

Public Service
Company of Colorado

2420 W. 26th Avenue, Suite 100D, Denver, Colorado 80211

July 14, 1989
Fort St. Vrain
Unit No. 1
P-89260

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Docket No. 50-267

SUBJECT: Emergency Response Capabilities:
Regulatory Guide 1.97

- REFERENCES: 1) PSC Letter, Warembourg to
Document Control Desk, dated
November 2, 1988 (P-88326)
- 2) NRC Letter, Heitner to Williams
dated April 19, 1989 (G-89137)
- 3) PSC Letter, Crawford to Document
Control Desk/Hebdon, dated
June 16, 1989 (P-89218)

Gentlemen:

The purpose of this letter is to provide you with the current status of all Regulatory Guide (RG) 1.97 instrumentation as required by reference 2 and scheduled by reference 3.

This status is provided as Table A (attachment 1) which supersedes all previous submittals. Table B (attachment 2) lists the differences and the basis for the differences between Table A and the previous submittal provided by reference 1.

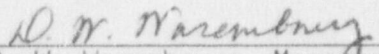
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If you have any questions on this matter, please contact Mr. M. H. Holmes at (303) 480-6960.

Very truly yours,


D. W. Warembourg, Manager
Nuclear Engineering Division

DWW/DJG:nan

Attachments

cc: Regional Administrator, Region IV
Attn: Mr. T. F. Westerman, Chief
Projects Section B

Mr. Robert Farrell
Senior Resident Inspector
Fort St. Vrain

TABLE A
SUMMARY REPORT
POST ACCIDENT MONITORING INSTRUMENTATION

VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CIL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
<u>Plant Specific</u>							
A1	Prestressed Concrete Reactor Vessel (PCRV) Pressure	1	PE-1108 PE-1109 PE-1110	0-1000 psia	PI-1108 PI-1109 PI-1110	Provide information to operator to indicate when depressurization should terminate	Qualified for DBA1, MCA and LNSC conditions
<u>Reactivity Control</u>							
B1	Neutron Flux	1	NE-1133-1 NE-1134-1 NE-1135-1 NE-1133-1 NE-1134-1 NE-1135-1 NE-1131 NE-1132	10E-7 to 10E+3% Full Power 0 to 150% Full Power 1 to 3x10E5 Counts per second	NI-1133-1 NI-1134-1 NI-1135-1 NI-1133-3 NI-1134-3 NI-1135-3 NI-1131-1 NI-1132-1	Indicate neutron flux rate of the core	Channels qualified for DBA1, MCA and LNSC conditions. Outage required to install qualified transmitters and to verify or install adequate protection from harsh environments for circuit connections to qualify for DBA2 and HELB conditions.
B2.a	Control Rod Position	3	ZSL-1211-1 thru ZSL-1211-37	Full in or not full in	ZIL-1211-1 thru ZIL-1211-37	Verification of rod position	Channels qualified
B2.b	Control Rod Position	3	ZI-1233-1 thru ZI-1233-37	0-192"	ZI-1233-1 thru ZI-1233-37	Verification of rod position	Channels qualified
B3	Reserve Shutdown System Bottle Press.	3	PI-2409	0-1500 psig	PI-2409	Verification of system pressure	Channel qualified
<u>Core Cooling</u>							
B4	Core Outlet Temp.	3	TE-11101-2 thru TE-11137-2	100-2300 degrees F	I-93515 I-93516	Function detection	Channels qualified
B5	Maximum Region Outlet Temperature Mismatch	3	TE-11101-1 thru TE-11137-1	100-2300 degrees F	XI-9006 (Computer Calc.)	Verification and prevention of hot spots	Channels qualified
B6	Helium Circulator Inlet Temperature	3	TE-11171 thru TE-11178	100-1000 degrees F	II-11187	Status of cooling	Channels qualified

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B7	PCR Pressure	1	PE-1108 PE-1109 PE-1110	0-1000 psia	PI-1108 PI-1109 PI-1110	Verification of cooling	Qualified for DBA1, MCA, and LNSC conditions. Outage required to verify or install adequate protection from harsh environment (DBA2 & HELB) for leads and connections contained in horn extensions
B8	Helium Circulator Speed	3	SE-2105-1 SE-2106-1 SE-2111-1 SE-2112-1	0-12,000 RPM	SI-2109 SI-2110 SI-2115 SI-2116	Verification of primary coolant flow	Channels qualified
B8.a	Steam Generator EES Outlet (Main Steam) Temperature	1	TE-22121 TE-22122	0-1200 degrees F	IR-22121 IR-22122	Indicate proper operation	Channels qualified
B8.b	Steam Generator EES Outlet (Main Steam) Pressure	1	PI-22129-1 PI-22130-1	0-3000 psig	PI-22129-1 PI-22130-1	Indicate existence of steam at outlet	Channels qualified
B8.c	Steam Generator EES Inlet (Feedwater)	3	FI-2205 FI-2206	0-1,250 M-lb/hr	FR-2205 FR-2206	Indicate adequate flow of water for heat removal	Channels qualified
<u>Reactor Coolant System Integrity (liner and primary closure)</u>							
B9	Prestressed Concrete Reactor Vessel (PCR) Pressure	1	PE-1108 PE-1109 PE-1110	0-1000 psia	PI-1108 PI-1109 PI-1110	Verify pressure is within design limits	Same as variable B7
B10	Penetration Inter- Space Flow	3	FE-11263	0-4.3 ACFM	FI-11263	Indication of primary closure integrity	Channel qualified
B11	Helium Circulator Seal Status	3	ZS-21191-1 ZS-21191-2 ZS-21191-3 ZS-21191-4 ZS-21192-1 ZS-21192-2 ZS-21192-3 ZS-21192-4 ZS-21193-1 ZS-21193-2 ZS-21193-3 ZS-21193-4 ZS-21194-1 ZS-21194-2	Seal set or not set	XI-21191-1 XI-21191-2 XI-21192-1 XI-21192-2 XI-21193-1 XI-21193-2 XI-21194-1 XI-21194-2	Indicate primary barrier integrity when circulator is stopped	Channels qualified

