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RECIP.NAME RECIPIENT AFFILIATION
DENTON,H. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards supplemental response to Generic Ltr 83-28,Required Actions Based on Generic Implication of Salem ATWS Events." Activities may be rescheduled during next update of integrated plan for mods.

SEE REPTS.

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Iowa Electric Light and Power Company
February 29, 1984
NG-84-0825

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

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Generic Letter 83-28: "Required Actions Based on Generic Implications of Salem ATWS Events"

References: 1) Letter, D. Eisenhut to All Licensees of Operating Reactors, et. al., "Required Actions Based on Generic Implications of Salem ATWS Events, (Generic Letter 83-28), July 9, 1983.

2) Letter, R. McGaughy to H. Denton, "Generic Letter 83-28 "Required Actions Based on Generic Implications of Salem ATWS Event", NG-83-3824, November 7, 1983.

Dear Mr. Denton:

This letter is in response to the referenced 10 CFR 50.54(f) letter from Mr. Eisenhut (see Reference 1), which requested that Iowa Electric submit the information requested in Generic Letter 83-28 to the NRC. The attachment to this letter provides our responses to each of the items in the Generic Letter. These responses supercede those submitted in our November 7 1983 letter, (see Reference 2). Where the information is available, it has been provided. Where programs have been developed to implement the NRC positions in the Generic Letter, plans and schedules have been included in our responses; however, we may find it necessary to reschedule some of these activities during the next update of our integrated plan for modifications to DAEC. For convenience, the information is provided in a position and response format in which the NRC position is repeated followed by our response.

Please contact this office if you require further information as to our responses.

IOWA ELECTRIC LIGHT AND POWER COMPANY

BY Richard W McGaughy
Richard W. McGaughy
Manager, Nuclear Division

Subscribed and sworn to Before Me on this 29th day of February 1984.

Kathleen M. Turner
Notary Public in and for the State of Iowa

RWM/RAB/dmb*
Attachment: Generic Letter 83-28 Response

cc: R. Browning
L. Liu
S. Tuthill
M. Thadani
NRC Resident Office
Commitment Control No. 83-0203

A055
1/10

50-331

"REQUIRED ACTIONS BASED
ON
GENERIC IMPLICATIONS OF SALEM ATWS EVENTS"

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Appendix B

NSSS & BOP Post-Trip Logs Variable List

NSSS POST-TRIP LOG VARIABLE LIST

	Variable Description	Computer Address	Engineering Units
1)	Core Thermal Power (APRM Channel A)	B000	% of Rated Power
2)	Core Thermal Power (APRM Channel C)	B002	% of Rated Power
3)	Total Core Flow	B012	10^6 lbm/hr
4)	Core Pressure Drop	B103	Psid
5)	Feedwater Flow - Loop "A"	B015	10^6 lbm/hr
6)	Feedwater Flow - Loop "B"	B016	10^6 lbm/hr
7)	Reactor Water Level	B021	in. above TAF*
8)	Total Steam Flow	B022	10^6 lbm/hr
9)	Reactor Dome Pressure	B025	Psig
10)	Feedwater Temperature (Channel A1)	B030	Deg-°F

*TAF = Top of Active Fuel

BOP POST-TRIP LOG VARIABLE LIST

Variable Description	Computer Address	Engineering Units
1) Off-Gas System, Steam Jet Air Ejector Flow - Loop "A"	F003	ft^3/min
2) Off-Gas System, Steam Jet Air Ejector Flow - Loop "B"	F093	ft^3/min
3) Condensate Pump Discharge Pressure - Loop "A & B"	F004	Psig
4) Low Pressure Condensor Differential Pressure - Loop "A"	F011	Psid
5) Low Pressure Condensor Differential Pressure - Loop "B"	F012	Psid
6) High Pressure Condensor Differential Pressure - Loop "B"	F013	Psid
7) High Pressure Condensor Differential Pressure - Loop "A"	F014	Psid
8) Circulating Water Pump Discharge Pressure - Loop "A & B"	F015	Psig
9) Reactor Feedwater Pump Suction Pressure - Loop "A"	F040	Psig
10) Reactor Feedwater Pump Suction Pressure - Loop "B"	F041	Psig
11) Reactor Feedwater Pump Discharge Pressure - Loop "A"	F042	Psig
12) Reactor Feedwater Pump Discharge Pressure - Loop "B"	F043	Psig
13) Final Feedwater Heater Temperature-Loop "A"	F067	Deg-F
14) Final Feedwater Heater Temperature-Loop "B"	F068	Deg-F
15) Turbine Steam Reheater Intercept Valve (CIV-1)	T022	Psig
16) Turbine Steam Reheater Intercept Valve (CIV-2)	T023	Psig

BOP POST-TRIP LOG VARIABLE LIST (Continued)

Variable Description	Computer Address	Engineering Units
17) Turbine First Stage Inlet Pressure	T016	Psig
18) Generator Output Voltage	G000	KV
19) Generator Output - Gross	G001	MW
20) Generator Vars - Gross	G002	MVar
21) Generator Stator Current	G003	KAmp
22) Generator Field Voltage	G006	Volts
23) Generator Field Current	G007	Amps
24) Alterex Cooler Inlet Air Temperature	G016	Deg-C
25) Generator Stator Liquid Hydrogen Outlet Temperature	G050	Deg-C
26) Generator Cooling Water Inlet Conductivity	G051	mMho
27) Reactor Recirculation Pump Motor Vibration - Loop "A"	B079	mils
28) Reactor Recirculation Pump Motor Vibration - Loop "B"	B080	mils
29) Low Pressure Condensor Vacuum	T039	in-Hg
30) High Pressure Condensor Vacuum	T040	in-Hg

Appendix C

Strip Chart Recorder List

PLANT STRIP-CHART RECORDERS

RECORDER NO	NAME	LOCATION	SPEED	POINTS	RANGE	P/S
NEUTRON MONITORING SYSTEM						
NMR 9253	Source Range Monitor	1C05	1"/hr	Source Range B or D Source Range A or C	10-1 to 10-6 cps 10-1 to 10-6 cps	1Y23
NMR 9254A	IRM - APRM	1C05	1"/hr	IRM "C" or APRM "C" IRM "A" or APRM "A"	0 to 40/125 0 to 40/125	1Y23
NMR 9254B	IRM - APRM / RBM	1C05	1"/hr	RBM "B" IRM "B" or APRM "B"	0 to 125 % 0 to 40/125	1Y23
NMR 9254C	IRM - APRM / RBM	1C05	1"/hr	RBM "A" IRM "E" or APRM "E"	0 to 125 % 0 to 40/125	1Y23
NMR 9254D	IRM - APRM	1C05	1"/hr	IRM "D" or APRM "D" IRM "F" or APRM "F"	0 to 40/125 0 to 40/125	1Y23
RR 4574	J600 X-Y Recorder	1C13	N/A	N/A	N/A	1Y11
RECIRC SYSTEM						
FR 4635	Recirc Pump Discharge Flow	1C04	1"/hr	Recirc Pump A Recirc Pump B	0 to 40k gpm 0 to 40k gpm	1Y11
FR 4528 DPR 4528	Reactor Flow D/P	1C05	1"/hr	Total Jet Pmum Flow Core Pres Drop	0 to 60k lbm/hr 0 to 30 psig	1Y11
TR 4659	Recirc Drive Temp	1C21	All pts in 2 min	24pts	0 to 300 F	1Y21
TR 4600	Recirc Pump Temp	1C21	All pts in 2 min	24pts	0 to 300 F	1Y21
TR 4661	Drive Motor Gen Temp	1C21	All pts in 1 min	12pts	0 to 300 F	1Y21
TR 4603 A/B	Recirc Pump Suct Temp	1C04	1"/hr	Pump A Pump B	0 to 600 F 0 to 600 F	1Y11

RECORDER NO	NAME	LOCATION	SPEED	POINTS	RANGE	P/S
ECCS						
XVR 2283	HPCI Turbine Vibration	1C03	1/2"/hr	N/A	0 to 3 mils	1Y21
FR 1971	RHR Pump Discharge Flow	1C03	1"/hr	Pump A Pump B	0 to 15k gpm 0 to 15k gpm	1Y21
TR 1945	RHR Water Temp & HPCI Turb & Pump Temp	1C21	All pts in 2 min	24 pts	0 to 600 F	1Y21
RR 1997	RHR & Emerg Service Water Radiation	1C02	1"/hr	N/A	10-1 to 10+6 cps	1Y11
TR 4400A	ADS Safety Valve Temperature	1C21	3/4"/hr	PSV 4400 PSV 4401	0 to 600 F 0 to 600 F	1Y21
TR 4400B	ADS Safety Valve Temperature	1C21	3/4"/hr	PSV 4402 PSV 4403	0 to 600 F 0 to 600 F	1Y21
TR 4400C	ADS Safety Valve Temperature	1C21	3/4"/hr	PSV 4404 PSV 4405	0 to 600 F 0 to 600 F	1Y21
TR 4400D	ADS Safety Valve Temperature	1C21	3/4"/hr	PSV 4406 PSV 4407	0 to 600 F 0 to 600 F	1Y21
REACTOR VESSEL INSTRUMENTATION						
TR 4569	Vessel Flang Shell Temp	1C04	1"/hr	Vessel Wall Vessel Top Head	0 to 600 F 0 to 600 F	1Y21
PR 4563/4564 LR 4559/4560	Reactor	1C05	1"/hr	Reactor Pressure Reactor Water Level	0 to 1200 psig 158 to 218 in	1Y23
PR 4542 FR 1003	Reactor & Turbine Steam	1C05	1"/hr	Reactor Pressure Turbine Steam Flow	800 to 1100 psig 0 to 8x10+6 lbm/hr	1Y23
PR 4599A	Reactor Pressure	1C09	3/4"/hr	N/A	0 to 1500 psig	1Y30
PR 4599B	Reactor Pressure	1C09	3/4"/hr	N/A	0 to 1500 psig	2Y30
LR 4566	Reactor Vessel Level	1C03	1"/hr	N/A	-100 to 200 in	1Y21
TR 4570	Reactor Vessel Temperatures	1C59	All pts in 1.2 min	12 pts	0 to 600 F	1Y21
TR 1889	CRD Temperatures	1C59	All pts in 20 min	100 pts	0 to 500 F	1Y21

RECORDER NO	NAME	LOCATION	SPEED	POINTS	RANGE	F/S
SETAM AND TURBINE SYSTEMS						
FR 4450A FR 4450B	Feedwater and Steam	1C05	1"/hr	Steam Flow Feedwater Flow	0 to 8x10+6 lbm/hr 0 to 8x10+6 lbm/hr	1Y23
PR 1000	Primary Steam Pres	1C07	3/4"/hr	N/A	0 to 1200 psig	1Y11
VR 9019	Turbine Vibration	1C07	All pts in 1 min	10 pts	0 to 15 mils	1Y11
TR 9000	Turbine Temperature and Rotor Expansion	1C07	All pts in 2.5 min	10 pts 3 pts	0 to 600 F 0 to 750 mils	1Y11
TR 3127	Turbine Bearing & Bearing Drain Temp	1C20	All pts in 80 sec	16 pts	0 to 300 F	1Y11
VPR 9304	Speed Control and Bypass Position	1C07	3"/hr	Control Valve Posit. Bypass Valve Posit.	0 to 100 % 0 to 100 %	1Y11
RR 4448	Main Steam Radiation	1C02	3/4"/hr	Ch A, C Ch B, D	1 to 10+6 mr/hr 1 to 10+6 mr/hr	1Y11
FEED AND CONDENSATE SYSTEMS						
TR 1587	Final Feedwater Temperature	1C06	1.5"/hr	A B	0 to 500 F 0 to 500 F	1Y11
PR 1637	Final Feedwater Pressure	1C06	3/4"/hr	N/A	0 to 2000 psig	1Y11
LR 1496	Hotwell Level	1C06	3/4"/hr	N/A	-7 to +7 in	1Y11
CR 1514	Condensate Tube Conductivity	1C06	All pts in 1 min	12 pts	0 to 10 umhos	1Y11
PR 1479	Condenser Vacuum	1C07	1"/hr	Hi Pres Condenser Low Pres Condenser	0 to 30 in Hg 0 to 30 in Hg	1Y11
TR 1511	Condensate and Feed Pump Bearing Temp	1C20	All pts in 2 min	24 pts	0 to 300 F	1Y11
TR 1200A	Feed and Condensate Temp "A"	1C20	All pts in 2.3 min	20 pts	0 to 400 F	1Y11
TR 1200B	Feed and Condensate Temp "B"	1C20	All pts in 2.3 min	20 pts	0 to 400 F	1Y11
CR 1702	Condensate Conductivity	1C80	All pts in 30 sec	8 pts	0 to 10 umhos	1B45
FRCS 2810A	Cleanup Filter Deminerlizer "A"	1C87	3/4"/hr	N/A	0 to 85 gpm	1Y11
FRCS 2810B	Cleanup Filter Deminerlizer "B"	1C87	3/4"/hr	N/A	0 to 85 gpm	1Y11
CIRS 3509	Effluent Conductivity A & B	1C136	1/2"/hr	A B	0 to 10 umhos 0 to 10 umhos	1Y11
FRCS 3511A	Filter Deminerlizer "A" Flow	1C136	3/4"/hr	N/A	0 to 65 gpm	1Y11
FRCS 3511B	Filter Deminerlizer "B' Flow	1C136	3/4"/hr	N/A	0 to 65 gpm	1Y11

