drain		None	None	None	None	None
Heating Steam Condensate Return		Open/Closed	Mild	Normally Closed External Valve	Rx Plant 125 VDC	Control Room

* Not Plant Specific

Type C

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Fuel Cladding						
Radioactivity Concentration or Radiation Level in Circulating Primary Coolant - Offgas Monitor †	1	$0-10^6$ cpm (~$0-10^4$ μCi/cc or ~ $0-10^3$ Ci/day)	Mild		1B Inverter	Control Room
				Victoreen Fuel Integrity Offgas Monitor ($0-10^7$ mR/hr)	1B Inverter	Control Room
Analysis of Primary Coolant (γ spectrum)	3	10^{-7} to 10^{-2} μci/ml sample can be diluted to cover extended range	Mild	3 detectors 2 separate spectrum outlets	TSC Inverter 1B Diesel Generator	Plant Lab
Core Temperature*	NA	NA	NA	NA	NA	NA
Reactor Coolant Pressure Boundary						
Reactor Pressure	1					
Safety Channel 1 †		0-1600 psig	Mild	S.S. Channel 2	1A Inverter	Control Room
Safety Channel 2		0-1600 psig	Mild	S.S. Channel 1	1B Inverter	Control Room
HPCS ††		0-1400 psig	Harsh	S.S. Channel 1 and 2	1B Inverter	Control Room
Narrow Range †		1200-1400 psig	Mild	S.S. Channel 1,2, HPCS	1B Inverter	Control Room
Containment Radiation †	3	0.1-10 R/Hr (5 detectors	Mild		1B Inverter	Local and
		0.1-100 R/Hr (2 detector	Mild		1B Inverter	Control Room
			Harsh	Cont. Bldg. High Range Area Radiation Monitor 10^0-10^8 R/Hr (2 Chan.)	1B Inverter 1B Diesel Generator	Control Room
Drywell Sump Level (Retention Tank Level) 2 Channels	1	0-12'	Mild		1B Inverter	Control Room
		0-12'	Mild		1B Inverter	Control Room
				Level Switch High Alarm	120V Reg. TBMCC1A 125 V Rx Plant DC	Control Room
Suppression Pool Level *	NA	NA	NA	NA	NA	NA
Drywell Pressure *	NA	NA	NA	NA	NA	NA

* Not Plant Specific
† Recorded Continuously
†† Stored In Computer Memory

WT1.4.6

Type C

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Containment						
Reactor Pressure	1					
Safety Channel 1 †		0-1600 psig	Mild	S.S.Channel 2	1A Inverter	Control Room
Safety Channel 2		0-1600 psig	Mild	S.S.Channel 1	1B Inverter	Control Room
HPCS ††		0-1400 psig	Harsh	S.S.Channel 1 and 2	1B Inverter	Control Room
Narrow Range †		1200-1400 psig	Mild	S.S.Channel 1,2 and HPCS	1B Inverter	Control Room
Containment Pressure	1					
Channel 1 †,††		-5 to 200 psig	Mild	Channel 2 **	1B Inverter	Control Room
Channel 2		0-70 psig	Mild	Channel 1 **	1A Inverter	Control Room
Containment Hydrogen	1					
Channel 1 ††		0-25%	Mild	Channel 2	TB MCC1A Reg. Bus	Local and Control Room
Channel 2		0-25%	Mild	Channel 1	TB MCC1A Reg. Bus	Local and Control Rooom
Containment and Drywell Oxygen* (for inerted containments)	NA	NA	NA	NA	NA	NA
Containment Effluent Identified Release Points	3					
Gaseous Monitor ††		10^{-6} to 10^{-2} µCi/cc	Mild	PING 3 or SPING 4	Rx Bldg. MCC1A (pump) Rx Bldg. MCC1B (Monitor)	Local and Control Room
Auxiliary Buildings*	2					
PING 3 ††		10^{-7} to 10^{3} µCi/cc	Mild	SPING 4	TBMCC1A - Reg. Bus	Local and Control Room (CT-2)
SPING 4 ††		10^{-7} to 10^{5} µCi/cc	Mild	PING 3 **	TBMCC1A	Local and Control Room (CT-2)