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VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CTL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
B12	Hot Reheat Steam Radiation	3	RI-93250-10 RI-93251-10 RI-93252-10 RI-93250-11 RI-93251-11 RI-93252-11	0-1-1000 mr/hr	RI-93250-10 RI-93251-10 RI-93252-10 RI-93250-11 RI-93251-11 RI-93252-11	Indicate breach of hot reheat portion of steam generator tubes	Channels qualified
B13	Helium Circulator Penetration Inter- space Pressure Switch	3	PSH-11177 thru PSH-11188	0-1500 psig	PAH-93325 thru PAH-93328 (Alarm Only)	Indicate breach of piping within inter-space	Channels qualified
B14	Steam Generator Penetration Inter-space Switches	3	PSH-11219 thru PSH-11224	0-1500 psig	PAH-93365 PAH-93366 (Alarm Only)	Indicate breach of piping within inter-space	Channels qualified
B15	Reactor Building Vent Exhaust Radiation Monitor	3	RI-7324-1,-2 RI-73437-1 RI-73437-2 RI-73437-3	30-2x10E7 CPM 10-10E6 CPM	RR-93539 RR-73437	Indicate breach of primary cooling system boundary	Channels qualified
B16	PCRV Safety Valve Discharge Radiation Monitor	3	RI-93252-12	0-1-10,000 mr/hr	RR-93252-12	Indicate status of safety valve	Channel qualified
Reactor Containment Integrity (PCRV concrete and secondary closure)							
B17	PCRV Cooling Water Inlet Temperature	3	TE-4637-1 TE-4638-1 TE-46209 TE-46210	50-150 degrees f	IR-4637 IR-4638 TI-46209 TI-46210	Indicate concrete being kept within design temperature limits	Channels qualified

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VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CTL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
B18	PCRV Cooling Water Outlet Temperature	3	TE-46209-1 thru TE-46200-72 TE-46201-1 thru TE-46201-42 TE-46202-1 thru TE-46202-24 TE-46203-1 thru TE-46203-16 TE-46203-18 TE-46204-1 thru TE-46204-24 TE-46205-1 thru TE-46205-100 TE-46206-1 thru TE-46206-130 TE-46207-1 thru TE-46207-58 TE-46208-1 thru TE-46208-42 TE-46328-1 thru TE-46328-26	0-1800 degrees F	XI-9000	Indicate concrete being kept within design temperature limits	Channels qualified One TE for each of 535 channels input to scanner for indication.
B19	PCRV Surface Concrete Temperature	3	TE-73336-1 TE-73336-2	50-150 degrees F	IR-4637 IR-4638	Indicate concrete being kept within design temperature limits	Channels qualified
B20	Prestressed Concrete Reactor Vessel (PCRV) Pressure	1	PE-1108 PE-1109 PE-1110	0-1000 psia	PI-1108 PI-1109 PI-1110	Verify pressure is within design limits	Same as variable B7
B21	Penetration Inter-space Flow Isolation Valve Status Indication	3	ZS-1128	open/close	ZI-1128	Indication of breach secondary penetration	Channel qualified
B22	Penetration Inter- space Flow	3	FE-11263	0-4.3 ACFM	FI-11263	Indication of breach of secondary penetration closure	Channel qualified