RECORDER NO	NAME	LOCATION	SPEED	POINTS	RANGE	P/S
DRYWELL AND TORUS						
RR 9184A	Hi Level Radiation	1C09	1"/hr	North Drywell North Torus	1 to 10+7 rem/hr 1 to 10+7 rem/hr	1Y30
RR 9184B	Hi Level Radiation	1C09	1"/hr	South Drywell South Torus	1 to 10+7 rem/hr 1 to 10+7 rem/hr	2Y30
LR 4397A LR 4396A	Water Level	1C09	3/4"/hr	Torus Drywell	0 to 30 ft -20 to 80 ft	1Y30
LR 4397B LR 4396B	Water Level	1C09	3/4"/hr	Torus Drywell	0 to 30 ft -20 to 80 ft	2Y30
PR 4398A PR 4399A	Drywell Pressure	1C09	3/4"/hr	Low Pressure Hi Pressure	-5 to 5 psi 0 to 250 psi	1Y30
PR 4398B PR 4399B	Drywell Pressure	1C09	3/4"/hr	Low Pressure Hi Pressure	-5 to 5 psi 0 to 250 psi	2Y30
AR 4381	Containment Hydrogen, Oxygen	1C09	3/4"/hr	Oxygen Hydrogen	0 to 10, 0 to 25 % 0 to 10, 0 to 20 %	1Y30
AR 4382	Containment Hydrogen, Oxygen	1C09	3/4"/hr	Oxygen Hydrogen	0 to 10, 0 to 25 % 0 to 10, 0 to 20 %	2Y30
AR 4162	Off Gas hydrogen Annalyzer	1C34	1"/hr	A B	0 to 5 % 0 to 5 %	1Y11
AR 1705	Disolved Oxygen Annalyzer	1C213	2"/hr	N/A	0 to 100 ppb	1L20
RR 4379A	Containment Atmos Post LOCA Radiation	1C29	3/4"/hr	Particulate Gas Iodine	10 to 10+6 cpm 10 to 10+6 cpm 10 to 10+6 cpm	1Y11
RR 4379B	Containment Atmos Post LOCA	1C29	3/4"/hr	Particulate Gas Iodine	10 to 10+6 cpm 10 to 10+6 cpm 10 to 10+6 cpm	1Y21
TR 4383A	Drywell Air Temperature	1C29	3/4"/hr	TE 4386G TE 4386J TE 4386L	0 to 350 F 0 to 350 F 0 to 350 F	1Y11
TR 4383B	Drywell Air Temperature	1C29	3/4"/hr	TE 4386E TE 4386H TE 4386K	0 to 350 F 0 to 350 F 0 to 350 F	1Y21
TR 4383C	Drywell Air Temperature	1C29	3/4"/hr	TE 4386F TE 4386M	0 to 350 F 0 to 350 F	1Y21
TR 4386A	Torus Water and Air Temperatures	1C29	3/4"/hr	Water TE 4325 Air TE 4386A Air TE 4386C	0 to 230 F 0 to 230 F 0 to 230 F	1Y11
TR 4386B	Torus Water and Air Temperature	1C29	3/4"/hr	Water TE 4324 Air TE 4386B Air TE 4386D	0 to 230 F 0 to 230 F 0 to 230 F	1Y21

RECORD NO	NAME	LOCATION	SPEED	POINTS	RANGE	P/S
PR/LR 4384	Containment and Nitrogen Pressure and Torus Water Level	1C29	3/4"/hr	Cont Pres Nitrogen Pres Water Level	-10 to 90 psig 0 to 150 psig -10 to 10 in	1Y11
PR/LR 4385	Containment Pressure and Torus Water Level	1C29	3/4"/hr	Contain Pres Water Level	-10 to 90 psig -10 to 10 in	1Y21
TR 5713A	Drywell Cooling Loop A	1C25	All pts in 1.5 min	24 pts	0 to 200 F	1Y11
TR 5713B	Drywell Cooling Loop B	1C25	All pts in 1.5 min	24 pts	0 to 200 F	1Y21
FR 4339	Nitrogen Purge and Makeup Flow	1C142	1"/hr	Nitrogen Purge Makeup Flow	0 to 3k SCFH 0 to 300k SCFH	1Y21
OFF GAS SYSTEM						
FR 1374	Off Gas Flow	1C07	1"/hr	"A" Air Ejector "B" Air Ejector	0 to 150 SCFM 0 to 150 SCFM	1Y11
TR 4137	Absorber Vslt Temp	1C34	1"/hr	N/A	0 to 100 F	1Y11
TRS 4141	Gyclol Storage Tank Temp	1C34	1"/hr	N/A	0 to 100 F	1Y11
FR 4132	Inlet Flow to Holdup Line	1C34	1"/hr	Hi Flow Lo /flow	0 to 200 SCFM 0 to 20 SCFM	1Y11
TRS 4112 MSR 4113	Gas Reheat Temp	1C34	1"/hr	Inlet Temp Outlet Temp	0 to 100 F 0 to 100 F	1Y11
TRS 4154	Recombiner Temp	1C34	All pts in 30 sec	TE4154A-F	0 to 1000 F	1Y11
TRS 4136	Absorber Vessel Temp	1C34	All pts in 45 sec	TE4136A-G	50 to 150 F	1Y11
RR 4104	Off Gas Pretreatment Rad	1C02	1"/hr	N/A	1 to 10+6 cps	1Y11
FR 4133	Off Gas Stack Flow	1C02	3/4"/hr	N/A	0 to 10k SCFM	1Y23
RR 4116	Stack Gas Rad Mon	1C02	1"/hr	Ch A Ch B	1 to 10+6 cps 1 to 10+6 cps	1Y23
RR 4105	Off Gas Rad Mon	1C02	1"/hr	N/A	0 to 40/125	1Y11
RR 4101	Off Gas Post Treatment Radiation	1C02	1"/hr	Ch A Ch B	.1 to 10+6 cps .1 to 10+6 cps	1Y11
RADWASTE						
FR 3707	Drywell Floor Drain Sump Flow	1C04	1"/hr	Equlizer Drain Sump Floor Drain Sump	0 to 120 gpm 0 to 120 gpm	1Y11
RR 3972	Radwaste Effluent to Canal	1C84	1"/hr	N/A	.1 to 10+6 cps	1Y11
FR 3943 HC 3942	Floor Drain Sample Dicharge	1C84	1"/hr	Hi Flow Low Flow	0 to 100 gpm 0 to 10 gpm	1Y11

RECORDER NO	NAME	LOCATION	SPEED	POINTS	RANGE	P/S
SERVICE WATER SYSTEMS						
FR 4917	River Water Makeup Flow "A"	1C06	3/4"/hr	N/A	0 to 14k gpm	1Y11
FR 4916	River Water Makeup Flow "B"	1C06	3/4"/hr	N/A	0 to 14k gpm	1Y11
LR 4935A	ESW / RHRSW Pit Level	1C29	3/4"/hr	N/A	0 to 33 ft	1Y11
LR 4935B	ESW / RHRSW Pit Level	1C29	3/4"/hr	N/A	0 to 33 ft	1Y21
RR 4820	Service Water / CWW Rad	1C02	1"/hr	Closed Cooling Water Service Water	.1 to 10+6 cps .1 to 10+6 cps	1Y11
FR 4414	Well Pump Flow	1C23	3/4"/hr	P1-58A P1-58B P1-58C	0 to 1000 gpm	1Y21
FR 4247	Circ Water Blow Down to Canal	1C225	1"/hr	N/A	0 to 7k gpm	1L50
TR 4200	Circulating Water Temperatures	1C20	All pts in 40 sec	8 pts	0 to 200 F	1Y11
GENERATOR						
WR 1000	Generator Gross Megawatts	1C31	1.5"/hr	N/A	0 to 600 mw	1Y11
VR 1001	Generator Gross Megavars	1C31	1.5"/hr	N/A	-300 to 300 mv	1Y11
WVR 2000	Aux Transformer Watts-Vars	1C31	1.5"/hr	N/A	0 to 50 mw	1Y11
WVR 3000	Startup Xfmer X-winding Watt-Vars	1C31	1.5"/hr	N/A	0 to 25 mw	1Y11
WVR 3001	Startup Xfmer Y-winding Watt-Vars	1C31	1.5"/hr	N/A	0 to 25 mw	1Y11
WVR 4000	Stby Xfmer Watts-Vars	1C31	1.5"/hr	N/A	0 to 7.5 mw	1Y11
WR 1100	Net Plant Megawatts	1C31	3"/hr	N/A	0 to 600 mw	1Y11
CR 3609	Generator Machine Gas Humidity	1C83	1rev/day	N/A	0 to 80 %	1Y21

RECORDER NO	NAME	LOCATION	SPEED	POINTS	RANGE	P/S
VENTILATION SYSTEMS						
RR 7606A	Reactor Building Exaust Radiation	1C183	2"/hr	N/A	.05 to 50 mr/hr	1Y11
RR 7606B	Reactor Building Exaust Radiation	1C184	2"/hr	N/A	.05 to 50 mr/hr	1Y21
RR 5946	Turbine Building Vent Rad	IC367	1"/hr	Vent Rad Hi Range Vent Rad Lo Range	10-3 to 10+5 uc/cc 10-8 to 1 uc/cc	1Y34
FR 5945	Turbine Vent Flow	IC367	1"/hr	N/A	0 to 72k SCFM	1Y34
RR 4131	Reactor Building Vent Rad	1C02	1"/hr	Ch A Ch B	.01 to 100 cpm .01 to 100 cpm	1Y23
RR 7613	Reactor Building Exaust Gas	1C336	1"/hr	N/A	10-3 to 10+5 uc/cc 10-8 to 1 uc/ml	1Y34
RR 7614	Reactor Building Exaust Gas	1C336	1"/hr	N/A	10-3 to 10+5 uc/cc 10-8 to 1 uc/cc	1Y34
RR 7615	Reactor Building Exaust Gas	1C336	1"/hr	N/A	10-3 to 10+5 uc/cc 10-8 to 1 uc/cc	1Y42
	Off Gas Stack Gas	Control Room	(To be installed)		10-3 to 10+5 uc/cc 10-8 to 1 uc/cc	
MISCELLANEOUS						
XR 1234	Computer Trend	1C07	3/4"/hr	Pt 1 Pt 2	0 to 100 % 0 to 100 %	1Y11
XR 1235	Computer Trend	1C07	3/4"/hr	Pt 3 Pt 4	0 to 100 % 0 to 100 %	1Y11
CR 2737	Cleanup Outlet Conductivity	1C04	1"/hr	Ch A Ch B	0 to 1 umho 0 to 1 umho	1Y11
CR 2738	Cleanup Inlet Conductivity	1C04	1"/hr	Ch A Ch B	0 to 10 umhos 0 to 10 umhos	1Y11
PR 9150	Area Rad Monitors	1C02	All pts in 1 min	12 pts	.01 to 100 mr/hr	1L60

Appendix D

Control Room Panel Annunciator List

Panel 1C03-A

REACTOR AND CONTAINMENT COOLING AND ISOLATION

MAIN STEAM LINE HI RADIATION	PRETREATMENT OFF GAS SYSTEM WILL ISOLATE	OFF GAS VENT PIPE SAMPLE HI/LO FLOW	POST TREATMENT OFF-GAS HI RADIATION	FUEL POOL EXHAUST DOWNSCALE/INOP	ADS IN TEST STATUS	ADS CORE SPRAY OR RHR PUMP RUNNING	ADS CORE SPRAY OR RHR PUMP RUNNING	CORE SPRAY SYSTEM I HEADER TO TOP OF CORE PLATE HI ΔP
POST TREATMENT OFF GAS HIGH-HIGH RADIATION	PRETREATMENT OFF-GAS DOWNSCALE OR INOPERATIVE	OFF-GAS VENT PIPE HI RADIATION	LIQUID RADIATION MONITORS DOWNSCALE OR INOPERATIVE	ADS SAFETY VALVE LEAKING	ADS TEST PROCEDURE FAULTY BOTH TEST JACKS INSTALLED	CORE SPRAY SYSTEM I VALVE HI DISCHARGE PRESSURE	POST TREATMENT OFF-GAS DOWNSCALE	RHR HX E11-B001A TUBE-TO-SHELL LO PRESSURE
MAIN STEAM LINE DOWNSCALE	POST TREATMENT OFF-GAS HI-HI-HI RADIATION OR INOPERATIVE	OFF-GAS VENT PIPE HI-HI RADIATION	FUEL POOL EXHAUST HI RADIATION	ADS HI DRYWELL PRESS SIGNAL SEALED-IN	ADS CONTROL POWER FAILURE UNDER VOLTS	CORE SPRAY SYSTEM I PUMP 1P211A TRIPPED	CORE SPRAY SYSTEM 1 & 2 LOGIC POWER FAILURE UNDER VOLTS	POST TREATMENT OFF-GAS SAMPLE HI/LO FLOW
PRETREATMENT AVERAGE ANNUAL RELEASE LIMIT WILL BE EXCEEDED	PRETREATMENT OFF-GAS SAMPLE FLOW TROUBLE	OFF-GAS VENT PIPE DOWNSCALE INOPERATIVE	FUEL POOL EXHAUST HI-HI RADIATION	ADS TIMERS INITIATED	ADS RELAYS ENERGIZED	CORE SPRAY SYSTEM 1 PUMP 1P211A MOTOR OVERLOAD	CORE SPRAY SYSTEM 1 ACTUATED	REACTOR BLDG CLOSED COOLING WATER HIGH RADIATION

Panel 1C03-B

REACTOR AND CONTAINMENT COOLING AND ISOLATION

ADS LO WATER LEV	RHR SERVICE WATER PUMP 1P-22C OVERLOAD	RHR PUMP 1P-229C OVERLOAD	RHR REACTOR LOOP SECTION LO LEVEL	RHR DRYWELL HI PRESSURE	RHR HX A/B INLET WATER HI TEMPERATURE	CORE SPRAY SYSTEM 1 LOOP LO DISCHARGE PRESSURE	RHR SERVICE WATER PUMP 1P-22B OVERLOAD	RHR PUMP 1P-229B OVERLOAD
RHR SERVICE WATER PUMP 1P-22A TRIP	RHR PUMP 1P-229A TRIP	RHR SYSTEM 1 ACTUATED	RHR IN TEST STATUS	RHR REACTOR LO PRESSURE	RHR HX A/B DISCH COOLING WATER HI TEMPERATURE	TORUS VACUUM BREAKER LOOP A HI ΔP	RHR SERVICE WATER PUMP 1P-22D OVERLOAD	RHR PUMP 1P-229D OVERLOAD
RHR SERVICE WATER PUMP 1P-22C TRIP	RHR PUMP 1P-229C TRIP	RHR BUS A/B LOGIC POWER FAILURE	RHR CONTAIN SPRAY SERVICE WATER PUMP SELECT OVERRIDE	RHR SYSTEM 1/2 DISCH. HEADER HI/LO PRESSURE	RHR HX 1E-201B TUBE-TO-SHELL LO PRESSURE	RHR SERVICE WATER PUMP 1P-22B TRIP	RHR PUMP 1P-229B TRIP	RHR SYSTEM 2 ACTUATED
RHR SERVICE WATER PUMP 1P-22A OVERLOAD	RHR PUMP 1P-229A OVERLOAD	RHR SERV WTR EMERG SERV WTR STRAINERS ΔP HI	RHR REACTOR INITIATION LO LEVEL	RHR EX 1E-201A/B OUTLET HI CONDUCTIVITY	RHR SHUTDOWN SUCTION HEADER HI PRESSURE	RHR SERVICE WATER PUMP 1P-22D TRIP	RHR PUMP 1P-229D TRIP	OFF GAS TROUBLE