* Not Plant Specific
** Redundant For Analyzed Accident Range
† Recorded Continuously
†† Stored In Computer Memory

WP1.4.6

Type D

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Condensate and Feedwater System						
Main Feedwater Flow †	3	0-800,000 lbm/hr	Mild	Not Required	1B Inverter	Control Room
Condensate Storage Tank	3	0-10 ft.	Mild	Not Required	1B Inverter	Control Room
Primary Containment Related Systems						
Suppression Chamber Spray * Flow	NA	NA	NA	NA	NA	NA
Drywell Pressure *	NA	NA	NA	NA	NA	NA
Suppression Pool Level *	NA	NA	NA	NA	NA	NA
Drywell Atmosphere * Temperature	NA	NA	NA	NA	NA	NA
Drywell Spray Flow *	NA	NA	NA	NA	NA	NA
Main Steam						
Main Steamline Isolator Valve Leakage Control System*	NA	NA	NA	NA	NA	NA
Primary System Safety Relief Valve Position Indication (3 Valves)	2	Open-Closed	Harsh	Thermocouples	Rx Plant 125 VDC	Control Room
MDS Valve Position 1AC and 1DC Valve	NA	Open-Closed	Harsh	Not Required	Rx Plant 125 VDC 1B Inverter	Control Room
MSIV Indication		Open-Closed	Mild	External valve (turbine building MSIV)	Rx Plant 125 VDC TBMCC 1A	Control Room
Safety System				Slidewire on Rx bldg. MSIV (0-100%)	1B Inverter	
Shutdown Condenser System						
Valve Position Steam Inlet 2 channels	2	Open-Closed	Harsh	2 Channels	Gen. Plant 125 VDC Rx Plant 125 VDC	Control Room Control Room
				Valve Positioner Slidewire	1B Inverter	Control Room

* Not Plant Specific
† Recorded Continuously

WP1.4.6

Type D

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Shutdown Cond. System (Cont'd)						
Condensate Outlet Valve Position	2	Open-Closed	Harsh	Not Required	Rx Plant 125 VDC Gen. Plant 125 VDC	Control Room
Offgas Vent Valve Position	2	Open-Closed	Harsh	Not Required	Rx Plant 125 VDC	Control Room
Condensate Leg Drain Valve Position	2	None	None	Not Required	None	None
Secondary Level	2	-16 to +16 inches	Mild	Not Required	1B Inverter	Control Room
RCIC Flow *	NA	NA	NA	NA	NA	None
HPCI Flow *	NA	NA	NA	NA	NA	None
HPCS Flow ††	2	0-120 gpm	Harsh	Not Required	1B Inverter	Control Room
ACS Flow ††	2	0-1300 gpm	Mild	Not Required	1B Inverter	Control Room
LPCS Valve Position	2	Open-Closed	Harsh	Flow Alarm	1B Inverter Rx Plant 125 VDC TBMCC1A Reg. Bus	Control Room Control Room
SLCS Flow *	NA	NA	NA	NA	NA	NA
SLCS Storage Tank Level *	NA	NA	NA	NA	NA	NA
Residual Heat Removal System						
RHR System Flow *	NA	NA	NA	NA	NA	NA
RHR Heat Exchange * Outlet Temperature	NA	NA	NA	NA	NA	NA
Cooling Water System						
Cooling Water Temperature to * ESF System Components Cooling Water Flow	NA	NA	NA	NA	NA	NA
Cooling Water Flow to ESF * System Components	NA	NA	NA	NA	NA	NA

* Not Plant Specific
** Redundant For Analyzed Accident Range
†† Stored In Computer Memory