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VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CTL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
B23	PCRV Rupture Disk Isolation Valve Position	3	ZS-1197-1 ZS-1197-2	open/close	ZI-1197-1 ZI-1197-2	Indicate status of secondary boundary valves	Channels qualified
B24	Circulator Penetration Inter-space Pressure Switches	3	PSH-11177 thru PSH-11188	0-1500 psig	XA-9325 thru ZA-9328 (Alarm Only)	Indicate integrity of secondary penetration closure	Channels qualified
B25	Steam Generator Penetration Inter-space Pressure Switches	3	PSH-11219 thru PSH-11224	0-1500 psig	PAH-93365 PAH-93366 (Alarm Only)	Indicate integrity of outer penetration	Channels qualified
B26	Core Outlet Temp.	3	TE-11101-2 thru TE-11137-2	100-2300 degrees F	I-93515 I-93516	Verify temp. within design limits	Channels qualified
<u>Fuel Particle Coating Integrity</u>							
C1	Prestressed Concrete Reactor Vessel (PCRV) Pressure	1	PE-11108 PE-11109 PE-11110	0-1000 psia	PI-1108 PI-1109 PI-1110	Indicate potential for fuel damage (adequate flow)	Same as variable B7
C2	Reactor Coolant System Activity	2	RI-9301	30-2x10E7 CPM	RR-93256	Indicate circulating activity	Channel qualified for DBA1, MCA and LNSC conditions. Outage required to install qualified cable for harsh environment (DBA2 and HELB)
C3	Helium Circulator Speed	3	SE-2105-1 SE-2106-1 SE-2111-1 SE-2112-1	0-12,000 RPM	SI-2109 SI-2110 SI-2115 SI-2116	Indicate potential for fuel damage (adequate flow)	Channels qualified
C3.a	Steam Generator EES Outlet (Main Steam) Temperature	1	TE-22121 TE-22122	0-1200 degrees F	IR-22121 IR-22122	Indicate proper operation	Same as variable B8.a
C3.b	Steam Generator EES Outlet Pressure (Main Steam)	1	PI-22129-1 PI-22130-1	0-3000 psig	PI-22129-1 PI-22130-1	Indicate existence of steam at outlet	Same as variable B8.b
C3.c	Steam Generator EES Inlet (feedwater) Flow	3	FI-22205 FI-22206	0-1,250 M-lb/hr	FR-2205 FR-2206	Indicate adequate flow of water for heat removal	Channels qualified

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C4	Core Outlet Temperature	3	TE-11101-2 thru TE-11137-2	100-2300 degrees F	I-93515 I-93516	Indicate potential for fuel damage.	Channels qualified
C5	Helium Circulator Inlet Temperature	3	TE-11171 thru TE-11178	100-1000 degrees F	TI-1187	Indicate potential for fuel damage.	Channels qualified
C6	Maximum Region Outlet Temperature Mismatch	3	TE-11101-1 thru TE-11137-1	100-2300 degrees F	XI-9000 (Computer Calc.)	Indicate potential for fuel damage	Channels qualified
C6.a	Analysis of Primary Coolant (Gamma Spectrum)	3	Grab Sample via HV-93486	N/A	N/A	Provide estimate of fuel damage	Equipment qualified
<u>Reactor Coolant System Pressure Boundary</u> (liner and primary closures)							
C7	Prestressed Concrete Reactor Vessel (PCRV) Pressure	1	PE-1108 PE-1109 PE-1110	0-1000 psia	PI-1108 PI-1109 PI-1110	Indicate potential for rupture of boundary	Same as variable B7
C8	Penetration Inter- space Flow	3	FE-11263	0-4.3 ACFM	FI-11263	Indicate breach of inner penetration	Channel qualified
C9	Helium Circulator Seal Status	3	ZS-21191-1 ZS-21191-2 ZS-21191-3 ZS-21191-4 ZS-21192-1 ZS-21192-2 ZS-21192-3 ZS-21192-4 ZS-21193-1 ZS-21193-2 ZS-21193-3 ZS-21193-4 ZS-21194-1 ZS-21194-2	Seal set or not set	XI-21191-1 XI-21191-2 XI-21192-1 XI-21192-2 XI-21193-1 XI-21193-2 XI-21194-1 XI-21194-2	Indicate boundary status around circulator shaft when it is stopped	Channels qualified
C10	Reactor Building Ventilation Exhaust Stack Radiation Monitor	3	RI-7324-1,-2 RI-73437-1 RI-73437-2 RI-73437-3	30-2x10E7 CPM 1.0-10E6 GPM	RR-93539 RR-73437	Indicate breach of liner or primary closures	Channels qualified
C11	Steam Jet Air Ejector Radiation	3	RI-31193	30-2x10E7 CPM	RR-93539	Indicate breach of steam generator tube	Channel qualified