Panel 1C03-C

REACTOR AND CONTAINMENT COOLING AND ISOLATION

CORE SPRAY SYSTEM 2 VALVE NI DISCHARGE PRESSURE	CORE SPRAY SYSTEM 2 LOOP LOW DISCHARGE PRESSURE	HPCI LO FLOW	HPCI OIL TANK HI/LO LEVEL	HPCI PUMP SUCTION LO PRESSURE	HPCI TURBINE BEARING OIL LO PRESSURE	HPCI TURBINE INLET STEAM LINE WATER DRAIN POT HI LEVEL	HPCI TURBINE/LOGIC TEST SW IN TEST	HPCI LOGIC BUS POWER FAILURE UNDER VOLTS
CORE SPRAY SYSTEM 2 PUMP 1P211B TRIPPED	TORUS VAC BKR. LOOP B HI ΔP	NUCLEAR INSTRUMENTS SYSTEM A EXCESS FLOW	HPCI AUX OIL PUMP MOTOR OVERLOAD	HPCI PUMP SUCTION HI PRESSURE	HPCI VACUUM TANK HI PRESSURE	HPCI TURB OIL COOL DISCHARGE OIL HI TEMPERATURE	HPCI TURBINE EXHAUST DIAPHRAGM HI PRESSURE	HPCI STEAM LINE HI ΔP
CORE SPRAY SYSTEM 2 PUMP 1P211B MOTOR OVERLOAD	CORE SPRAY SYSTEM 2 ACTUATED PMP START	NUCLEAR INSTRUMENTS SYSTEM B EXCESS FLOW	HPCI INVERTER CIRCUIT FAILURE	HPCI VACUUM BREAKER V-F069/F070 NOT FULLY OPEN	HPCI VACUUM TANK HI LEVEL	HPCI TURBINE TRIP SOLENOID ENERGIZED	HPCI TURBINE EXHAUST LINE DISCHARGE HI PRESSURE	HPCI CNDS STORAGE TANK A/B LO WATER LEVEL
CORE SPRAY SYSTEM 2 HEADER TO TOP OF CORE PLATE HI ΔP	CORE SPRAY IN TEST	HPCI LOGIC A ISOLATION TRIP SIGNAL INITIATED	HPCI LOGIC B ISOLATION TRIP SIGNAL INITIATED	HPCI OIL FILTER HI ΔP	HPCI VACUUM TANK LO LEVEL	HPCI TURBINE TRIPPED	HPCI TURBINE EXHAUST LINE DRAIN POT HI LEVEL	HPCI SUPPR POOL HI LEVEL

Panel 1C04-A

REACTOR WATER CLEANUP AND RECIRCULATION

RECIRC SYST A GENERATOR LOCKOUT	RECIRC SYST A STARTUP SEQUENCE INCOMPLETE	RECIRC SYST A GENERATOR FIELD GROUND	RECIRC SYST A DRIVE MOTOR TRIP	RECIRC SYST A PUMP SEAL STAGING HI/LO FLOW	RECIRC SYST A ONLY IN SERVICE	RECIRC SYST B GENERATOR LOCKOUT	RECIRC SYST B STARTUP SEQUENCE INCOMPLETE	RECIRC SYST B GENERATOR FIELD GROUND
RECIRC SYST A DC CONTROL POWER TRANSFER	RECIRC SYST A DRIVE MOTOR OVERLOAD	RECIRC SYST A FLUID DRIVE OIL HI TEMPERATURE	RECIRC SYST A PUMP MOTOR HI VIBRATION	RECIRC SYST A PUMP SEAL CLOSED COOLING WATER LO FLOW	RECIRC SYST A/B GENERATOR AND DR MOTOR STATOR HI TEMP	RECIRC SYST B DC CONTROL POWER TRANSFER	RECIRC SYST B DRIVE MOTOR OVERLOAD	RECIRC SYST B FLUID DRIVE OIL HI TEMPERATURE
RECIRC SYST A AUX GENERATOR LOCKOUT	RECIRC SYST A DC AUX LUBE OIL PUMP LOSS OF POWER	RECIRC SYST A FLUID DRIVE OIL LO TEMP	RECIRC SYST A PUMP MOTOR OIL LEVEL	RECIRC SYST A FLUID DRIVE SCOOP TUBE LOCK	RECIRC SYST A/B MG SET BEARING AND OIL HI TEMPERATURE	RECIRC SYST B AUX GENERATOR LOCKOUT	RECIRC SYST B, DC AUX LUBE OIL PUMP LOSS OF POWER	RECIRC SYST B, FLUID DRIVE OIL LO TEMP
RECIRC SYST A SPEED CONTROL SIGNAL FAILURE	RECIRC SYST A FLOW LIMIT	RECIRC SYST A FLUID DRIVE LUBE OIL LO PRESSURE	RECIRC SYST A OUTER SEAL LEAK DETECTION HI FLOW	RECIRC SYST A OIL MIST ELIMINATOR HI DIFFERENTIAL P.	RECIRC SYST A/B PUMP MOTOR HI TEMPERATURE	RECIRC SYST B SPEED CONTROL SIGNAL FAILURE	RECIRC SYST B FLOW LIMIT	RECIRC SYST B FLUID DRIVE LUBE OIL LO PRESSURE

Panel 1C04-B

REACTOR WATER CLEANUP AND RECIRCULATION

RECIRC SYST B DRIVE MOTOR TRIP	RECIRC SYST B PUMP SEAL STAGING HI/ LO FLOW	RECIRC SYST B ONLY IN SERVICE	RADWASTE TROUBLE	ATMOS. CONTROL VLV. ISO. BYPASS	REACTOR BLDG HI RADIATION	RADWASTE BLDG HI RADIATION	CLEANUP SYS HI CONDUCTIV- ITY	CLEANUP SYS PUMP LO FLOW
RECIRC SYST B PUMP MOTOR HI VIBRATION	RECIRC SYST B PUMP SEAL CLOSED COOL ING WATER LO FLOW	STEAM LEAK DETECTION SYS LOGIC A IN TEST STATUS	STEAM LEAK DETECTION SYS AM- BIENT HI TEMPERATURE	STEAM LEAK DETECTION SYS LOGIC B IN TEST STATUS	NEW FUEL STORAGE AREA HI RADIATION	ADMIN. BLDG HI RADIATION	CLEANUP SYS HI/LO DISCH PRESSURE	CLEANUP SYS FILTER DEMIN TROUBLE
RECIRC SYST B PUMP MOTOR OIL LEVEL	RECIRC SYST B FLUID DRIVE SCOOP TUBE LOCK	TORUS VENT BYPASS VALVE 4309/ 4310 ISOL OVERRIDE	STEAM LEAK DETECTION SYS RCIC LOGIC POWER FAILURE	STEAM LEAK DETECTION SYS HPIC LOGIC POWER FAILURE	SPENT FUEL STORAGE AREA HI RADIATION	AREA MONITORS DOWNSCALE INOP	CLEANUP SYS PUMP COOL- WATER HI TEMPERATURE	CLEANUP SYS FILTER INLET HI TEMPERATURE
RECIRC SYST B OUTER SEAL LEAK DETECTION HI FLOW*	RECIRC SYST B OIL MIST ELIMINATOR HI DIFFER- ENTIAL P.	MACHINE SHOP HI RADIATION	STEAM LEAK DETECTION SYS HI DIFFEREN- TIAL TEMP.	VESSEL FLANGE SEAL LEAK	TURBINE BLDG HI RADIATION	RHR OR EMERG SERV WATER RADIATION HIGH	CLEANUP SYS HI DIFFEREN- TIAL FLOW	CLEANUP SYS FILTER INLET HI- HI TEMP.

Panel 1C04-C

REACTOR WATER CLEANUP AND RECIRCULATION

RADWASTE EFFLUENT HIGH RADIATION	FUEL POOL COOLING TROUBLE	TORUS AREA LEAKAGE	REACTOR BLDG EQUIP. DRAIN SUMP HI TEMPERATURE	RCIC PUMP SUCTION VALVE MO-2516 FROM TORUS FULL OPEN	RCIC PUMP DISCHARGE LO FLOW SENSOR	RCIC TURBINE HI PRESSURE BEARING HI TEMPERATURE	RCIC TURBINE BEARING OIL LO PRESSURE	RCIC STEAM LINE HI ΔP
SERVICE WATER EFFLUENT HIGH RADIATION	TORUS LEVEL HIGH RISE	DRYWELL EQUIP DRAIN SUMP HI-HI LEVEL	REACTOR BLDG EQUIP DRAIN SUMP HI LEAK	RCIC ISOLATION TRIP SIGNAL LOGIC A	RCIC BAROMETRIC COND VACUUM TANK LO LEVEL	RCIC TURBINE LO PRESSURE BEARING HI TEMPERATURE	RCIC TURBINE EXHAUST HI PRESSURE	RCIC LOGIC BUS A/B POWER FAILURE
CARBON BED VAULT DOWNSCALE/INOP	DRYWELL FLOOR DRAIN SUMP HI-HI LEVEL	DRYWELL EQUIP DRAIN SUMP HI LEAK	REACTOR BLDG FLOOR DRAIN SUMP HI LEAK	RCIC PUMP SUCTION HI PRESSURE	RCIC BAROMETRIC COND VACUUM TANK HI LEVEL	RCIC TURBINE TRIP/RCIC TRIP ON HI REAC VSL LVL	RCIC TURBINE EXHAUST DIAPHRAGM HI PRESSURE	RCIC INVERTER POWER FAILURE
CARBON BED VAULT HIGH RADIATION	DRYWELL FLOOR DRAIN SUMP HI LEAK	DRYWELL EQUIP DRAIN SUMP HI TEMPERATURE	RCIC OIL FILTER DIFFERENTIAL HI PRESSURE	RCIC PUMP SUCTION LO PRESSURE	RCIC VACUUM TANK HI PRESSURE	RCIC IN TEST STATUS	RCIC TURBINE INLET STEAM LINE DRAIN POT HI LEVEL	RCIC ISOLATION TRIP SIGNAL LOGIC B

Panel 1C05-A

REACTOR CONTROL

± 24 V-DC SYSTEM A TROUBLE	RPT SYS A OR B TRIP	CRD CHARGING WATER HI PRESSURE	IRM A UPSCALE TRIP OR INOPERATIVE	IRM B UPSCALE TRIP OR INOPERATIVE	APRM BUS A UPSCALE TRIP INOP	APRM BUS B UPSCALE TRIP INOP	REACTOR VESSEL WATER LO-LO LEVEL
± 24V-DC TROUBLE	CONTINUITY LOSS TO SQUIB VALVE	CRD WATER FILTER HI ΔP	IRM UPSCALE	SRM PERIOD	LPRM UPSCALE	APRM UPSCALE	CHANNEL A LO CONDENSER VACUUM BYPASS
REACTOR HI/LO LEVEL	STANDBY LIQUID TANK HI/LO TEMP	CRD PUMP 1P-209A SUCTION LO PRESSURE	SRM UPSCALE OR INOPERATIVE	SRM DETECTOR RETRACTED WHEN NOT PERMITTED	RBM UPSCALE INOP	FLOW REF OFF NORMAL	CHANNEL A MAIN STM TUNNEL HI TEMPERATURE
REACTOR HI PRESSURE	STANDBY LIQUID TANK HI/LO LEVEL	CRD PUMP 1P-209B SUCTION LO PRESSURE	IRM DOWNSCALE	RPT SYS A OR B OUT OF SVC	LPRM DOWNSCALE	TORUS/DRYWELL VENT VALVE 4300/4302 PERMISSIVE	CHANNEL A MAIN STEAM LINE HI FLOW
FEEDWATER VALVE A AIR LO PRESSURE	CRD PUMP 1P-209A HI VIBRATION	CRD PUMP 1P-209A OVERLOAD	SRM DOWNSCALE	CRD PUMP 1P-209A TRIPPED	APRM DOWNSCALE	CHANNEL A COND LO VAC OR T.B. BLDG HI TEMP	CHANNEL A MAIN STEAM LINE LO PRESSURE
FEEDWATER VALVE B AIR LO PRESSURE	CRD PUMP 1P-209B HI VIBRATION	CRD PUMP 1P-209B OVERLOAD	RPT LOGIC A OR B POWER LOSS	CRD PUMP 1P-209B TRIPPED	RBM DOWNSCALE	TRIP SYST A REACTOR AUTO SCRAM	TRIP SYST A REACTOR MANUAL SCRAM

Panel 1C05-B

REACTOR CONTROL

REACTOR VESSEL WATER LO-LO-LO LEVEL	DISCH. VOLUME HI WATER LEVEL CRD TRIP	NEUTRON MONITORING SYS TRIP	MAIN STEAM LINE HI RADIATION TRIP	SCRAM DISCHARGE VOLUME NOT DRAINED	MAIN STEAM ISOLATION VALVE CLOSURE TRIP BYPASS	ROD OUT BLOCK	ROD SEQUENCE CONTROL SYSTEM A RODS BYPASSED
CHANNEL B LO CONDENSER VACUUM BYPASS	MAIN STEAM LINE ISOLATION VLVS NOT FULLY OPEN TRIP	REACTOR VESSEL LO LEVEL TRIP	TURBINE CONTROL VALVE FAST CLOSURE TRIP	CRD ACCUMULATOR LO PRESSURE HI LEVEL	MODE SWITCH SHUTDOWN SCRAM BYPASS	ROD OVERTRAVEL	ALL A/B SEQUENCE RODS NOT FULL OUT
CHANNEL B STEAM TUNNEL HI TEMPERATURE	REACTOR VESSEL HI PRESSURE TRIP	TRIP SYSTEM B REACTOR AUTO SCRAM	TURBINE STOP VALVE CLOSURE TRIP	PRIMARY CONTAINMENT HI/LO PRESSURE	REACTOR VESSEL HI PRESSURE	ROD DRIFT	ROD SEQUENCE CONTROL SYSTEM MALFUNCTION
CHANNEL B MAIN STEAM LINE HI FLOW	PRIMARY CONTAINMENT HIGH PRESSURE TRIP	TRIP SYSTEM B MANUAL SCRAM	PANEL 1C-208 TROUBLE	CONTROL VALVE FAST CLOSURE TURB STOP VALVE SCRAM AND RPT BYPASS	SCRAM VALVE PILOT AIR HEADER HI/LO PRESSURE	CRD HYD HI TEMPERATURE	CONTAINMENT HI OXYGEN CONTENT A
CHANNEL B MAIN STEAM LINE LO PRESSURE	RECIRC PUMP A HIGH PRESSURE LOW LEVEL TEST	RECIRC PUMP B HIGH PRESS. LOW LEVEL TEST	ROD SEQUENCE CONTROL SYSTEM B RODS BYPASSED	DISCH. VOLUME WATER HI LEVEL TRIP BYPASS	HPCI AUTO INITIATE	RCIC AUTO INITIATE	CONTAINMENT HI OXYGEN CONTENT B
CHANNEL B CONDENSER LO VAC OR TURBINE BLDG. HI TEMP	RECIRC.PUMP A HIGH PRESSURE LOW LEVEL TRIP	RECIRC.PUMP B HI PRESSURE LOW LEVEL TRIP	GROUP I ISOLATION	GROUP II,III, IV ISOLATION	GROUP V ISOLATION	RWM ROD BLOCK	TIP SHEAR VALVE CLOSED CKT ABNORMAL