WF1.4.6

Type D

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Radwater Systems						
Retention Tank Levels (2 Channels)	3	0-12' 0-12'	Mild Mild		1B Inverter 1B Inverter	Control Room
				Level Switch High Alarm	120V Reg. TBMCC 1A 125V Rx Plant DC	Control Room
Ventilation System						
Emergency Ventilation Damper * Position	NA	NA	NA	NA	NA	NA
Power Supplies	2					
TB MCC1A /1A Diesel Generator		0-600 V	Mild	Not Required	N/A	Control Room
TB MCC1A		0-500 Amp	Mild	Not Required	N/A	Control Room
1A D/G AMPS		0-500 Amp	Mild	Not Required	N/A	Control Room
Rx Bldg. MCC1A/1B Diesel Generator Voltage		0-600 V	Mild	Not Required	N/A	Control Room
1B Ess. Switchgear Amps		0-1500 Amps	Mild	Not Required	N/A	Control Room
1B Diesel Generator Amps		0-800 Amps	Mild	Not Required	N/A	Control Room
1B Diesel Building 125 VDC		0-150 V	Mild	Not Required	N/A	Control Room
1A Static Inverter Voltage Low		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room
1B Static Inverter Trouble		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room
1C Static Inverter Voltage Low		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator 1A Low Battery Voltage		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator 1A Breaker Trip		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room
1A Diesel Generator Not in Auto		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator Neutral Ground		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator 1B Not in Auto Mode		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room

* Not Plant Specific
** Redundant for Analyzed Accident Range

Type D

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Power Supplies (cont'd)	2					
Diesel Generator Battery Changer Trouble		Annunciator Panel F	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Building 125 VDC Bus Ground or Low Voltage		Annunciator	Mild	Not Required	Gen. Plant 125 VDC	Control Room
1B Static Inverter Static Switch Bypass		Annunciator	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator 1B Trouble		Annunciator	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator 1B Auto Start		Annunciator	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator 1B Running		Annunciator	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator 1B Breaker Tripped		Annunciator	Mild	Not Required	Gen. Plant 125 VDC	Control Room
Diesel Generator 1B Test		Annunciator	Mild	Not Required	Gen. Plant 125 VDC	Control Room
125VDC kx Plant Charger Current		0-200A	Mild	Not Required	NA	Elect. Eq. Rm
125VDC Rx Plant Battery Current		100-0-200A	Mild	Not Required	NA	Elect. Eq. Rm
125VDC Rx Plant Battery Voltage		0-150 VDC	Mild	Not Required	NA	Elect. Eq. Rm
125 VDC Rx Plant Bus Tie Current		100-0-200A	Mild	Not Required	NA	Elect. Eq. Rm
Rx Plant Battery Charger Failure		Annunciator	Mild	Not Required	Rx Plant 125 VDC TBMCC1A Reg. Bus	Control Room
Rx Plant 125 VDC Ground		Annunciator	Mild	Not Required	Rx Plant 125 VDC TBMCC1A Reg. Bus	Control Room
125VDC Generator Plant Battery Current		100-0-200A	Mild	Not Required	NA	Elect. Eq. Rm
125 VDC Generator Plant Charger Current		0-200A	Mild	Not Required	NA	Elect. Eq. Rm

* Not Plant Specific

Type D

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Power Supplies (cont'd)						
125VDC Generator Plant Bus, Charger or Battery Voltage		0-150V	Mild	Not Required	NA	Elect. Eq. Rm
Generator Plant Battery Charger Failure		Annunciator	Mild	Not Required	Rx Plant 125 VDC TBMCC1A Reg. Bus	Control Room
Generator Plant 125 VDC Ground		Annunciator	Mild	Not Required	Rx Plant 125 VDC TBMCC1A Reg. Bus	Control Room