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VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CTL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
C12	Hot Reheat Steam Radiation	3	RI-93250-10 RI-93251-10 RI-93252-10 RI-93250-10 RI-93251-11 RI-93252-11	0.1-10,000 mr/hr	RI-93250-10 RI-93251-10 RI-93252-10 RI-93250-11 RI-93251-11 RI-93252-11	Indicate breach of reheat section of steam generator	Channels qualified
C13	PCRV Safety Valve Discharge Radiation Monitor	3	RI-93252-12	0.1-10,000 mr/hr	RR-93252-12	Indicate status of safety valve	Channel qualified
<u>Reactor Containment Pressure Boundary</u> (PCRV concrete and secondary closure)							
C14	PCRV Cooling Water Inlet Temperature	3	TE-4637-1 TE-4638-1 TE-46209 TE-46210	50-150 degrees F	IR-4637 IR-4638 TI-46209 TI-46210	Indicate potential for failure of the secondary boundary	Channels qualified
C15	PCRV Cooling Water Outlet Temperature	3	TE-46200-1 thru TE-46200-72 TE-46201-1 thru TE-46201-42 TE-46202-1 thru TE-46202-24 TE-46203-1 thru TE-46203-16 TE-46203-18 TE-46204-1 thru TE-46204-24 TE-46205-1 thru TE-46205-100 TE-46206-1 thru TE-46206-130 TE-46207-1 thru TE-46207-58 TE-46208-1 thru TE-46208-42 TE-46328-1 thru TE-46328-26	0-1800 degrees F	XI-9000	Indicate potential for failure of the secondary boundary	Channels qualified One TE for each of 535 channels input to scanner for indication.

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VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CIL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
C16	Prestressed Concrete Reactor Vessel (PCRV) Pressure	1	PE-1108 PE-1109 PE-1110	0-1000 psia	PI-1108 PI-1109 PI-1110	Indicate the potential for failure of the secondary boundary	Same as variable B7
C17	PCRV Rupture Disk Isolation Valve Position	3	ZS-1197-1 ZS-1197-2	open/close	ZI-1197-1 ZI-1197-2	Indicate status of secondary boundary valves	Channels qualified
C18	Reactor Building Exhaust Stack Ventilation System Radiation Monitor	3	RI-7324-1,-2 RI-73437-1 RI-73437-2 RI-73437-3	30-2x10E7 CPM 10-10E6 CPM	RR-93539 RR-73437	Indicate a breach of secondary closure	Channels qualified
Final Fission Product Cleanup System (Reactor Building)							
C19	Penetration Inter-space Flow Isolation Valve Position Indication	3	ZS-1128	open/close	ZI-1128	Indicate failure of outer penetration	Channel qualified
C20	Louver Position via Pressure Indication	2	PS-7377-1 thru PS-7377-20	closed or not closed	PAL-7377 (Alarm Only)	Indicate status of louvers	Channels qualified
C21	Reactor Building Pressure	2	PDI-7319-1 thru PDI-7319-4	0.2" water column	PDI-7319	Indicate potential for louvers opening	Channels qualified
C22	Deleted						
Primary Heat Removal Auxiliaries							
D1	Helium Circulator Speed	3	SE-2105-1 SE-2106-1 SE-2111-1 SE-2112-1	0-12,000 RPM	SI-2109 SI-2110 SI-2115 SI-2116	Indicate primary coolant being circulated	Channels qualified
D2	Helium Circulator Water Turbine Drive Header Pressure	3	PI-21243 PI-21244	0-320C psig	PI-21243 PI-21244	Indicate operation of booster pump and ability to drive circulator pelton wheel	Channels qualified
D3	turbine Water Drain Tank Level	2	LI-21129	0-72" H2O	LI-21129	Indicate proper operation and ensure pelton wheel cavity does not become packed	Channel qualified

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VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CIL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
D4	Bearing Water Surge Tank to PCRV Differential Pressure	2	PDI-2147 PDI-2148	+50 to -50 psid	PDI-2147 PDI-2148	Indicate proper operation and proper pressure of cover gas	Qualified for DBA1, MCA and LNSC conditions. Outage required to install qualified transmitters for DBA2 and HELB conditions.
D5	Bearing Water Surge Tank Level	2	LI-21135 LI-21136	0-48" H2O	LI-21135 LI-21136	Indicate adequate supply for proper operation of bearing water pumps	Qualified for DBA1, MCA and LNSC conditions. Outage required to install qualified transmitters for DBA2 and HELB conditions.
D6	Bearing Water Flow	2	FI-2183 FI-2184 FI-2185 FI-2186	0-200 gpm	FI-2183 FI-2184 FI-2185 FI-2186	Indicate adequate supply of bearing water	Qualified for DBA1, MCA and LNSC conditions. Outage required to install qualified transmitters for DBA2 and HELB conditions.
D6.a	Bearing Water Pump Differential Pressure	3	PDI-2133 PDI-2134	0-1500 psid	PDI-2133 PDI-2134	Indicate proper operation of bearing water pumps.	Channels qualified
D6.b	Emergency feedwater Header to Helium Circulator	3	PI-21189	0-2500 psig	PI-21189	Indicate adequate emergency feedwater pressure for proper operation of circulator emergency bearing water	Channel qualified
D6.c	High Pressure Separator Service Flow	2	FI-21425 FI-21426 FI-21427 FI-21428	0-15 gpm	FI-21425 FI-21426 FI-21427 FI-21428	Indicate proper operation of high pressure separator	Channels qualified
D6.d	High Pressure Separator Level	2	LI-21121 LI-21122 LI-21123 LI-21124	0-70" H2O	LI-21121 LI-21122 LI-21123 LI-21124	Indicate proper operation of high pressure separator	Channels qualified
D6.e	Circulator Main Drain Differential Pressure	2	PDI-2175-1 PDI-2176-1 PDI-2177-1 PDI-2178-1	-5 to 25 psid	PDI-2175 PDI-2176 PDI-2177 PDI-2178	Indicate proper operation of circulator main drain	Channels qualified
D7	Deleted						