Panel 1C06-A

FEEDWATER AND CONDENSATE

WATER SUPPLY PUMP PIT "A" LEVEL LOW	WATER SUPPLY PUMP PIT "B" LEVEL LOW	WTR. SUPPLY PP 1P11TB AUTO TRIP OR DISABLED	WATER SUPPLY PP 1P11TD AUTO TRIP OR DISABLED	COOLING TOWER 1E-69A FANS TROUBLE	COOLING TOWER 1E-69B FANS TROUBLE	CONDENSER HOT WELL LEVEL HIGH	COND STORAGE TANK 1T-5A LEVEL HIGH	COND STORAGE 1T-5B LEVEL HIGH	CIRC. WATER PUMP 1P-4A TRIP	CIRC. WTR. PUMP 1P-4B TRIP	COND. PUMP 1P-8A AUTO-TRIP	COND. PUMP 1P-8B AUTO-TRIP
WTR. SUPPLY PP 1P11TA AUTO TRIP OR DISABLED	WTR. SUPPLY PP 1P11TC AUTO TRIP OR DISABLED	SERV. WTR. PUMPS DISCH. PRESS LOW	SERV WTR. AUTO FILTER DIFF. PRESS HIGH	COOL. TOWER 1E-69A BASIN LEVEL HIGH-LOW	COOL. TOWER 1E-69B BASIN LEVEL HIGH-LOW	CONDENSER HOT WELL LEVEL LOW	COND. STORAGE TANK 1T-5A LEVEL LOW	COND. STORAGE TANK 1T-5B LEVEL LOW	CIRC. WATER PUMP 1P-4A VIBRATION HIGH	CIRC. WTR. PUMP 1P-4B VIBRATION HIGH	COND. PUMP 1P-8A VIBRATION HIGH	COND. PUMP 1P-8B VIBRATION HIGH
EMERG. S.W. PUMP 1P-99A TRIP-LO PRESS	EMERG. S.W. PUMP 1P-99B TRIP-LO PRESS	SERV. WTR. PUMP 1P-89A AUTO-TRIP	SERV. WTR. PUMP 1P-89B AUTO - TRIP	SERV. WTR. PUMP 1P-89C AUTO-TRIP	SERVICE WATER PUMPS OVERLOAD	CONDENSER HOT WELL LEVEL HIGH-HIGH	COND. STORAGE TANK 1T-5A LEVEL LOW-LOW	COND. STORAGE TANK 1T-5B LEVEL LOW-LOW	CIRC. WTR. PUMP 1P-4A OVERLOAD	CIRC. WTR. PUMP 1P-4B OVERLOAD	COND. PUMP 1P-8A OVERLOAD	COND. PUMP 1P-8B OVERLOAD
EMERG. S.W. PIT "A" LEVEL LOW	EMERG. S.W. PIT "B" LEVEL LOW	RIVER WTR. INLET C.U.'s AIR SUPPLY LOW	SERV. WTR. PUMPS CONTROL SWITCH NOT IN AUTO	CONDENSERS CIRC. WTR. CONDUCTIVITY HIGH	COND. STORAGE OVERFLOW TNK-1T-10 LVL HIGH	COND. STORAGE TANK 1T-5A WTR. OUTL. TEMP LOW	COND. STORAGE TANK 1T-5A WATER TEMP. LOW-LOW	COND. STORAGE TANK 1T-5B WATER TEMP. LOW-LOW	COND. STORAGE TANK 1T-5B WTR. OUTL. TEMP LOW	CIRC. WTR. PIT LEVEL LOW	COND. PUMPS DISCH. PRESS LOW	COND. PUMPS SEAL WATER PRESS LOW

Panel 1C06-B

COND. DEMINER PANEL 1C-80 TROUBLE	MAKE-UP DEMIN. PANEL 1C-81 TROUBLE	DEMIN. WATER TANK TEMP LOW	DEMIN. WATER TANK LEVEL LOW-LOW	MAIN COND. OXYGEN CONTENT HIGH	LPFW HTR. 1E-1A & 1E-2A LEVEL HI-HI	LPFW HTR. 1E-3A LEVEL HI-HI	LPFW HTR. 1E-4A LEVEL HI-HI	LPFW HTR. 1E-5A LEVEL HI-HI	HPFW HTR. 1E-6A LEVEL HI-HI
COND. DEMIN. INL/OUTL DIFF PRESS HIGH	REACT. FW PUMP 1P-1A VIBRATION HIGH	REACT FW PUMP 1P-1B VIBRATION HIGH	RIVER WATER INTAKE SYSTEM 1C-102 TROUBLE	LPFW HTR 1E-1A LEVEL HIGH	LPFW HTR. 1E-2A LEVEL HIGH	LPFW HTR. 1E-3A LEVEL HIGH	LPFW HTR. 1E-4A LEVEL HIGH	LPFW HTR. 1E-5A LEVEL HIGH	HPFW HTR. 1E-6A LEVEL HIGH
DEMIN. WATER TRANSF. PUMPS DISCH PRESS LOW	COND. SERVICE JOCKEY PMP 1P-11 DISCH. PRESS LOW	REACT FW PMP 1A MTR OVERLOAD & AUTO TRIP	REACT FW PMP 1B MTR OVERLOAD & AUTO TRIP	LPFW HTR 1E-1B LEVEL HIGH	LPFW HTR 1E-2B LEVEL HIGH	LPFW HTR 1E-3B LEVEL HIGH	LPFW HTR. 1E-4B LEVEL HIGH	LPFW HTR. 1E-5B LEVEL HIGH	HPFW HTR 1E-6B LEVEL HIGH
RB COOL WTR HT EXCHR OUTLET TEMP HIGH	RB COOL WTR SURGE TANK LEVEL HI-LOW	RB C.C.W PUMPS DISCH PRESS LOW	WASTE SUMP/OIL SUMP LEVEL HIGH	TURB. INSTR PANEL 1C-20 TROUBLE	LPFW HTR 1E-1B & 1E-2B LEVEL HI-HI	LPFW HTR 1E-3B LEVEL HI-HI	LPFW HTR. 1E-4B LEVEL HI-HI	LPFW HTR 1E-5B LEVEL HI-HI	HPFW HTR 1E-6B LEVEL HI-HI

Panel 1C07-A

TURBINE BENCHBOARD

EHC DC POWER FAILURE	MAIN TURBINE TRIP	HYDR. FLUID PUMPS NOT IN AUTO START	HYDR. FLUID PUMPS MOTORS OVERLOAD	HYDR. FLUID FILTER PUMP TRIP 'A'	L.O. CONDITIONING UNIT TROUBLE	TURB. BRG. OIL HEADER PRESS LOW	MECHANICAL TRIP LOCKOUT	TURN GEAR OIL PUMPS NOT IN AUTO START	LIFT PUMPS NOT IN AUTO START	PANEL 1C-23 TROUBLE
TURB. M.S.P. NOT IN AUTO START	TURN GEAR MOTOR NOT IN AUTO START	HYDR. FLUID RESERVOIR LEVEL HIGH	HYDR FLUID RESERVOIR LEVEL LOW	BYPASS VALVE #1 OPEN	TURB. L.O. TANK 1T-1 LEVEL HIGH	EMERG. BRG OIL PUMP RUNNING	EMERG. BRG OIL PUMP NOT IN AUTO START	TURN GEAR OIL PUMP RUNNING	LIFT PUMPS OVERLOAD TRIP	PANEL 1C-24 TROUBLE
TURB. M.S.P. RUNNING	FWP PUMP STUFFING BOX SEAL WATER DRAIN TANK LEVEL HI/LOW	HYDR. FLUID TEMPERATURE HIGH - LOW	HYDR FLUID PUMPS 1P-97A/B RUNNING	L.O. TANK VAPOR EXTRACTOR TRIP	TURB. L.O. TANK 1T-1 EMERGENCY OVERFLOW	CLEAN L.O. TANK LEVEL HIGH	C.W. VALVE HO-4201 or 4202 HYDRAULIC OIL PRESSURE LOW	TURN GEAR OIL PUMP MOTOR OVERLOAD	TURB. THRUST BEARING WEAR	PANEL 1C-25 TROUBLE
TURB. M.S.P. MOTOR OVERLOAD	TURN GEAR ENGAGED	HYDR FLUID PRESSURE LOW	EMERG HYDR FLUID LEVEL HIGH		TURB. L.O. TANK 1T-1 LEVEL LOW	DIRTY L.O. TANK LEVEL HIGH	EMERG. BRG. OIL PUMP MOTOR OVERLOAD	CONDENSER VACUUM PUMP AUTO TRIP 52-205	NITROGEN SUPPLY PRESS LOW	PANEL 1C-26 TROUBLE

Panel 1C07-B

TURBINE BENCHBOARD

RFP 1P1A,1P1B SEAL WATER FILTER DIFF PRESSURE HIGH	TSI DIFF EXPANSION HIGH	1st STAGE DRN. TK. 1T-91A LEVEL HIGH	2nd STAGE DRN. TK. 1T-92A LEVEL HIGH	M.S.R. DRN. TK. 1T-93A LEVEL HIGH	M.S.R. 1E-18A/1E-18B LEVEL HIGH	STM. PACKING EXHAUSTER 1E-9 LEVEL HIGH	L.P. TURB. 1G-1B EXHAUST HOOD TEMP HIGH	AIR COMPRESSOR 1K-1A AIR DISCH. TEMP HIGH	INSTR. AIR DRYER 1T-53 TROUBLE	BREATHING AIR UNDER RPV LOW
TURB. 1G-1B VACUUM LOW	TSI VIBRATION HIGH	1st STAGE DRN. TK. 1T-91A LEVEL LOW	2nd STAGE DRN. TK. 1T-92A LEVEL LOW	M.S.R. DRN. TK. 1T-93A LEVEL LOW	1st STAGE DRN. TKS. 1T-91A/B PRESS DIFF HIGH	AIR COMPRESSOR 1K1C AIR DISCH TEMP HIGH	L.P. TURB. 1G-1C EXHAUST HOOD TEMP	AIR COMPRESSOR 1K-1B AIR DISCH TEMP HIGH	INST. AIR DRYER 1T-53 AIR DISCH. PRESS LOW	BREATHING AIR IN AIRLOCK LOW
TURB. 1G-1C VACUUM LOW	TSI INSTRUMENTATION NO VOLTAGE	1st STAGE DRN. TK. 1T-91B LEVEL HIGH	2nd STAGE DRN. TK. 1T-92B LEVEL HIGH	M.S.R. DRN. TK. 1T-93B LEVEL HIGH	ACID/ CHLORINATION SYSTEM TROUBLE	STM. PACKING EXHAUSTER VACUUM LOW	EXHAUST HOOD SPRAY WATER ON	SERVICE AIR HDR. PRESS LOW	INSTR. AIR DRYER 1T-53 PR. DIFF. ACROSS HIGH	DOMESTIC WATER STORAGE TANK 1T-125 LEVEL HIGH
VACUUM P.S. BELLOWS FAILURE	TSI INSTRUMENTATION MALFUNCTION	1st STAGE DRN. TK. 1T-91B LEVEL LOW	2nd STAGE DRN. TK. 1T-92B LEVEL LOW	M.S.R. DRN. TK. 1T-93B LEVEL LOW	2nd STAGE DRN. TKS. 1T-92A/B PRESS DIFF. HIGH	SEAL STEAM PRESS LOW-LOW	AIR EJECTOR OFF GAS ISOLATION	CONDENSER VACUUM LOW	DOMESTIC WATER HYPO TANK 1T-120 LEVEL LOW	DOMESTIC WATER STORAGE TANK 1T-125 LEVEL LOW

Panel 1C08-A

GENERATOR AND AUXILIARY POWER

AUX TRANS TO BUS 1A1 4KV BKR 1A101 TRIP	4K BUS 1A1 LOCKOUT TRIP	STARTUP TRANS TO BUS 1A1 4KV BKR 1A102 TRIP	STANDBY TRANS TO BUS 1A3 4KV BKR 1A301 TRIP	4KV BUS 1A3 LOCKOUT TRIP	STARTUP TRANS TO BUS 1A3 4KV BKR 1A302 TRIP	STARTUP TRANS TROUBLE	UNINTERRUPTIBLE AC SYSTEM TROUBLE	125V DC SYSTEM I TROUBLE	DIESEL GEN 1G31 RUNNING	DIESEL GEN 1G31 4KV BKR 1A311 TRIP	DIESEL GEN 1G31 LOCKOUT TRIP
TB EL 757-6 LC TRANS 1X11 4KV BKR 1A107 TRIP	COOLING TOWER LC TRANS 1X71 4KV BKR 1A108 TRIP	TB EL 757-6 LC TRANS 1X51 480V BKR 1A109 TRIP	SWITCH YARD LC TRANS 4KV BKR 1A110 TRIP	CB EL 757-6 LC TRANS 1X31 4KV BKR 1A303 TRIP	LOAD CENTER TRANS 1X91 152-312 TRIP OR 480V MCC 1B91 BKR TRIP	MAIN GENERATOR NEGATIVE SEQUENCE	UNINTERRUPTABLE M-G SET DC MOTOR RUNNING	125V DC CHARGER 1D12 TROUBLE OR OUT OF SERVICE	DIESEL OIL DAY TANK A LO-LO LEVEL	DIESEL GEN 1G31 PHASE OR GND OVERCURRENT	DIESEL GEN 1G31 OVERSPEED TRIP
TB EL 757-6 LC TRANS 1X11 480V BKR 1B101 TRIP	LOAD CENTER 1B1-1B2 TIE BKR 1B107	TB EL 757-6 LC TRANS 1X51 480V BKR 1B501 TRIP	4KV BUS 1A1 LOSS OF VOLTAGE	LOAD CENTER 1B3 MCC FEEDER 480V BREAKERS TRIP	4KV BUS 1A3 LOSS OF VOLTAGE	STARTUP TRANS LOCKOUT TRIP	UNINTERRUPTABLE M-G SET LOSS OF DC POWER	125V DC CHARGER 1D120 TROUBLE OR OUT OF SERVICE	FUEL OIL TANK 1T 34 LOW LEVEL	DIESEL GEN 1G31 PANEL 1C-93 TROUBLE	DIESEL GEN 1G31 ENGINE CRANKING
LOAD CENTER 1B1 MCC FEEDER 480V BREAKERS TRIP	LOAD CENTER 1B5-1B6 TIE BKR 1B505 TRIP	LOAD CENTER 1B5 MCC FEEDER 480V BREAKERS TRIP	INSTRUMENT A C DIST PANELS FAILURE	RB EL 786 MCC 1B34A 480V BKR 1B340 TRIP	480V MCC BKRS 1B3402 1B4402 TRIP	4KV BUS AUTO TRANSFER INOP	DIESEL OIL STORAGE TANK LO-LO LEVEL	DIESEL GEN 1G31 CONTROL POWER FAILURE	DIESEL GEN 1G31 AUTO START OR AUTO SWITCHES LOCKOUT	DIESEL GEN 1G31 ENGINE SHUTDOWN	DIESEL GEN 1G31 START FAILURE