Type E

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Containment Area Radiation						
High Range Area Monitor (2 Channels) Cont. Bldg. High Rad. Area Radiation Monitor †,††	1	Approximately 5 R/hr to to 10^8 R/hr	Harsh	2 Channels	1B Inverter 1B Diesel Generator	Control Room
Reactor Building or Secondary Containment †	2	0.1 to 10 R/hr (5 Ch.) 0.1 to 100 R/hr (2 Ch.)	Mild Mild	 Cont. Bldg. High Rad. Area Radiation Monitor	1B Inverter 1B Inverter 1B Inverter 1B Diesel Generator	Local and Control Room Control Room Control Room
Area Radiation						
Turbine Building †	3	0.1 to 10 R/Hr (6 Ch.)	Mild	Other Channels	1B Inverter	Local and Control Room
Airborne Radioactive Materials Released from Plant						
Common Release Point Noble Gases (For 1 or 2 Stack Blowers) ††	2	PING 3 10^{-7}-10^{3} µCi/cc SPING 4 10^{-7}-10^{5} µCi/cc	Mild Mild	SPING 4 PING 3 **	TBMCC 1A Reg. Bus TBMCC 1A	Local and Control Room CT2
Part. & Halogens	3	10^{-7} to 10^{-2} µCi/ml	Mild	1 detector with ND 66 3 detectors/2 separate gamma spectroscopy terminals	ND 6600 UPS/1B D/G House	Radio-Chemistry Lab Radio-Environ. Lab
Environs Radiation and Radioactivity						
Environ - airborne radio-Halogens and Particulates	3	10^{-9} µCi/cc - 10^{-3} µCi/cc	Mild	7 Air samplers	ND 6600 UPS Vernon Electric Coop	NA
Plant and Environment Radiation	3	2 Extenders 0-1000 R/Hr scale not calibrated 0-100 R/Hr in last cal.	Mild	R03 0-5R R03A 0-50R	N/A	Local
Plant & Environ. Radioactive Part. inst.	3	No portable isotopic analysis device.	None	Not Required	None	None

* Not Plant Specific
** Redundant For Analyzed Accident Range
† Recorded Continuously
†† Stored In Computer Memory

WP1.46

Type E

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Meteorology						
Wind Direction	3					
10 M †,††		0-540°	Mild	Not Required	1B Diesel Generator Switchgear	Control Room
100M †,††		0-540°	Mild	Not Required	1B Diesel Generator Switchgear	Control Room
Wind Speed	3					
10M †,††		0-100 mph	Mild	Not Required	1B Diesel Generator Switchgear	Control Room
100M †,††		0-100 mph	Mild	Not Required	1B Diesel Generator Switchgear	Control Room
Atmospheric Stability †,††	3	-5°C to +5°C	Mild	Not Required	1B Diesel Generator Switchgear	Control Room
Accident Samples						
1. Primary Coolant & Sump	3	PASS System-Pri. Coolant	Mild/Harsh as required	None	TBMCC 1A	Various
Gross Activity	-	Any range $\geq 10^{-8}$ Ci/cc with dilution	Mild	3 Units	1A D/G Ess. Power	Radio-Chemistry Lab
Gamma Spect.		Any range $\geq 10^{-8}$ Ci/cc with dilution	Mild	3 detector/2 spect. units	1A D/G Ess. Power	Radio-Chemistry Lab
Boron Concentration		0.1-10 ppm - ssmple dilution can be used for extended range	Mild	NA	Station Power	Radio-Chemistry Lab
Chloride		Any range through dilution	Mild	NA	1A D/G Ess. Power	Radio-Chemistry Lab
Dissolved H_2 or TG		No		None	None	None
Dissolved O_2		Chemets are available		NA	NA	Radio-Chemistry Lab
pH		1-14		2 Units	1A D/G Ess. Power	Radio-Chemistry Lab

* Not Plant Specific
† Recorded Continuously
†† Stored In Computer Memory

Type E

Instrument	Category	Range	Qualification	Redundance	Power Source	Display
Containment Air-Grab Sample						
Gamma Spectroscopy	3	Any range $\geq 10^{-8}$ μCi/cc with dilution	Mild	3 detectors/2 spect. units	1A D/G Ess. Power	Radio-Chemistry Lab
H_2		0-100% Lower Explosive Limit (~4-75%)	Mild	2 Installed H_2 monitors in P.A.S.S	Battery	Local
O_2		0-25%	Mild	None	Battery	Local

* Not Plant Specific

ATTACHMENT 2

Justification for Deviations from Regulatory Guide 1.97 and Comments

Reactor Water Level

Comment: Reactor water level is the only identified Type A variable. Manual action is needed to terminate reactor water level increase during an increase in feedwater flow (runaway feedpump) transient. The reactor does automatically scram on high reactor water level, but the feedpump does not automatically trip on high water level. The water level increase needs to be terminated to avoid exceeding the maximum level analyzed for contained energy in the Containment Building in the event of a LOCA. Otherwise, the operability of the Containment Building, if a LOCA occurred, following the increase in feedwater flow transient could be challenged.