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VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CTL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
D8	Storage Basin Level	2	LI-4102-1	0-100 Million Gals	LI-4102-3	Indicate adequate water supply for circulator drive and heat removal from core	Qualified for DBA1, DBA2, MCA and INSC conditions. Control Room indicator not qualified for "loss of HVAC" condition possible in a HELB accident
<u>Secondary Heat Removal</u>							
D9	Steam Generator FES Inlet (feedwater) flow	2	FI-2205 FI-2206	0-1.250 M-lb/hr	FR-2205 FR-2206	Indicate adequate flow of water for heat removal	Channels qualified
D9.a	Emergency Condensate flow	3	FI-2239 FI-2240	0-1.250 M-lb/hr	FR-2239 FR-2240	Indicate proper system operation	Channels qualified
D10	Deleted						
D11	Steam Generator FES Inlet (feedwater) Temperature	3	TI-2205 TI-2206	0-500 degrees F	TI-2205 TI-2206	Indicate proper operation	Channels qualified
D12	Steam Generator FES Outlet (Main Steam) Temperature following DBA1 or MCA	1	TI-22121 TI-22122	0-1200 degrees F	TI-22121 TI-22122	Indicate proper operation	Same as variable B8.a
D12.a	Main Steam Temperature	3	TI-2225-1 thru TI-2225-6 TI-2226-1 thru TI-2226-6	700-1100 degrees F	TI-2225 TI-2226	Indicate proper system operation	Channels qualified
D13	Deleted						
D14	Deleted						
D15	Steam Generator FES Outlet (Main Steam) Pressure following DBA1 or MCA	2	PI-22129-1 PI-22130-1	0-2000 psig	PI-22129-1 PI-22130-1	Indicate existence of steam at outlet	Same as variable B8.b
D15.a	Steam Generator Reheater Pressure	3	PI-2267 PI-2268	0-1200 psig	PC-2267 PC-2267 PC-2268 PR-2268	Indicate proper system operation	Channels qualified
D16	Deleted						

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VARIABLE (NOTE 1)	DESCRIPTION	CAI NUMBER (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CIL ROOM DISPLAY	PAN PURPOSE	COMMENTS (NOTE 5)
D17	Storage Basin Level	2	LI-4102-1	0-100 Million Gals	LI-4102-3	Indication of adequate supply of water for steam generators	Same as variable D8
<u>Reserve Shutdown System</u>							
D18	System Status-Bottle Pressure	3	PI-2409	0-1500 psia	PI-2409	Indicate adequate pressure for reserve shutdown system actuation	Channel qualified
D18.a	Neutron Flux	2	NE-1133-1 NE-1134-1 NE-1135-1 NE-1131 NE-1132	10E-7 to 10E+3% full Power 1 to 3x10E5 counts per second	NI-1133-1 NI-1134-1 NI-1135-1 NI-1131-1 NI-1132-1	Indicate successful actuation of reserve shutdown system	Same as variable B1
<u>Reactor Plant Cooling System</u>							
D19	PCR Subheader Flows	2	FE-46132 FE-46133 FE-46136 thru FE-46145 FE-46160 thru FE-46174 FE-46176 FE-46194 thru FE-46199 FE-46304 FE-46305	14-250 gpm	X1-9001	Indicate proper distribution of flow	Channels qualified Total of 36 flow transmitters input to scanner

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D20	PCRV Cooling Water Outlet Temperature	3	TE-46200-1 thru TE-46200-72 TE-46201-1 thru TE-46201-42 TE-46202-1 thru TE-46202-24 TE-46203-1 thru TE-46203-16 TE-46203-18 TE-46204-1 thru TE-46204-24 TE-46205-1 thru TE-46205-100 TE-46206-1 thru TE-46206-130 TE-46207-1 thru TE-46207-58 TE-46208-1 thru TE-46208-42 TE-46328-1 thru TE-46328-26	0-1800 degrees F	XI-9000	Indicate proper operation.	Channels qualified One TE for each of 535 channels input to scanner for indication
D21	PCRV Bottom Penetrations Bottom Head, Barrel and Top Head Circuit Inlet Header Temperature	2	TE-4637-1 TE-4638-1	50-150 degrees F	IR-4637 IR-4638	Indicate proper operation	Channels qualified
D22	PCRV Top Penetrations Circuit Inlet Header Temperature	3	TE-46209 TE-46210	50-150 degrees F	II-46209 II-46210	Indicate proper operation	Channels qualified
D23	Purification Cooling Water Heat Exchanger Outlet Temperature	2	TE-2321-1 TE-2321-2	0-800 degrees F	IR-2322 (Multipoint)	Indicate proper operation of system	Channels qualified