Panel 1C08-B

GENERATOR AND AUXILIARY POWER

DIESEL GEN 1G21 LOCKOUT TRIP	DIESEL GEN 1G21 4KV BKR 1A411 TRIP	DIESEL GEN 1G21 RUNNING	125V DC SYSTEM 2 TROUBLE	STARTUP TRANS TO BUS 1A4 4KV BKR 1A402 TRIP	4KV BUS 1A4 LOCKOUT TRIP	STANDBY TRANS TO BUS 1A4 4KV BKR 1A401 TRIP	STARTUP TRANS TO BUS 1A2 4KV BKR 1A202 TRIP	4KV BUS 1A2 LOCKOUT TRIP	STARTUP TRANS FEED TO BUS 1A2 152-202 TRIP	STANDBY TRANS GROUND FAULT	MAIN TRANS TROUBLE
DIESEL GEN 1G21 OVERSPEED TRIP	DIESEL GEN 1G21 PHASE OR GND OVERCURRENT	DIESEL OIL DAY TANK B LO-LO LEVEL	125V DC CHARGER 1D22 TROUBLE OR OUT OF SERVICE	STARTUP TRANS PRI BKR J CONTROL FAILURE	LOAD CENTER TRANS 1X20 152-412 TRIP OR 480V MCC 1B21 BKR TRIP	CR EL 757-6 LC TRANS 1X41 4KV BKR 1A403 TRIP	TB EL 734 LC TRANS 1X61 152-209 TRIP OR MCC 1B44 TRANS 1X62 152-211 TRIP	COOLING TOWER LC TRANS 1X81 4KV BKR 1A208 TRIP	TB EL 734 LC TRANS 1X21 4KV BKR 1A207 TRIP	STANDBY TRANS LOCKOUT TRIP	SUBSTATION 48V & 125V D.C. TROUBLE
DIESEL GEN 1G21 ENGINE OVERSPEED	DIESEL GEN 1G21 PANEL 1C-94 TROUBLE	DIESEL GEN 1G21 CONTROL POWER FAILURE	250V DC CHARGER 1D44 TROUBLE OR OUT OF SERVICE	AUX TRANS TROUBLE	4KV BUS 1A4 LOSS OF VOLTAGE	LOAD CENTER 1B4 MCC FEEDER 480V BREAKERS TRIP	TB EL 734 LC TRANS 1X61 480V BKR 1B601 TRIP	4KV BUS 1A2 LOSS OF VOLTAGE	TB EL 734 LC TRANS 1X21 480V BKR 1B201 TRIP	STANDBY TRANS TROUBLE	GEN BKR H CONTROL FAILURE
DIESEL GEN 1G21 START FAILURE	DIESEL GEN 1G21 ENGINE SHUTDOWN	DIESEL GEN 1G21 AUTO START OR AUTO SWITCHES LOCKOUT	250V DC SYSTEM TROUBLE	250V DC CHARGER 1D43 TROUBLE OR OUT OF SERVICE	ESSENTIAL 4KV BUSES LOAD SHED CKT LOSS OF DC	RB EL 757-6 MCC 1B44A 480V BKR 1B4401 TRIP	LOAD CENTER 1B6 MCC FEEDER 480V BREAKERS TRIP	STANDBY TRANS PRI BKR M CONTROL FAILURE	LOAD CENTER 1B2 MCC FEEDER 480V BREAKERS TRIP	GEN BKR I CONTROL FAILURE	GEN BKR H IN LOCAL CONTROL

Panel 1C08-C

GENERATOR & AUXILIARY POWER

MAIN GEN 1G1 PRIMARY LOCKOUT TRIP	MAIN GEN 1G1 REVERSE POWER	MAIN GEN 1G1 LOCKOUT RELAY CIRCUIT LOSS OF DC	MAIN GEN 1G1 BACKUP LOCKOUT TRIP	MAIN GEN 1G1 POTENTIAL TRANSFORMER FAILURE	MAIN GEN 1G1 FREQUENCY LOW
MAIN GEN 1G1 EXCITER FIELD OVERLOAD OR OVERCURRENT	MAIN GEN 1G1 FIELD GROUND	MAIN GEN 1G1 AUTO REGULATION TRIP TO MANUAL	MAIN GEN 1G1 FIELD MAX EXCITATION	MAIN GEN 1G1 VOLTS/HERTZ HIGH	MAIN GEN 1G1 H_2 & STATOR COOLING PANEL LOSS OF DC
GEN ISOLATED PHASE BUS COOLING AIR LOW FLOW	GEN ISOLATED PHASE BUS AIR FILTER ΔP HIGH	GEN STATOR COOLING WATER PUMP A OR B OL TRIP	MAIN GEN 1G1 FIELD MAX.EXCIT. TRIP	MAIN GEN 1G21 SUPPLEMENTARY CONTROL OFF LIMIT	MAIN GEN 1G1 EMERGENCY SEAL OIL PUMP NOT IN AUTO
GEN ISOLATED PHASE BUS COOLING WATER LOW FLOW	GEN ISOLATED PHASE BUS TEMP HIGH	GEN STATOR COOLING WATER PUMP A OR B NOT IN AUTO	MAIN GEN 1G1 H_2 & STATOR COOLING SYS TROUBLE	GEN SEAL OIL VACUUM PUMP 1P-94 AUTO TRIP	GEN MAIN SEAL OIL PUMP 1P-92 AUTO TRIP

Panel 1C23-A

HVAC REACTOR BLDG & MAIN PLANT AIR

REACT BLDG SUPPLY FAN 1V-SF-10A NO FLOW	TURBINE BLDG SUPPLY FAN 1V-SF-22A NO FLOW	MAIN PLANT EXHAUST FAN 1V-EF-1 FLOW HIGH	MAIN PLANT EXHAUST FAN 1V-EF-1 FLOW LOW	MAIN PLANT EXHAUST FAN RADIATION 1V-EF-1 TROUBLE
RHR CORE SPRAY COOLING SUPPLY AIR 1V-AC-12 TEMP HIGH	RHR CORE SPRAY COOLING 1V-AC-12 TEMP HIGH	CRD PUMP ROOM COOLING SUPPLY AIR 1V-AC-13A TEMP HIGH	CRD PUMP ROOM TEMP HIGH	TURBINE BLDG AUX HTG FEED PUMP 1V-HP-20A or B FLOW LOW
H.P.I.C. ROOM COOLING SUPPLY AIR 1V-AC-14A TEMP HIGH	H.P.I.C. ROOM TEMP HIGH	R.C.I.C. ROOM COOLING SUPPLY AIR 1V-AC-15A TEMP HIGH	R.C.I.C. ROOM TEMP. HIGH	PLANT HTG. SYSTEM SHELL/TUBE 1E-17 ΔP LOW
DEAERATOR 1S-62 HIGH WATER	DIESEL GEN. ROOM TEMP HIGH	DIESEL GEN ROOM TEMP LOW	REACTOR BLDG EXHAUST FAN 1V-EF-11A NO FLOW	PLANT AIR MAIN LOOP 1V-HP-12A or B TEMP LOW
CONDENSER AREA SUPPLY AIR 1V-AC-21 TEMP HIGH	MAIN PLANT AIR INTAKE TEMP LOW	CIRC PUMP MAIN LOOP 1P52 A & B NO FLOW	TURBINE LUBE OIL HEATER 1E-61 TEMP LOW	BOILER FEED LEAD PUMP 1P-54 A or B OUT OF SERVICE
ADMIN. BLDG LAB EXHAUST NO FLOW 1V-EF-19A		REACTOR BLDG VENT SHAFT RADIATION TROUBLE RIM-7606A		

Panel 1C23-B

HVAC REACTOR BLDG & MAIN PLANT AIR

REACT BLDG SUPPLY FAN 1V-SF-10B NO FLOW	TURBINE BLDG SUPPLY FAN 1V-SF-22B NO FLOW	MAIN PLANT EXHAUST FAN 1V-EF-2 FLOW HIGH	MAIN PLANT EXHAUST TV-EF-2 FLOW LOW	MAIN PLANT EXHAUST FAN RADIATION 1V-EF-2 TROUBLE
RHR CORE SPRAY COOLING SUPPLY AIR 1V-AC-11 TEMP HIGH	RHR CORE SPRAY COOLING 1V-AC-11 TEMP HIGH	CRD PUMP ROOM COOLING SUPPLY AIR 1V-AC 13B TEMP HIGH	CRD PUMP ROOM TEMP HIGH	REACT BLDG AUX HTR. FEED PUMP 1V-HP-10A or 10B LO FLOW
H.P.I.C. ROOM COOLING SUPPLY AIR 1V-AC-14B TEMP HIGH	H .P.I.C. ROOM TEMP HIGH	R.C.I.C. COOLING AIR 1V-AC-15B	R.C.I.C. ROOM TEMP 1V-AC-15B	PLAT HTG. SYSTEM SHELL/TUBE 1E-17 Δ P LOW
DE-AERATOR LOW WATER	DIESEL GEN ROOM TEMP HIGH	DIESEL GEN ROOM TEMP LOW	REACT BLDG EXHAUST FAN 1V-EF-11B NO FLOW	PLANT AIR MAIN LOOP LEAD PUMP 1V-HP-12A or 12B OUT OF SERVICE
CONDENSER AREA SUPPLY AIR 1V-AC-22 TEMP HIGH	CONDENSER AREA TEMP HIGH	MG SET ROOM TEMP LOW	MG SET ROOM TEMP HIGH	PLANT AIR HTG LEAD PUMP 1V-HP-13A OR 13B OUT OF SERVICE
ADMIN. BLDG LAB EXHAUST NO FLOW 1V-EF-19B	REFUELING POOL EXHAUST FAN 1V-EF-10 NO FLOW	REACTOR BLDG VENT SHAFT RADIATION TROUBLE RIM-7606B		

Panel 1C23-C

HVAC REACTOR BLDG. & MAIN AIR PLANT

REACT BLDG SUPPLY FAN 1V-SF-10C NO FLOW	TURBINE BLDG SUPPLY FAN 1V-SF-22C NO FLOW	MAIN EXH.FAN 1V-EF-3 FLOW HIGH	MAIN PLANT EXH. FAN 1V-EF-3 FLOW LOW	MAIN PLANT EXH. FAN 1V-EF-3 RAD. TROUBLE	MAIN PLANT EXH. FAN PLENUM PRESS. HIGH
HEAT EXCH. AREA COOLING SUPPLY AIR 1V-AC-10 TEMP. HIGH	HEAT EXCH. AREA COOLING 1V-AC-10 TEMP HIGH	SWGR. ROOM SUPPLY AIR 1V-AC-20 TEMP HIGH	SWGR. ROOM 1V-AC-20 TEMP HIGH	BOILER ROOM TEMP LOW	AUX. BOILER TROUBLE
REACTOR BLDG AUX. HEATING INJ. PUMP LOW TEMP 1V-HP-11	TURBINE BLDG AUX. HEATING INJ. PUMP LOW TEMP 1V-HP-21	AIR EJE. ROOM EXHAUST FANS 1V-EF-13A & B NO FLOW	DEMIN WATER EXCHANGER 1E-14 TEMP LOW	CONDENSATE STORAGE TANK EXCHGR. 1E-15 TEMP LOW	REACT BLDG VENT SHAFT RADIATION TROUBLE
DEAERATOR 1S-62 PRESSURE LOW		AIR EJE. ROOM EXHAUST FAN 1V-EF-11A-B NO FLOW			
ADMIN. BLDG HVAC TROUBLE	PUMP HOUSE HVAC TROUBLE	INTAKE STRUCT. HVAC TROUBLE	RAD. BLDG. HVAC TROUBLE	MACHINE SHOP HVAC TROUBLE	OFF GAS BLDG HVAC TROUBLE
			WELL 1P-58A HI/LO FLOW	WELL 1P-58B HI/LO FLOW	WELL 1P-58C HI/LO FLOW

Panel 1C24-A

STANDBY GAS TREATMENT

COMPRESSOR TROUBLE 1K-15A	TRAIN "A" RUNNING	TRAIN "A" STANDBY	TRAIN "A" LOW FLOW	TRAIN "A" LOSS OF CONTROL POWER
STACK FAN A LOW FLOW	TRAIN "A" NO ΔT	CHARCOAL BED OVERHEAT	TRAIN "A" OVERHEAT	COMPRESSOR TROUBLE 1K-3
STACK FAN "A" OUT OF SERVICE	TRAIN "A" HIGH ΔP	CHARCOAL BED EMER. OVERHEAT	TRAIN "A" MANUAL MODE	

Panel 1C24-B

STANDBY GAS TREATMENT

COMPRESSOR TROUBLE 1K-15B	TRAIN "B" RUNNING	TRAIN "B" STANDBY	TRAIN "B" LOW FLOW	TRAIN "B" LOSS OF CONTROL POWER
STACK FAN B LOW FLOW	TRAIN "B" NO Δ T	CHARCOAL BED OVERHEAT	TRAIN "B" OVERHEAT	COMPRESSOR TROUBLE 1K-4
STACK FAN "B" OUT OF SERVICE	TRAIN "B" HIGH ΔP	CHARCOAL BED EMER. OVERHEAT	TRAIN "B" MANUAL MODE	

Panel 1C25-A

DRYWELL VENTILATION & N_2 INERTING

DRYWELL COOLING LOOP A OPERATIONAL	DRYWELL COOLING LOOP A STANDBY	SYSTEM LOOP A BACKWASH	SYSTEM LOOP A OVER TEMPERATURE
	SYSTEM LOOP A INOPERATIVE	CRD AREA LOOP A OVER TEMPERATURE	SYSTEM LOOP A HIGH PRESSURE

Panel 1C25-B

DRYWELL VENTILATION & N_2 INERTING

DRYWELL COOLING LOOP B OPERATIONAL	DRYWELL COOLING LOOP B STANDBY	SYSTEM LOOP "B" BACKWASH	SYSTEM LOOP B OVER TEMPERATURE
	SYSTEM LOOP B INOPERATIVE	CRD AREA LOOP B OVER TEMPERATURE	SYSTEM LOOP B HIGH PRESSURE

Panel 1C26-A

HVAC CONTROL BUILDING

SFU A RUNNING	SFU A STANDBY	SFU A NO HEAT	SFU A HIGH ΔP	SFU A HIGH TEMP.	SFU A NO FLOW	SFU A LOSS OF CONTROL POWER
SFU A CARBON BED OVERTEMP.	SFU A CARBON BED EMER. OVERTEMP	SFU A MANUAL MODE	TRAIN "A" FILTER HIGH ΔP	CHILLER "A" TROUBLE	BATTERY ROOMS EXHAUST TROUBLE	BUILDING SUPPLY AIR NO FLOW
	CONTROL BUILDING AREA RADIATION TROUBLE	HOT WATER SEC. LOOP NO FLOW	HOT WATER SEC. LOOP RETURN LOW TEMP.			