Deviation: Range of -30 to +30 inches with 0" nominal operating level. -30 corresponds approximately to the top of core. Environmentally qualified channels not recorded.

Justification: The most important information supplied by water level instrumentation is whether water level is normal and whether the core is covered during a transient or accident. As discussed in the cover letter, water level above the top of core provides adequate core cooling. Once the water level drops below the top of core, other methods and hence indication of adequate core cooling are needed (e.g. Alternate Core Spray Flow, Containment Building water level). Therefore, the installed qualified instrumentation provides the information needed. Following a Maximum Credible Accident (MCA), the Containment Building is flooded to core midplane. The CB water level instruments provide the necessary water level indication during the flood up condition. Core midplane is at 330 inch on a 0-500 inch scale. Recording not needed for determination of adequacy of core cooling.

Nuclear Instrumentation

Deviation: Not environmentally qualified for harsh environment.

Justification: During an accident involving adverse environmental conditions in the Containment Building (CB), the reactor will quickly scram, so neutron flux instrumentation will not be needed. The nuclear instrumentation and rod position indication are sufficiently separated that confirmation of shutdown may be obtained, if desired, prior to the failure of the nuclear instrumentation and rod position indications. During a transient, including an Anticipated Transient Without Scram (ATWS), in which the Nuclear Instrumentation is needed, adverse environmental conditions will not exist, so the instrumentation will be able to function during appropriate events.

RCS Soluble Boron Concentration Grab Sample

Comment: The LACBWR Boron Inject System is a manual non-safety grade system.

Reactor Presssure

Deviation: LACBWR has 1 harsh environmentally qualified 0-1400 psig instrument with 2 backup 0-1600 psig instruments that are qualified for a mild environment vs. redundant harsh environment qualified 0-1500 psig instruments.

Justification: Scale - The primary system low set safety valve is set to relieve at less than 1400 psig.

Qualification/redundancy - In the case of a large break, Containment Building pressure is available as a diverse parameter to serve as a backup to the harsh environment qualified reactor pressure instrument.

Drywell Sump Level

Comment: LACBWR has a Containment Building rather than a drywell and Reactor Building as do the General Electric designed BWRs. Waste water generated in the Containment Building is collected in the 2 Retention Tanks. Therefore, Retention Tank level indication provides similar information to drywell sump level indication in a GE plant.

Deviation: Retention Tank Level indicators are not qualifed for harsh environments. No installed recorder.

Justification: Retention Tank Level indication is useful in detecting a leak, by evaluating changes in level indication. Operators take periodic readings of the level indication and the rate of water accumulation is calculated daily and if a significant unexpected change is observed. The level indication is only useful in detecting a leak, not in responding to a break. If a major LOCA occurred causing environmentally harsh conditions in the C.B., there would be no need for Retention Tank level indication. Even during reflood, C.B. level instrumentation is monitored, not Retention Tank level. Therefore, Retention Tank level instrumentation would be operable when useful and is sufficient.

Containment Pressure

Deviation: Range recommended is -5 psig to design pressure, which is 60 psig. Range of 1 channel is -5 to 200 psig, the other 0-70 psig.

Justification: The channels are redundant in the analyzed accident range of 0-48.5 psig. Vacuum breakers set at -0.5 psig are installed to prevent an excessive negative pressure. Refer to Reference 5 for a discussion of C.B. pressure indication.