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<u>Helium Purification System</u>							
D24	Helium Purification High Temperature Absorber Outlet Temperature	3	TE-2321-5 TE-2321-6	0-800 degrees F	IR-2322 (Multipoint)	Indicate proper operation	Channels qualified
D25	Helium Purification Cooler Outlet Temperature	3	TE-2319 TE-2320	0-200 degrees F	TI-2319 TI-2320	Indicate proper operation	Channels qualified
D26	Helium Purification Dryer Outlet Temperature	2	TE-23105 TE-23106	0-700 degrees F	TI-23105 TI-23106	Indicate proper operation	Channels qualified
D27	Helium Purification Low Temperature Absorber Outlet	2	TE-2322-3 TE-2322-4	0-800 degrees F	IR-2322 (Multipoint)	Indicate proper operation	Channels qualified
<u>Service Water System</u>							
D28	Service Water Pump Pit Level	2	LI-4218	-10 to +4 inches	LIC-4218-1	Indicate adequate water supply for service water system	Channel qualified
D29	Service Water Pump Header Discharge Pressure	2	PI-4229	0-50 psig	PI-4229	Indicate operation of pump	Qualified for DBA1, DBA2, MCA and LNSC conditions. Outage required to install qualified transmitter for HELB conditions
D30	Storage Tank Level	2	LI-2519-1	200-1200 gallons	LI-2519	Indicate adequate supply of liquid N2 for proper operation of low temperature absorber	Channel qualified
<u>Ventilation System</u>							
D31	Damper Positions for Control Room Isolation and Emergency Air flow	2	ZS-75184-1 thru ZS-75184-18	open/close	ZI-75298-1,-2 ZI-75323-1,-2 of dampers thru ZI-75330-1,-2	Indicate status of dampers	Channels qualified
D32	Reactor Building Vent Exhaust flow	2	FI-7320	0-60,000 CFM	FI-7320	Indicate exhaust flow	Channel qualified

TABLE A
SUMMARY REPORT
POST ACCIDENT MONITORING INSTRUMENTATION

VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CIL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
Power Supplies							
D33	Essential 480V Bus Voltage	2	EI-9273-1 EI-9273-2 EI-9274-1 EI-9274-2 EI-9275-1 EI-9275-2	0-600 Volts AC	EI-9273-A EI-9274 EI-9275-A	Indicate system status	Channels qualified
D34	Essential 480V Bus Current	2	No Number	0-500 Amps AC	11-9244 11-9248	Indicate system status	Qualified for DBA1, DBA2, MCA and INSC conditions. Passive circuit components (located in the Control Room) are not qualified for "loss of HVAC" condition possible in a HELB accident.
D34.a	Standby Diesel Generator Voltage	3	EI-92513-1 EI-92513-2 EI-92514-1 EI-92514-2	0-600 Volts AC	EI-9273 EI-9275	Indicate system status	Channels qualified
D34.b	Standby Diesel Generator Frequency	3	EI-92513-2 EI-92513-2 EI-92514-1 EI-92514-2	58-62 Hertz	XFI-9244 XFI-9248	Indicate system status	Channels qualified
D35	Essential 125V Bus Voltage	2	EI-92220 EI-92221	0-150 Volts DC	EI-92220 EI-92221	Indicate system status	Channels qualified
D36	Instrument Air Receiver Pressure	2	PI-8212 PI-8254	0-125 psig	PI-8212 PI-8254	Indicate system status	Qualified for DBA1, DBA2, MCA and INSC conditions. Outage required to install qualified transmitters for HELB conditions.
D37	Hydraulic Oil loop Pressure	2	PI-91141 PI-91142	2000-3500 psig	PI-91141 PI-91142	Indicate system status	Channels qualified