Panel 1C26-B

HVAC CONTROL BUILDING

SFU B RUNNING	SFU B STANDBY	SFU B NO HEAT	SFU B HIGH ΔP	SFU B HIGH TEMP.	SFU B NO FLOW	SFU B LOSS OF CONTROL POWER
SFU B CARBON BED OVERTEMP.	SFU B CARBON BED EMER. OVERTEMP.	SFU B MANUAL MODE	TRAIN "B" FILTER HIGH ΔP	CHILLER "B" TROUBLE	BATTERY ROOMS EXHAUST TROUBLE	MAIN INLET AIR LOW TEMP.
	CONTROL BUILDING AREA RADIATION TROUBLE	HUMIDIFIER HIGH PRESSURE	HUMIDIFIER LOW PRESSURE			

Panel 1C34

OFF-GAS SYSTEM BOARD

RECOMBINER A INLET LOW TEMP	CONDENSER A LEVEL HI/LO	RECOMBINER B INLET LO TEMP	CONDENSER B LEVEL HI/LO	H_2 ANALYZER A HI H_2	H_2 ANALYZER B HI H_2	LOW RANGE INLET FLOW TO HOLDUP LINE HI/LO	HI RANGE INLET FLOW TO HOLDUP LINE HI	REFRIGERATION MACHINES TROUBLE		GLYCOL STRG TANK HI TEMP	GLYCOL STRG TANK LOW TEMP
GAS RHTR INLET HI TEMP	GAS RHTR INLET LO TEMP	PREFILTER HI DIFF PRESS	AFTER FILTER HI DIFF PRESS	ADSORBER VESSEL HI TEMP	ADSORBER VAULT HI TEMP				STBY CLG WATER PUMP B ON	COND COOLING SURGE TANK LEVEL LOW	STBY CLG WATER PUMP A ON
RECOMBINER TEMP HI/LO	CONDENSER OUTLET HI TEMP	JET COMPRESSOR STM FLOW LOW	JET COMPRESSOR STM PRESS HI	HOLDUP LINE PRESSURE HI	GLYCOL STRG TANK LOW LEVEL	GAS RHTR OUTLET DEW POINT HI TEMP	ADSORBER HI DIFF PRESS	ADSORBER VAULT LO TEMP	OFF GAS CARBON BED BYPASSED		

Panel 1C35-A

CONTAINMENT ATMOSPHERE CONTROL AND DILUTION VERTICAL BOARD

REFUELING FLOOR NORTH END HI RADIATION	REFUELING FLOOR SOUTH END HI RADIATION	Rx. BLDG. EXH. HI GASEOUS RAD. 1V-EF-1,2,3	RECIRC 2C RISER LEAK ALARM
MSIV-LCS LOGIC POWER FAIL	MSIV LEAKAGE FLOW HIGH		TORUS OR DRYWELL RADIATION HIGH CHANNEL -A-
			DRYWELL HIGH RADIATION OR INSTRUMENT FAILURE
	LOW/HIGH PRESSURE PI 4390 N_2 HEADER	N_2 SUPPLY SYST. PRESSURE LOW PI 4338A	N_2 CONTMT SPRAY PRESSURE HIGH

Panel 1C35-B CONTAINMENT ATMOSPHERE CONTROL AND DILUTION VERTICAL BOARD

N_2 PRES LOW PI-4339	INTRUSION ALARM SYSTEM POWER	STANDBY ΔP AIR COMPRESSOR RUNNING	DRYWELL TORUS LOW ΔP
PLEASANT CREEK PUMP STATION TROUBLE			TORUS OR DRYWELL RADIATION HIGH CHANNEL -B-
	CONDENSATE RETURN TANK 1T136 HIGH LEVEL		DRYWELL HIGH RADIATION OR INSTRUMENT FAILURE
N_2 CONTMT SPRAY PRESSURE HIGH	NITROGEN COMPRESSOR TROUBLE	S.S.E. OFFICE B.S. Hi LEVEL	UNION TROUBLE

CLEAN AND DIRTY LUBE OIL TANKS FIRE	DIESEL GEN DAY TANK 1T-37A FIRE	DIESEL GEN DAY TANK 1T-37B FIRE	CONDENSER AREA FIRE	PLANT HEATING BOILER FIRE	RADWASTE BALER FIRE
DIESEL FIRE PUMP ROOM FIRE	Diesel 1G31/1G21 Pre-act Sys.Press Low	Railroad Bay Turb .Area Pre-actSys.	Railroad Airlock Fire		
RCIC ROOM FIRE	HPCI ROOM FIRE	REACTOR FEED PUMP 1P-1A FIRE	REACTOR FEED PUMP 1P-1B FIRE	H_2 SEAL OIL UNIT FIRE	TURBINE LUBE OIL RESERVOIR FIRE
M-G SET 1G-1A FIRE	M-G SET 1G-1B FIRE	MAIN TRANSFORMER FIRE	STARTUP TRANSFORMER FIRE	AUXILIARY TRANSFORMER FIRE	STANDBY TRANSFORMER FIRE
		MAIN TRANSFORMER DETECTOR TROUBLE	STARTUP TRANSFORMER DETECTOR TROUBLE	AUXILIARY TRANSFORMER DETECTOR TROUBLE	STANDBY TRANSFORMER DETECTOR TROUBLE
COOLING TOWER 1E-69A FIRE	COOLING TOWER 1E-69B FIRE				CABLE SPREADING ROOM FIRE PRE-ALARM
COOLING TOWER 1E-69A DETECTOR TROUBLE	COOLING TOWER 1E-69B DETECTOR TROUBLE				CABLE SPREADING ROOM FIRE
					CABLE SPREADING ROOM DETECTOR TROUBLE
DIESEL FIRE PUMP RUN	DIESEL FIRE PUMP TROUBLE	DIESEL FIRE PP SW NOT IN AUTO	DIESEL FIRE PP DAY TANK LEV LOW	ELECTRIC FIRE PP RUN	ELEC. FIRE PP POWER FAILURE

Panel 1C-40

Panel 1C80

CONDENSATE DEMINERALIZER CONTROL PANEL

FILTER DEMINERALIZER 1T-13E HIGH DP	FILTER DEMINERALIZER 1T-13D HIGH DP	FILTER DEMINERALIZER 1T-13C HIGH DP	FILTER DEMINERALIZER 1T-13B HIGH DP	FILTER DEMINERALIZER 1T-13A HIGH DP	INFLUENT HIGH CONDUCTIVITY	PRECOAT TANK HIGH LEVEL
FILTER DEMINERALIZER 1T-13E HIGH CONDUCTIVITY	FILTER DEMINERALIZER 1T-13D HIGH CONDUCTIVITY	FILTER DEMINERALIZER 1T-13C HIGH CONDUCTIVITY	FILTER DEMINERALIZER 1T-13B HIGH CONDUCTIVITY	FILTER DEMINERALIZER 1T-13A HIGH CONDUCTIVITY	EFFLUENT HIGH CONDUCTIVITY	PRECOAT TANK LOW LEVEL
FILTER DEMINERALIZER 1T-13E LOW FLOW	FILTER DEMINERALIZER 1T-13D LOW FLOW	FILTER DEMINERALIZER 1T-13C LOW FLOW	FILTER DEMINERALIZER 1T-13B LOW FLOW	FILTER DEMINERALIZER 1T-13A LOW FLOW	INFLUENT HIGH TEMPERATURE	POWER FAILURE
FILTER DEMINERALIZER 1T-13E RESIN TRAP HIGH DP	FILTER DEMINERALIZER 1T-13D RESIN TRAP HIGH DP	FILTER DEMINERALIZER 1T-13C RESIN TRAP HIGH DP	FILTER DEMINERALIZER 1T-13B RESIN TRAP HIGH DP	FILTER DEMINERALIZER 1T-13A RESIN TRAP HIGH DP		RECIRC. PRECOAT & BACKWASH HEADER HIGH PRESSURE

Panel 1C81

MAKE-UP DEMINERALIZER PANEL

CATION "A" REGENERATION COMPLETE	ANION "A" REGENERATION COMPLETE	TRAIN "A" THROUGHPUT HIGH	ANION "A" CONDUCTIVITY HIGH	CATION "A" RESIN TRAP DIFFERENTIAL HIGH	ANION "A" RINSE OVERTIME	CATION "A" REGENERATION COMPLETE	ANION "B" REGENERATION COMPLETE	TRAIN "B" THROUGHPUT HIGH		ANION "B" CONDUCTIVITY HIGH	CATION "B" RESIN TRAP DIFFERENTIAL HIGH
ANION "B" RINSE OVERTIME	MIXED BED "A" REGENERATION COMPLETE	MIXED BED "A" CONDUCTIVITY HIGH	MIXED BED "A" SILICA HIGH	MIXED BED "A" RESIN TRAP DIFFERENTIAL HIGH	MIXED BED "A" RINSE OVERTIME	MIXED BED "B" REGENERATION COMPLETE	MIXED BED "B" CONDUCTIVITY HIGH	MIXED BED "B" SILICA HIGH	MIXED BED "B" RESIN TRAP DIFFERENTIAL HIGH	MIXED BED "B" RINSE OVERTIME	PRIMARY ACID DILUTION WATER FLOW LOW
SECONDARY ACID DILUTION WATER FLOW LOW	CAUSTIC DILUTION WATER FLOW LOW	CONCENTRATED ACID PRESSURE LOW	CONCENTRATED CAUSTIC PRESSURE LOW	DILUTE CAUSTIC TEMPERATURE HIGH OR LOW	ACID INTRODUCTION OVERTIME	CAUSTIC INTRODUCTION OVERTIME	ACID FEED PUMP #1 OVERLOAD	ACID FEED PUMP #2 OVERLOAD	CAUSTIC FEED PUMP #1 OVERLOAD	CAUSTIC FEED PUMP #2 OVERLOAD	ACID TANK LEVEL LOW
CAUSTIC TANK LEVEL LOW	DEGASIFIER BOOSTER PUMPS PRESSURE LOW	RECIRC TANK LEVEL LOW		DEMIN WATER TANK LEVEL HIGH	NEUTRAL TANK LEVEL HIGH	ACID CAUSTIC SUMP LEVEL HIGH	NORMAL WASTE SUMP LEVEL HIGH	CHEM WASTE SUMP LEVEL HIGH	MAKE-UP DEMIN PUMPS PRESS LOW		

Panel 1C82

REACTOR WATER CLEANUP FILTER-DEMIN PANEL

HIGH F/D A DIFF. PRESS.	HIGH STRAINER A DIFF. PRESS.	PRECOAT TANK HIGH LEVEL	HIGH F/D B DIFF. PRESS.	HIGH STRAINER B DIFF. PRESS.
LOW F/D A FLOW		PRECOAT TANK LOW LEVEL	LOW F/D B FLOW	

Panel 1C83-A

GENERATOR H_2 AND COOLING WATER PANEL

INLET FLOW LOW	INLET PRESS LOW	INLET TEMP. HIGH	OUTLET TEMP HIGH	WATER TANK LEVEL HIGH	WATER TANK LEVEL LOW	GENERATOR PROTECTION CIRCUIT ENERGIZED
CONDUCTIVITY ABOVE 0.5 MICROMHOS	CONDUCTIVITY ABOVE 0.5 MICROMHOS	RESERVE PUMP RUNNING	RECTIFIER HIGH TEMP	RECTIFIER COOLANT LOW FLOW		

Panel 1C83-B

GENERATOR Hz AND COOLING WATER PANEL

MACH GAS PRESSURE HIGH-LOW	MACH GAS PURITY LOW	MACH GAS TEMP HIGH
DIFF'L SEAL OIL PRESS LOW	EMERG SEAL OIL PUMP RUNNING	VAC TANK OIL LEVEL HIGH-LOW
GENERATOR CASING LIQUID DETECTOR FULL	SEAL DRAIN ENLARGEMENT LIQUID DETECTOR FULL	ALTERNATOR LIQUID DETECTOR FULL
ALTERNATOR AIR TEMP HIGH		

Panel 1C84-A

RADWASTE

REACTOR BLDG. EQUIP DRAIN SUMP HI LEVEL	WASTE SAMPLE TANK A BLACK PEN HI LEVEL	RADWASTE BLDG FLOOR DRAIN SUMP HI LEVEL	FLOOR DRAIN COLLECTOR TANK HI LEVEL	FLOOR DRAIN SAMPLE TANK LO LEVEL	DETERGENT DRAIN TANK A BLACK PEN LO LEVEL	WASTE COLLECTOR TANK BLACK PEN HI LEVEL
REACTOR BLDG FLOOR DRAIN SUMP HI LEVEL	WASTE SAMPLE TANK B RED PEN LO LEVEL	RADWASTE BLDG EQUIP DRAIN SUMP HI LEVEL	FLOOR DRAIN COLLECTOR TANK LO LEVEL	CHEM WASTE SAMPLE TANK HI LEVEL	DETERGENT DRAIN TANK A BLACK PEN HI LEVEL	WASTE SURGE TANK RED PEN LO LEVEL
WASTE DEMINERALIZER TANK HI ΔP	WASTE SAMPLE TANK B RED PEN HI LEVEL	DETERGENT DRAIN FILTER HI ΔP	FLOOR DRAIN FILTER HI ΔP	CHEM WASTE SAMPLE TANK LO LEVEL	DETERGENT DRAIN TANK B RED PEN LO LEVEL	WASTE SURGE TANK RED PEN HI LEVEL
WASTE DEMINERALIZER TANK HI CONDUCTIVITY	TURBINE BLDG FLOOR DRAIN SUMP HI LEVEL	FILTER AID TANK LO LEVEL	FLOOR DRAIN FILTER LO DISCH FLOW	FLOOR DRAIN SAMPLE TANK HI LEVEL	DETERGENT DRAIN TANK B RED PEN HI LEVEL	WASTE COLLECTOR FILTER HI ΔP
WASTE SAMPLE TANK A BLACK PEN LO LEVEL	TURBINE BLDG EQUIP DRAIN SUMP HI LEVEL	WASTE PRECOAT TANK HI LEVEL	FLOOR DRAIN DEMINERALIZER CONDUCTIVITY HI	DETERGENT DRAIN HOLDING TANK HI LEVEL	WASTE COLLECTOR TANK BLACK PEN LO LEVEL	WASTE COLLECTOR FILTER LOW DISCH FLOW

Panel 1C84-B

RADWASTE

OFF GAS BLDG. EQUIP. DRAIN SUMP HI LEVEL	REACTOR BLDG. FLOOR DRAIN 1C-47 TROUBLE	CONDENSATE BACKWASH REC. TANK LO LEVEL	CLEANUP PHASE SEP TANK A HI LEVEL	CENTRIFUGE A BEARING HI TEMP	CENTRIFUGE A HI TORQUE	CONVEYOR FLOOR DRAIN SUMP HI LEVEL
OFF GAS BLDG FLOOR DRAIN SUMP HI LEVEL	FUEL POOL FILTER-DEMIN 1C-136 TROUBLE	CONDENSATE BACKWASH REC. TANK HI LEVEL	CLEANUP PHASE SEP. TANK B HI LEVEL	CENTRIFUGE B BEARING HI TEMP	CENTRIFUGE B HI TORQUE	
CHEM WASTE FILTER HI ΔP	OFF GAS STACK SUMP HI LEVEL	CONDENSATE PHASE SEP. TANK A HI LEVEL	WASTE SLUDGE TANK A HI LEVEL	SPENT RESIN TANK HI LEVEL	HOPPER A HI LEVEL	
FLOOR DRAIN DEMINERALIZER HI ΔP		CONDENSATE PHASE SEP. TANK B HI LEVEL	WASTE SLUDGE TANK B HI LEVEL		HOPPER B HI LEVEL	
CHEMWASTE TANK HI LEVEL	CHEMWASTE TANK LO LEVEL	LOW DILUTION FLOW	RADWASTE EFFLUENT HI RADIATION			