Primary Containment Isolation Valves Position

Deviation: Valve position indication not environmentally qualified for a harsh environment. This applies to the following valves: Reactor Building Main Steam Isolation Valve (MSIV), MSIV Bypass Valve, Containment Building Dampers, 4-Inch Vent Header Internal Valve, Retention Tank Discharge Valve, Heating Steam Condensate Return Valve and Decay Heat Blowdown Valve. There is

no position indication for the Shutdown Condenser Condensate Leg Drain Valve. Valve positions are not recorded.

Comment: Position indication is planned to be installed for the Shutdown Condenser Condensate Leg Drain Valve as a result of the Detailed Control Room Design Review, which is under review by the NRC.

Justification: All these valves close automatically on diverse containment isolation signals. The Major Primary System Leak Procedure requires that manual valves be closed if automatic valves do not close automatically. All but the RBMSIV are air-operated and fail close on loss of air. All but the Heating Steam Condensate Return Valve, fail close on loss of power. A manual valve in the Heating Steam Condensate Return line is maintained locked closed during Operational Conditions 1 and 2.

A redundant isolation valve located in the Turbine Building operable from the control room is installed on the main steam and vent header lines. Similar capability is being installed for the Retention Tank discharge line, which is isolated except during a Retention Tank discharge. The Decay Heat Blowdown Valve is maintained closed during power operation. It is used for water level control during startups and while shutdown.

Containment isolation capability was reviewed under the Systematic Evaluation Program and is not an issue here. It is discussed to demonstrate the assurance of containment isolation post-accident and so the relative unimportance of valve position indication.

Containment isolation will occur at the onset of a large break LOCA situation. Indication would be expected to indicate initially. Verifying containment isolation is one of the first steps of the Major Primary System Leak Procedure. Following a small break, the indication would definitely be expected to be working for a period of time.

If the isolation valve indications fail following a LOCA, diverse parameters can be used to determine if the Containment Building is isolated. Containment Building pressure and stack (SPING 4) radioactivity would provide information on containment isolation. A comparison of Containment Building High Range Area Radiation Monitor indication and stack activity with expected relative values based on design leakage rate can be conducted to determine if the containment is isolated.

Based on the fail-safe failure mode of the containment isolation valves, that indication is expected to be functioning initially, and the availability of the diverse parameters, harsh environmental qualification is not necessary for containment isolation valves position indication.

Due to the nature of the containment isolation system, valve position is not a parameter which needs to be trended. The valves would close or fail close at the beginning of the accident. Closure signals would not be reset during an accident, so valves would not reopen.

Radioactivity Concentration or Radiation Level in Circulating Primary Coolant

Deviation: No primary coolant in-line radioactivity or radiation level monitor.

Justification: In a BWR, monitoring offgas activity levels is a demonstrated method of detecting fuel and cladding degradation. Redundant offgas monitors are installed which cover normal operating range to approximately the Technical Specification limit. For post-accident conditions, the CB activity and radiation monitors will show increased levels if the fuel cladding is damaged. A correlation has been developed and posted which relates the CB High Range Area Radiation Monitor indication to fuel damage. With the combination of offgas and Containment Building monitors, breaches in cladding or fuel can be detected, so the purpose of the recommended primary coolant radioactivity concentration or radiation level monitor is fulfilled.

Containment Hydrogen Concentration

Deviation: Range 0-25% vs. recommended 0-30%.

Comment: Redundant hydrogen analyzers are located in Containment Atmosphere Post Accident Sampling System pathway outside the Containment Building.

Justification: Since the LACBWR fuel is clad with stainless steel, hydrogen generation will be significantly lower than at other BWR's. Refer to Reference 6 for discussion of hydrogen monitoring at LACBWR.

Vent Flow Rate

Deviation: No stack flow rate instrumentation.

Justification: Flow rate is approximated by number of stack blowers operating. The control switches with on/off indication for the 2 blowers are located in the control room. Individual sample monitor flow rate is available locally.

Airborne Radioactive Materials Released from the Plant - Particulates and Halogens (Sampling with Onsite Analysis Capability)

Deviation: Range 10^{-7} to 10^{-2} µCi/ml vs. recommended 10^{-3} to 10^{2} µCi/ml.