TABLE A
SUMMARY REPORT
POST ACCIDENT MONITORING INSTRUMENTATION

VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CTL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
Airborne Radioactive Material Released from Plant							
E1.	Reactor Building Vent Exhaust Flow	2	FI-7320	0-60,000 CFM	FI-7320	Verification of exhaust flow	Channel qualified
E2.	Reactor Building Vent Exhaust Radiation Monitor	3	RI-7324-1 RI-73437-1 RI-73437-2 RI-73437-3	30-2X10E7 CPM 10-10E6 CPM	RR-93539 RR-73437	Detection of significant releases	Channels qualified
E3.	PCRV Safety Valve Discharge Radiation	3	RI-93252-12	0.1-10,000 mr/hr	RR-93252-12	Detection of significant releases	Channel qualified
E4.	Prestressed Concrete Reactor Vessel (PCRV) Pressure	1	PE-1108 PI-1109 PI-1110	0-1000 psia	PI-1108 PI-1109 PI-1110	Detection of significant releases	Same as variable B7
E4a.1	RX Plant Exhaust Filter Rm - 1B	3	RI-93251-1	0.1R to 1E+4 R	RIS-93251-1	Verify significant releases and local magnitudes	Channel qualified
E4a.2	South Stairwell-RX	3	RI-93252-2	.1 mR to 1E+4mR	RIS-93252-2		Channel qualified
E4a.3	Mn Ctl Rm-1B	3	RI-93250-5	.1 mR to 1E+4mR	RIS-93250-5		Channel qualified
E4a.4	Gas Waste Filters	3	RI-93251-5	.1 mR to 1E+4mR	RIS-93251-5		Channel qualified
E4a.5	South Stairwell-RX	3	RI-93252-6	.1 mR to 1E+4mR	RIS-93252-6		Channel qualified
E4a.6	Valve Oper Stat. West - Rx	3	RI-93251-7	.1 mR to 1E+4mR	RIS-93251-7		Channel qualified
E4a.7	Valve Oper Stat. East - Rx	3	RI-93252-7	.1mR to 1E+4mR	RIS-93252-7		Channel qualified
E4a.8	NE Walkway - Rx	3	RI-93250-8	.1 mR to 1E+4mR	RIS-93250-8		Channel qualified
E4a.9	Buffer Hel Dryer Stairwell Loop 1 - RX	3	RI-93251-9	.1 mR to 1E+4mR	RIS-93251-9		Channel qualified
E4a.10	Condensate Demin. 1B	3	RI-93250-13	.1 mR to 1E+4mR	RIS-93250-13		Channel qualified
E4a.11	East Wall Refueling Floor-RX	2	RI-93250-14	.1 mR to 1E+4R	RIS-93250-14		Channel qualified for RCA. Outage required for installation of qualified cable to qualify for DBA2 conditions.

TABLE A
SUMMARY REPORT
POST ACCIDENT MONITORING INSTRUMENTATION

VARIABLE (NOTE 1)	DESCRIPTION	CAT (NOTE 2)	INSTRUMENT NUMBER (NOTE 3)	RANGE (NOTE 4)	CIL ROOM DISPLAY	PAM PURPOSE	COMMENTS (NOTE 5)
<u>Enviroms Radiation and Radioactivity</u>							
E.5	Portable Radiation Instrumentation/ Sensors	3	RO-5 RO-7 SAM-11	1mR-200R 200R- 20,000R 1E-10 to 5E-5 micro Ci/cc Iodine	None	Verify significant releases and local magnitudes	Qualified Portable instrumentation (not shown on plant component list).
<u>Meteorology</u>							
E.6	Wind Direction @58M @10M	3	XI-93576 XI-93578	0-540 degrees	XR-93574-1 XR-93574-2	Release Assessment	Channels qualified
E.7	Wind Speed @58M @10M	3	XSI-93575 XSI-93577	0-100 mph	XR-93574-1 XR-93574-2	Release Assessment	Channels qualified
E.8	Estimate of Atmo- spheric Stability temp. Differential between 58M & 10M	3	TI-93580	-5 to +5 degrees F	XR-93574-3	Release Assessment	Channel qualified
<u>Accident Sampling Capability</u>							
E.9	Primary Coolant -gross activity -gamma spectrum	3	Grab Sample via HV-93486	N/A	N/A	Release Assessment Verification	Equipment qualified

NOTES TO TABLE

NOTE 1 - "VARIABLE" types and definitions are consistent with Regulatory Guide 1.97.

NOTE 2 - "CATEGORY" listings are divided into one of the following groups:

Category 1 - This denotes a fully environmentally (10CFR50.49 as interpreted by PSC to apply to an HIGR) and seismically qualified instrument channel which complies with existing Quality Assurance criteria and which is powered from a Class 1E power supply. Redundant indication is provided in the Control Room.

Category 2 - This denotes a single-channel, fully-environmentally (10CFR50.49 as interpreted by PSC to apply to an HIGR) qualified instrument channel powered from a highly reliable power source with indication available in the Control Room.

Category 3 - This denotes a high-quality, commercial-grade instrument channel powered from a non-essential power source.

NOTE 3 - "INSTRUMENT NO." Column identifies the primary element of the instrumentation channel.

NOTE 4 - Indicates the range of the Control Room indicator.

NOTE 5 - Accidents conditions are as follows:

DBA1 - Loss of forced Circulation (does not create a harsh environment)

DBA2 - Release of entire primary coolant helium inventory (creates a harsh environment within Reactor Building)

MCA - A break in the helium purification system regeneration piping which results in a slow depressurization of the FCRV. (does not create a harsh environment)

HELB - A high energy line break (creates a harsh environment)

LNSC - The unavailability of the normal number of helium circulators, the loss of normal driving power of the helium circulators, or the unavailability of the economizer-evaporator-superheater sections of one or both steam generators. (does not create a harsh environment)

TABLE B
ITEMS LISTED ON CURRENT PAM LIST WHICH DIFFER FROM PAM SUBMITTAL
DATED NOVEMBER 2, 1988, (LETTER P-88326)