Panel 1C93

DIESEL GENERATOR 1G31

ENGINE OVER SPEED	DIESEL ENGINE START FAILURE	JACKET COOLANT LEVEL-LOW	JACKET COOLANT TEMPERATURE HIGH OR LOW	JACKET COOLANT PRESSURE-LOW	DIESEL OIL STORAGE TANK LO-LO LEVEL	COMBUSTION AIR TEMPERATURE HIGH
LUBE OIL MAKE UP TANK LEVEL LOW-LOW	LUBE OIL MAKE UP TANK LEVEL HIGH	LUBE OIL TEMPERATURE HIGH OR LOW	LUBE OIL PRESSURE-LOW	FUEL OIL LEVEL-LOW	FUEL OIL LEVEL-HIGH	FUEL OIL PRESSURE-LOW
CRANKCASE PRESSURE	STARTING AIR PRESSURE -LOW	SERVICE WATER PRESSURE-LOW	BACKUP FUEL PUMP RUNNING	HIGH PRESSURE DROP ACROSS AIR FILTER	AIR PRESSURE MOSITURE LEVEL-HIGH	
	ANY SWITCH NOT IN AUTO OR REMOTE POSITION	GENERATOR STATOR WINDING HIGH TEMPERATURE	GENERATOR UNDERVOLTAGE OR SINGLE PHASING	GENERATOR FIELD GROUND	GENERATOR LOSS OF FIELD	GENERATOR FIELD OVEREXCITATION

Panel 1C94

DIESEL GENERATOR 1G21

ENGINE OVER SPEED	DIESEL ENGINE START FAILURE	JACKET COOLANT LEVEL-LOW	JACKET COOLANT TEMPERATURE HIGH OR LOW	JACKET COOLANT PRESSURE-LOW	DIESEL OIL STORAGE TANK LO-LO LEVEL	COMBUSTION AIR TEMPERATURE HIGH
LUBE OIL MAKE UP TANK LEVEL LOW-LOW	LUBE OIL MAKE UP TANK LEVEL HIGH	LUBE OIL TEMPERATURE HIGH OR LOW	LUBE OIL PRESSURE-LOW	FUEL OIL LEVEL-LOW	FUEL OIL LEVEL- HIGH	FUEL OIL PRESSURE-LOW
CRANKCASE PRESSURE	STARTING AIR PRESSURE-LOW	SERVICE WATER PRESSURE-LOW	BACKUP FUEL PUMP RUNNING	HIGH PRESSURE DROP ACROSS AIR FILTER	AIR PRESSURE MOISTURE LEVEL-HIGH	
	ANY SWITCH NOT IN AUTO OR REMOTE POSITION	GENERATOR STATOR WINDING HIGH TEMPERATURE	GENERATOR UNDERVOLTAGE OR SINGLE PHASING	GENERATOR FIELD GROUND	GENERATOR LOSS OF FIELD	GENERATOR FIELD OVEREXCITATION

Panel 1C102

INTAKE STRUCTURE INSTRUMENTATION PANEL

SCREEN WASH PUMP 1P-112A DISCH PRESS LOW	TRAVEL SCREEN "A" DIFF. PRESS HIGH	SCREEN WASH PUMP 1P-112B DISCH PRESS LOW	TRAVEL SCREEN "B" DIFF. PRESS HIGH	

Panel 1C103-A

CHLORINATION AND ACID INJECTION PANEL

CHLORINE DISPENSER VACUUM LOSS	CHLORINE EVAPORATOR WATER TEMP. HIGH	CHLORINE GAS LEAK	CHLORINE EVAPORATOR WATER LEVEL LOW
CHLORINE EVAPORATOR SUPPLY PRESS. LOW	CHLORINE EVAPORATOR WATER TEMP. LOW	CHLORINE DETECTOR INSTRUMENT FAULT	EJECTOR WATER SUPPLY PRESSURE LOW

Panel 1C103-B

CHLORINATION AND ACID INJECTION PANEL

SULFURIC ACID TANK LEVEL HIGH		CIRC. WATER BLOWDOWN PH HIGH	CIRC. WATER BLOWDOWN CONDUCTIVITY HIGH
SULFURIC ACID TANK LEVEL LOW	SULFURIC ACID PUMP FAILURE	CIRC. WATER BLOWDOWN PH LOW	CIRC. WATER BLOWDOWN CONDUCTIVITY LOW

Panel 1C136

FUEL POOL FILTER-DEMIN CONTROL PANEL

HIGH F/D "A" Δ P	LOW FLOW "A"	HIGH STRAINER"A" Δ P	HIGH F/D "A" CONDUCTIVITY	PRECOAT TANK HIGH LEVEL	
HIGH F/D "B" Δ P	LOW FLOW "B"	HIGH STRAINER"B" Δ P	HIGH F/D "B" CONDUCTIVITY	PRECOAT TANK LOW LEVEL	

Panel .1C147

REACTOR BUILDING FLOOR DRAIN

REACTOR BLDG SOUTH WEST AREA FLOOR DRAIN LEVEL HIGH	REACTOR BLDG SOUTH EAST AREA FLOOR DRAIN LEVEL HIGH	SUPP. POOL NORTH EAST AREA FLOOR DRAIN LEVEL HIGH	H.P.C.I. AREA FLOOR DRAIN LEVEL HIGH	RCIC AREA FLOOR DRAIN HIGH LEVEL
REACTOR BLDG NORTH WEST AREA FLOOR DRAIN LEVEL HIGH	REACTOR BLDG NORTH EAST AREA FLOOR DRAIN LEVEL HIGH	SUPP. POOL SOUTH WEST AREA FLOOR DRAIN LEVEL HIGH		

Panel 1C175

RADWASTE EVAPORATOR CONTROL PANEL

	OPERATE	DISCHARGE	
BATCH DENSITY HIGH DT 8200	DISTILLATE COND. HIGH CITS 8207	DISTILLATE TK. HI LEVEL LIS 8214	BOTTOMS TK. HI LEVEL LIS 8215
MOTOR VOLTAGE FAILURE	AIR SUPPLY LOW PRESSURE PS 8200		
			HORN OFF

Appendix E

Sample Alarm Printer Output

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          080923   36  SEQ D*43 SCRAM DISCH VOL DRN CV1867B      INTD
          08092*   14  SEQ D*42 SCRAM DISCH VOL DRN CV1867B      CLSD
          080925   51  SEQ D541 SCRAM DISCH VOL VENT CV18*0B     INTD
          080926    1  SEQ D*40 SCRAM DISCH VOL VENT CV18*0B     CLSD
          080927   15  SEQ D536 MANUAL SCRAM CHANNEL A           TRIP
          080927   16  SEQ D*37 MANUAL SCRAM CHANNEL B           TRIP
          080922   13  SEQ D535 SCRAM DISCH VOL DRN CV1867A      INTD
          080928    *  SEQ D620 TSV&TCV FAST CLOS BYP A1         LOW
          080923    5  SEQ D620 TSV&TCV FAST CLOS BYP A1         NORM
          080923    5  SEQ D620 TSV&TCV FAST CLOS BYP A1         LOW
          080928   18  SEQ D623 TSV&TCV FAST CLOS BYP B2         LOW
          080923   18  SEQ D623 TSV&TCV FAST CLOS BYP B2         NORM
          080923   18  SEQ D623 TSV&TCV FAST CLOS BYP B2         LOW
          080928   24  SEQ D622 TSV&TCV FAST CLOS BYP A2         LOW
          080923   27  SEQ D621 TSV&TCV FAST CLOS BYP B1         LOW
          080931   47  SEQ D596 REP A LOW SUCT PRESS TRP         TRIP
          080932   20  SEQ D*96 REP A LOW SUCT PRESS TRP         NORM
          080932   21  SEQ D*97 REP B LOW SUCT PRESS TRP         TRIP
          080932   23  SEQ D597 REP B LOW SUCT PRESS TRP         NORM
          080936   46  SEQ D680 SCRAM DISCH VOL HI WTR LEVEL     HIGH
          080939   38  SEQ D656 HPCI, RCIC SYS INIT B            INTD
          080939   57  SEQ D679 HPCI, RCIC SYS INIT D            INTD
          080944   *4  SEQ D669 DISCH VOL LVL CHANNEL B1         TRIP
          080945   18  SEQ D656 HPCI, RCIC SYS INIT B            RSET
          08094*   32  SEQ D671 DISCH VOL LVL CHANNEL B2         TRIP
          080945   35  SEQ D668 DISCH VOL LVL CHANNEL A1         TRIP
          080946   26  SEQ D679 HPCI, RCIC SYS INIT D            RSET
          080946   28  SEQ D670 DISCH VOL LVL CHANNEL A2         TRIP
          0809*1   29  SEQ D677 MS RCIC TURB STOP VA             CLSD
          080932   21  SEQ D533 SCRAM DISCH VOL VENT CV1859A     INTD
          080939   18  SEQ D534 SCRAM DISCH VOL DRN CV1867A      CLSD
          080944   19  SEQ D532 SCRAM DISCH VOL VENT CV1859A     CLSD
          0809*3   40  SEQ D*00 DISCH VOL LVL CHANNEL A1         TRIP
          080955   19  SEQ D501 DISCH VOL LVL CHANNEL B1         TRIP
          0809*6   21  SEQ D*03 DISCH VOL LVL CHANNEL B2         TRIP
          0809*9    9  SEQ D*02 DISCH VOL LVL CHANNEL A2         TRIP
          080954   17  SEQ D676 MS HPCI TURB CONT VA,            OPEN
          0809*4   17  SEQ D676 MS HPCI TURB CONT VA             NOOP
          0809*4   17  SEQ D676 MS HPCI TURB CONT VA             OPEN
          080955   53  SEQ D674 MS HPCI TURB PRE STOP VA         NOOP
          081002   38  SEQ D67* MS HPCI TURB STOP VA             OPEN
          081004   29  SEQ D676 MS HPCI TURB CONT VA             NOOP
          081001    1  SEQ D*22 REACTOR LO WTR LVL CH A2         NORM
          081001    5  SEQ D523 REACTOR LO WTR LVL CH B2         NORM
          081001   29  SEQ D520 REACTOR LO WTR LVL CH A1         NORM
          081002   48  SEQ D*21 REACTOR LO WTR LVL CH B1         NORM
080922 ALM*** E*10 CRD PUMP 1P-209B BKR 410          TRIP
080924  ROD 02-19NO DATA AT LEAST 1 NOTCH
080923 ALM*** A519 APRM DOWNSCALE ALARM              ALRM
080923 ALM*** A555 ROD OUT BLOCK                     ON
          081014   42  SEQ D67* MS HPCI TURB STOP VA             NOOP
          081015   32  SEQ D520 REACTOR LO WTR LVL CH A1         TRIP
          08101*   40  SEQ D*20 REACTOR LO WTR LVL CH A1         NORM
080923 NORM E*16 RFP 1P-1B BKR 203                   CLSD
          081019   23  SEQ D675 MS HPCI TURB STOP VA             OPEN
080924 ALM*** B532 RW CU HIGH FLOW DIFF              HIGH
080924 ALM*** A*11 RWM ROD BLOCK                     ON
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080926	ALM*** A[illegible]1[illegible] IRM DET NOT FULL-IN POS			TRBL	
080926	ALM*** A[illegible]16 IRM DOWNSCALE ALARM			ALRM	
080926	NORM B[illegible]32 RW CU HIGH FLOW DIFF			NORM	
080927	ALM*** A[illegible]31 RWM 30% POWER SET POINT			ON	
080927	ALM*** B532 RW CU HIGH FLOW DIFF			HIGH	
080928	NORM B532 RW CU HIGH FLOW DIFF			NORM	
080931	LOW F040 1P-1A RFP SUCT PRESS	PSIG	176.8		
080931	LOW F041 1P-1B RFP SUCT PRESS	PSIG	172.9		
080931	BAD F044 COND TOTAL FLOW	M#/H			
080931	ALM*** B527 RCT CLNUP SYS FAILED AS USUAL			ALRM	
080931	S-LO** T017 STM SEAL HDR PRESS	PSIG	0.05		
080932	ALM*** E516 RFP 1P-1B BKR 203			TRIP	
080932	ALM*** E517 RFP 1P-1A BKR 103			TRIP	
381011	ALM*** A[illegible]08 DISCH VOL 24 GAL ROD BLK			HIGH	
381012	ALM*** A[illegible]37 RECIRC LOOP B INACTIVE			ALRM	
381013	ALM*** A539 RECIRC LOOP A INACTIVE			ALRM	
381013	NORM A539 TIP MACHINE A READY			ON	
381014	ALM*** B[illegible]24 HPCI PMP DISCH FLOW LOW			LOW	
381014	ALM*** B[illegible]31 DISCH FROM RCIC PMP IBVA			NOCL	
381015	ALM*** B536 REACTOR WTR CLEANUP IBVA			CLSD	
381015	ALM*** B537 REACTOR WTR CLEANUP OBVA			CLSD	
381018	NORM E[illegible]16 RFP 1P-1B BKR 203			CLSD	
381019	ALM*** E[illegible]18 RFP MG 1G-201A BKR 104			TRIP	
381019	ALM*** E[illegible]19 RFP MG 1G-201B BKR 204			TRIP	
381020	ALM*** F509 1E-2A LP HTR LVL HIGH			HIGH	
381020	ALM*** F513 1E-4A LP HTR LVL HIGH			HIGH	
381021	NORM F[illegible]09 1E-2A LP HTR LVL HIGH			NORM	
381021	ALM*** F[illegible]16 1E-[illegible]B LP HTR LVL HIGH			HIGH	
381021	ALM*** F[illegible]17 1E-6A HP HTR LVL HIGH			HIGH	
381022	ALM*** T[illegible]00 MS LINE A LOW PRESS			LOW	
381022	ALM*** T505 MS LINE B LOW PRESS			LOW	
381023	ALM*** T[illegible]10 MS LINE C LOW PRESS			LOW	
381023	ALM*** T[illegible]14 TURB CONT VA 1 CLOSED			CLSD	
381023	ALM*** T515 MS LINE D LOW PRESS			LOW	
381024	ALM*** T519 TURB CONT VA 2 CLOSED			CLSD	
381024	NORM T532 PSV 4401 OPEN OR LEAKING	OPEN			
381025	ALM*** B[illegible]19 STM LINES RAD MON DNSC			DNSC	
081028	ALM*** F[illegible]09 1E-2A LP HTR LVL HIGH			HIGH	
081031	NORM F040 1P-1A RFP SUCT PRESS	PSIG	497.4		
081031	NORM F041 1P-1B RFP SUCT PRESS	PSIG	497.0		
081031	BAD F046 COND REJECTION FLOW	M#/H			
081031	S-LO** T017 STM SEAL HDR PRESS	PSIG	-0.03		
081043	ALM*** A513 SRM UPSCALE ALARM			ALRM	
081047	NORM A513 SRM UPSCALE ALARM			NORM	
081048	ALM*** A[illegible]13 SRM UPSCALE ALARM			ALRM	
081[illegible]0	NORM F[illegible]09 1E-2A LP HTR LVL HIGH			NORM	
081[illegible]7	ALM*** F509 1E-2A LP HTR LVL HIGH			HIGH	
081059	ALM*** B590 CORE SPRAY DIFF PRESS A			HIGH	
081101	LRL B084 CRD CLG WTR DIFF PRESS	DPSI			
081102	S-HI** B10[illegible] TORUS RELATIVE WTR LVL	INCH	2.[illegible]13		1.300
081102	HIGH C102 (C100/G001)100 GROSS WATTS E/M		63773.5		20.0
081102	HRL F002 CONDENSER HOTWELL LEVEL	INCH			
081103	NORM T006 1E-2B LP FW HTR PRESS	PSIA	7.62		
081[illegible]0	S-HI** B021 REACTOR WATER LEVEL	INCH	194.6		194.0
081107	NORM F509 1E-2A LP HTR LVL HIGH			NORM	
081115	ALM*** F[illegible]09 1E-2A LP HTR LVL HIGH			HIGH	
081122	NORM F[illegible]09 1E-2A LP HTR LVL HIGH			NORM	