Justification: Higher concentrations can be analyzed by reducing quantity of filter media to be analyzed.

Shutdown Condenser Shell Side Water Level

Deviation: Not qualified for harsh environment and range is -16 inches to +16 inches vs. recommended top to bottom.

Justification: Range is adequate to cover normal operating band of -6 inches to +6 inches. The accident which creates a harsh environment is a major loss of coolant. During a major loss of coolant, the Shutdown Condenser is not needed as a condenser, though it may be needed as a pathway to the Manual Depressurization Valves for the primary system. Therefore, during a major loss of coolant shell side water level indication would not be needed and it's lack of harsh environmental qualifications does not constitute a problem.

Alternate Core Spray Flow

Comment: Flow instrument located outside Containment Building.

Containment and Turbine Building Effluent Radioactivity

Comment: The Containment Building and Turbine Building share a common release point - the stack. The PING 3 and SPING 4 monitor isokinetic sample streams of the stack effluent. The SPING 4 is located in an area for which it is environmentally qualified (mild). In case of a main steam line break outside containment, the SPING 4 could be adversely affected, but the PING 3 would not be.

Plant and Environs Radioactivity (portable instrumentation)

Deviation: No portable isotopic analysis device.

Justification: A detector and gamma spectroscopy terminal can be moved to an offsite location if the need or desire arises. Portable radiation monitors will give quick indication of plume pathway and deposition, which is more important than isotopic determination in the short term. Samples can be taken and analyzed in the laboratory.

Estimation of Atmospheric Stability

Deviation: Range or -5°C to +5°C rather than the recommended -5°C to +10°C.

Justification: The stability class if the temperature difference is +4°C or greater is Class G. Therefore, no additional useful information is gained with the range extended from +5°C to +10°C.

Sump Grab Sample

Deviation: The guidance recommends capability be installed for obtaining containment sump, ECCS pump room sumps and other similar auxiliary building sump liquid samples. No specific containment sump or Retention Tank sampling capability is installed external to the Containment Building.

Comment: As discussed earlier, there is no auxiliary building at LACBWR. The Containment Building contains much of the equipment installed in other plants' auxiliary buildings.

Justification: Since the Retention Tanks will contain a diluted primary coolant following a LOCA, sampling the primary coolant will provide a conservative estimate of Retention Tank activity in the shorter term. Following CB floodup to core midplane, the Reactor Coolant PASS sample will be indicative of water in the reactor vessel and Containment Building.

Dissolved H_2 or Total Gas

Deviation: No capability for analyzing dissolved H_2 or Total Gas in water samples.

Justification: Since the LACBWR fuel is clad with stainless steel, very little H_2 will be generated, so analysis capability is not required. See Reference 6 for discussion of low H_2 generation. Capability exists for analyzing H_2 concentration in containment air.

Containment Air Hydrogen - Grab Sample

Deviation: Range of 0-100% Lower Explosive Limit, which is approximately 4-75% H_2 vs. recommended 0-10% H_2.

Justification: The monitor covers the explosive range, which is the range of concern. The Containment Air Post Accident Sampling System in-line analyzers cover the range of 0-25% so it is unlikely that the grab sample would be additionally analyzed for H_2. The Containment Building is ventilated during normal operation, so there is no buildup of gases.

Containment Air Oxygen - Grab Sample

Deviation: Range of 0-25% vs. recommended 0-30%.

Justification: More than adequate to cover normal breathing range and expected post-accident containment concentration. The source of the containment spray system is demineralized water stored in an overhead storage tank. The available range is adequate to determine if a combustible atmosphere exists. Since the Containment Building is ventilated during normal operation, there would be no buildup of gases prior to an accident.

Containment and Turbine Building Area Radiation Monitors

Comment: The Turbine Building and Containment Area Radiation monitors are recorded on a multipoint recorder, however, a strip chart recorder is installed for the Containment Building High Range Area Radiation Monitor. One channel of the Containment Building High Range Area Radiation Monitor is also stored in computer memory.