VARIABLE	DESCRIPTION	CAT	INSTRUMENT NUMBERS	DIFFERENCES
B4, B26, C4	Core Outlet Temp.	3	XI-9000	IE-11101-2 thru IE-11137-2 provide input to Data Logger and are displayed on data logger consoles I-93515 and I-93516
B5, C6	Maximum Region Outlet Temperature Mismatch	3	Computer Calc.	IE-11101-1 thru IE-11137-1 provide input to Data Acquisition System and are displayed on XI-9000
B8.a, C3.a	Steam Generator FFS Outlet (Main Steam) Temperature	1	TI-22121 TI-22122	TI-22121 & TI-22122 located at I-9349. Use IR-22121/22 as display in Control Room (range 0-1200 degrees F). (Note: High accuracy instrumentation available for local installation following a HELB accident)
B8.b, C3.b, D15	Steam Generator FFS Outlet (Main Steam) Pressure	1	PR-22129 PR-22130	The signals from PI-22129-1 & PI-22130-1 are not recorded on PR-22129 & PR-22130. Control room indicators are PI-22129-1 & PI-22130-1 (range 0-3000 psig). (Note: High accuracy instrumentation available for local installation following a HELB accident)
B11, C9	Helium Circulator Seal Status	3	ZI-21191-2, -4 ZI-21192-2, -4 ZI-21193-2, -4 ZI-21194-2, -4	Instrument number prefix and numerical designation suffix changed by CN-1984
B13, B24	Helium Circulator Penetration Inter-space Pressure Switch	3	XA-9325 thru XA-9328	Correct alarm numbers are PAH-93325 and PAH-93328
B14, B25	Steam Generator Penetration Inter-space Pressure Switch	3	XA-9323 XA-9324	Correct alarm numbers are PAH-93365 and PAH-93366
B15, C10, C18, E2	Reactor Building Vent Exhaust Radiation Monitor	3	RI-73437-1, -2	Should be RI-73437-1, -2, -3
B18, C15, D20	PCRV Cooling Water Outlet Temperature	3	IE's	Listed actual instrument numbers
C11	Steam Jet Air Ejector Radiation	3	RR-93538	Should be RR-93539
C19	Penetration Inter-space Flow Isolation Valve Position Indication	3	ZS-1128	Control Room Display should be ZI-1128
C21	Reactor Building Pressure	2	PDI-73335 PDR-73335	Replaced by PDI-7319-1 thru PDI-7319-4 & PDI-7319 (range 0-2" water column).
D6.a	Bearing Water Pump Differential Pressure	3	PDI-2133 PDI-2134	Variable added as a result of items designated for shutdown following a high energy line break.
D6.b	Emergency Feedwater Header to Helium Circulator	3	PI-21189	Variable added as a result of items designated for shutdown following a high energy line break.

TABLE B
ITEMS LISTED ON CURRENT PAM LIST WHICH DIFFER FROM PAM SUBMITTAL
DATED NOVEMBER 2, 1988, (LETTER P-88326)

VARIABLE	DESCRIPTION	CAT	INSTRUMENT NUMBERS	DIFFERENCES
D6.c	High Pressure Separator Service Flow	2	FI-21425 FI-21426 FI-21427 FI-21428	Variable added as a result of items designated for shutdown following a high energy line break.
D6.d	High Pressure Separator Level	2	LI-21121 LI-21122 LI-21123 LI-21124	Variable added as a result of items designated for shutdown following a high energy line break.
D6.e	Circulator Main Brain Differential Pressure	2	PDI-21175-1 PDI-21176-1 PDI-21177-1 PDI-21178-1	Variable added as a result of items designated for shutdown following a high energy line break.
D9.a	Emergency Condensate flow	3	FI-2239 FI-2240	Variable added as a result of items designated for shutdown following a high energy line break.
D12.a	Main Steam Temperature	3	TE-2225-1 thru TE-2225-6 TE-2226-1 thru TE-2226-6	Variable added as a result of items designated for shutdown following a high energy line break.
D15.a	Steam Generator Reheater Pressure	3	PI-2267 PI-2268	Variable added as a result of items designated for shutdown following a high energy line break.
D23	Purification Cooling Water Heat Exchanger Outlet Temperature	2	TR-2321	Function of IR-2321 performed by new recorder IR-2322 (range 0-800 degrees F).
D24	Helium Purification High Temperature Absorber Outlet Temperature	3	IR-2321	Function of IR-2321 performed by new recorder IR-2322 (range 0-800 degrees F).
D31	Emergency Makeup Air Dampers	2	ZS-75184-27 thru ZS-75184-30	13 limit switches and 13 indicating lights should be 18 limit switches and 18 indicating lights (those used to verify damper positions for Control Room, isolation & emergency Makeup Air flow). four additional limit switches as proposed for installation By CN-2503 would require an outage to accomplish.
D32	Reactor Building Vent Exhaust flow	2	FI-7320	Control Room Display is FI-7320 (range 0-60,000 CFM).
D33	Essential 480V Bus Voltage	2	ES-9273 ES-9274 ES-9275	Primary sensing devices are designated EI-9273-1,-2, EI-9274-1,-2 and EI-9275-1,-2