Appendix F

Sample NSSS & BOP Post-Trip Log Output

133955 NSS DEMAND TRIP LOG

TIME	B000	B002	B012	B013	B015	B016	B021	B022	B025	B030
133459	73.9	73.8	31.2	10.4	2.4	2.3	192.1	5.0	996.	385.6
133504	73.7	73.7	31.1	10.3	2.4	2.3	192.0	4.9	996.	385.6
133509	73.6	73.6	31.1	10.3	2.4	2.3	191.9	5.0	996.	385.6
133514	74.0	74.0	31.1	10.4	2.4	2.3	192.0	5.0	996.	385.6
133519	73.8	73.8	31.1	10.4	2.4	2.3	191.9	5.0	996.	385.6
133524	73.3	73.2	31.0	10.3	2.4	2.3	191.9	5.0	996.	385.6
133529	73.8	73.7	31.1	10.3	2.4	2.3	191.9	5.0	996.	385.6
133534	73.8	73.7	31.1	10.3	2.4	2.3	191.9	5.0	996.	385.6
133539	73.7	73.7	31.1	10.3	2.4	2.3	191.8	5.0	996.	385.6
133544	73.4	73.3	31.0	10.3	2.4	2.3	191.7	4.9	996.	385.6
133549	73.7	73.7	31.1	10.3	2.4	2.3	191.8	4.9	996.	385.6
133554	73.5	73.5	31.1	10.3	2.4	2.3	191.7	5.0	996.	385.6
133559	73.5	73.5	31.0	10.3	2.4	2.3	191.8	5.0	996.	385.6
133604	73.8	73.7	31.1	10.3	2.4	2.3	191.7	5.0	996.	385.6
133609	74.1	74.0	31.2	10.4	2.4	2.3	191.7	5.0	996.	385.6
133614	73.7	73.7	31.2	10.4	2.4	2.3	191.7	5.1	996.	385.6
133619	73.9	73.8	31.1	10.3	2.4	2.3	191.8	5.0	996.	385.6

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133624	73.8	73.8	31.1	10.3	2.4	2.3	191.7	5.0	996.	385.6
133629	74.0	73.9	31.2	10.4	2.4	2.3	191.6	5.0	996.	385.6
133634	73.7	73.6	31.1	10.3	2.4	2.3	191.7	5.0	996.	385.6
133639	73.4	73.3	31.0	10.3	2.4	2.3	191.6	4.9	996.	385.6
133644	73.6	73.5	31.0	10.3	2.4	2.3	191.6	5.0	996.	385.6
133649	73.8	73.7	31.0	10.3	2.4	2.3	191.6	5.0	996.	385.6
133654	74.3	74.2	31.2	10.4	2.4	2.3	191.6	5.0	996.	385.6
133659	73.7	73.7	31.1	10.3	2.4	2.3	191.6	5.0	996.	385.6
133704	73.5	73.4	31.1	10.3	2.4	2.3	191.7	5.0	996.	385.6
133709	74.1	74.0	31.1	10.3	2.4	2.3	191.6	4.9	996.	385.6
133714	73.5	73.4	31.1	10.3	2.4	2.3	191.6	5.0	996.	385.6
133719	73.4	73.3	31.0	10.3	2.4	2.3	191.8	4.9	996.	385.6
133724	73.8	73.7	31.1	10.3	2.4	2.3	191.7	5.0	996.	385.6
133729	73.7	73.6	31.1	10.3	2.4	2.3	191.8	5.0	996.	385.6
133734	73.9	73.8	31.1	10.3	2.4	2.3	191.8	4.9	996.	385.5
133739	73.7	73.7	31.1	10.3	2.4	2.3	191.8	5.0	996.	385.5
133744	73.7	73.7	31.0	10.3	2.4	2.3	191.9	5.0	996.	385.5
133749	73.9	73.9	31.1	10.3	2.4	2.3	191.7	5.0	996.	385.5
133754	74.2	74.1	31.2	10.4	2.4	2.3	191.8	5.0	996.	385.5

135340 BOP DEMAND TRIP LOG

TIME	F003 T023	F093 T016	F004 G000	F011 G001	F012 G002	F013 G003	F014 G006	F015 G007	F040 G016	F041 G050	F042 G051	F043 B079	F067 B080	F068 T039	T022 T040
134619	37.3 95.0	29.5 456.	497.2 21.80	3.61 399.4	3.11 49.6	3.45 10.	2.96 246.4	25.7 1157.	423.4 32.7	418.9 53.7	1702.	1657. 0.33	387.6 0.41	384.5 2.34	95.6 2.69
134649	43.7 95.0	29.5 455.	497.2 21.80	3.62 398.9	3.18 49.6	3.45 10.	2.97 242.3	25.7 1154.	423.7 32.7	419.2 53.7	1701.	1659. 0.33	387.6 0.41	384.5 2.34	95.6 2.69
134719	44.4 95.1	-13.3 457.	496.9 21.80	3.56 399.8	3.18 47.9	3.48 10.	2.97 245.1	25.7 1154.	423.7 32.7	419.1 53.7	1701.	1657. 0.33	387.6 0.41	384.5 2.35	95.5 2.69
134749	39.5 95.1	-13.3 455.	497.1 21.80	3.52 398.9	3.29 47.9	3.43 10.	2.95 245.4	25.6 1162.	423.7 32.7	419.1 53.7	1697.	1660. 0.33	387.6 0.41	384.5 2.35	95.5 2.69
134819	54.4 95.0	-24.9 456.	497.4 21+8-	3.54 399.8	3.13 21.0	3.50 10.	2.97 249.0	25.7 1159.	424.1 32.7	419.6 53.7	1701.	1657. 0.33	387.6 0.41	384.8 2.35	95.5 2.70
134849	28.3 95.0	-24.9 456.	497.1 21.80	3.57 399.4	3.16 51.0	3.45 10.	2.97 244.7	25.7 1159.	423.0 32.7	418.3 53.7	1701.	1659. 0.33	387.6 0.42	384.8 2.35	95.5 2.70
134919	43.4 95.1	16.6 456.	496.9 21.80	3.58 399.4	3.13 50.0	3.45 10.	2.98 246.4	25.7 1157.	423.2 32.8	418.5 53.7	1699.	1657. 0.33	387.6 0.42	384.5 2.35	95.6 2.70
134949	36.3 95.1	16.6 456.	496.7 21.80	3.55 398.9	3.18 50.0	3.40 10.	2.98 243.7	25.7 1151.	421.7 32.8	417.2 53.7	1702.	1657. 0.33	387.6 0.41	384.5 2.35	95.6 2.70
135019	40.8 94.9	-19.3 456.	496.7 21.81	3.57 399.4	3.25 49.0	3.56 10.	3.01 246.0	25.7 1154.	422.2 32.8	417.7 53.7	1699.	1657. 0.33	387.6 0.41	384.5 2.35	95.4 2.70
135049	44.7 94.9	-19.3 455.	496.7 21.81	3.66 399.4	3.13 49.0	3.47 10.	3.05 247.7	25.6 1159.	423.0 32.8	418.5 53.7	1701.	1657. 0.33	387.6 0.41	384.5 2.35	95.4 2.70
135119	34.8 94.9	15.5 455.	497.6 21.80	3.66 398.4	3.23 49.9	3.39 10.	3.07 247.3	25.6 1155.	424.5 32.8	420.0 53.7	1702.	1661. 0.33	387.6 0.42	384.5 2.35	95.4 2.70

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135149	45.6	15.5	497.8	3.44	3.06	3.54	3.07	25.7	425.1	420.7	1702.	1662.	387.6	384.5	95.4
	94.9	454.	21.80	398.4	49.9	10.	245.1	1155.	32.8	53.7		0.33	0.42	2.35	2.70
135219	41.9	18.4	496.7	3.53	3.10	3.42	3.04	25.7	422.4	417.9	1699.	1654.	387.6	384.5	95.2
	94.9	456.	21.80	398.9	50.9	10.	247.9	1158.	32.8	53.6		0.34	0.42	2.35	2.70
135249	46.5	18.4	496.5	3.57	3.02	3.44	3.06	25.7	423.0	418.1	1700.	1652.	387.6	384.5	95.2
	94.9	456.	21.80	399.4	20.9	10.	243.4	1158.	32.8	53.6		0.33	0.41	2.35	2.70
135319	55.3	-21.4	496.7	3.51	3.23	3.51	3.08	25.7	423.0	418.3	1699.	1653.	387.6	384.5	95.6
	95.1	456.	21.81	399.8	50.4	10.	244.1	1157.	32.8	53.7		0.33	0.41	2.35	2.70
135349	35.8	-21.4	496.9	3.55	3.23	3.52	3.07	25.7	423.4	418.9	1701.	1655.	387.6	384.5	95.6
	95.1	456.	21.81	399.4	50.4	10.	242.1	1147.	32.8	53.7		0.33	0.41	2.35	2.70
135419	40.4	63.9	496.9	3.62	2.77	3.47	3.05	25.7	423.4	418.9	1700.	1660.	387.6	384.5	95.3
	94.9	456.	21.80	398.9	50.5	10.	247.5	1158.	32.8	53.7		0.33	0.42	2.35	2.69
135449	36.9	63.9	496.9	3.62	3.23	3.46	3.04	25.7	423.4	418.9	1699.	1659.	387.6	384.5	95.3
	94.9	456.	21.80	398.9	50.5	10.	246.0	1165.	32.8	53.7		0.33	0.42	2.35	2.69
135519	32.6	10.6	496.9	3.51	3.11	3.51	3.02	25.6	423.6	418.9	1702.	1659.	387.6	384.5	95.4
	94.9	455.	21.82	398.9	51.6	10.	247.1	1162.	32.8	53.7		0.33	0.42	2.34	2.69
135549	34.1	10.6	497.1	3.56	3.19	3.48	3.02	25.7	423.4	418.9	1704.	1661.	387.6	384.5	95.4
	94.9	455.	21.82	398.9	51.6	10.	243.6	1151.	32.8	53.7		0.33	0.42	2.34	2.69
135619	32.0	29.0	497.2	3.57	3.17	3.49	3.05	25.7	423.7	419.2	1701.	1659.	387.6	384.5	95.4
	94.9	455.	21.80	398.9	47.0	10.	244.7	1151.	32.8	53.7		0.32	0.41	2.34	2.68
135649	41.5	29.0	497.1	3.60	3.24	3.54	3.06	25.7	423.6	418.9	1703.	1659.	387.6	384.5	95.4
	94.9	455.	21.80	398.9	47.0	10.	243.9	1153.	32.8	53.7		0.33	0.41	2.34	2.68
135719	46.8	23.7	496.9	3.60	3.26	3.51	3.05	25.7	423.6	418.9	1701.	1655.	387.6	384.5	95.5
	95.1	456.	21.80	399.8	53.9	10.	249.2	1164.	32.9	53.7		0.32	0.41	2.34	2.68
135749	50.2	23.7	497.1	3.56	3.10	3.42	3.03	25.7	423.2	418.7	1699.	1653.	387.6	384.5	95.5
	95.1	455.	21.80	399.4	53.9	10.	244.3	1159.	32.9	53.7		0.33	0.42	2.34	2.68
135819	45.9	11.9	497.1	3.53	3.24	3.59	3.02	25.7	423.0	418.5	1701.	1657.	387.6	384.5	95.4
	94.9	456.	21.80	399.8	43.9	10.	245.3	1147.	32.9	53.7		0.32	0.42	2.34	2.69
135849	38.3	11.9	497.1	3.53	3.23	3.50	3.01	25.7	423.2	418.7	1699.	1661.	387.6	384.5	95.4
	94.9	457.	21.80	399.4	43.9	10.	244.1	1153.	32.9	53.7		0.33	0.42	2.34	2.69
135919	43.4	-24.4	497.2	3.62	3.27	3.47	3.01	25.7	424.3	419.4	1698.	1657.	387.6	384.5	95.5
	95.1	456.	21.80	399.4	47.4	10.	246.4	1153.	32.9	53.7		0.34	0.41	2.34	2.68

Appendix G

Selected Control Room Indicated Meter and Valve Position Indicating Light List

SELECTED SYSTEM METER INDICATIONS AND VALVE POSITION INDICATIONS

- RCIC System
  - Flow
  - Main Steam Pressure to the Turbine
  - Turbine Speed
  - Turbine Exhaust Pressure
  - Pump Discharge Pressure
  - RCIC Controller

- HPCI System
  - Pump Suction Pressure
  - Pump Discharge Pressure
  - Pump Flow
  - Selected Valve Positions
  - Main Steam Pressure to HPCI Turbine
  - Turbine Speed
  - Turbine Exhaust
  - HPCI Controller

- Recirculation System
  - A/B Recirculation Pump Differential Pressure
  - A/B Loop Flow
  - A/B Pump Speed
  - A/B Pump Motor Amperage
  - Recirculation Flow Controllers
  - Recirculation Pump Voltage
  - Recirculation Pump Wattage
  - Recirculation Pump Seal Pressure
  - M/G Set Drive Motor Amperage

- Feedwater System
  - RPF Flow
  - RPF Suction Pressure
  - RPF Discharge Pressure
  - Feedwater System Controllers
  - Feedwater Pump Amperage

- RHR/LPCI System
  - RHR Pump A, B, C, and D Amps
  - Service Water Flow to RHR Heat Exchangers
  - RHR Pump A, B, C, and D Flow
  - RHR Hx A, B Level
  - RHR Hx's to RCIC Pressure
  - RHR A Head Spray Flow
  - Selected Valve Positions
  - RHR Controllers (manual control only)
  - RHR Loop Flow

- LPCS System
  - LPCS Pump Amps
  - LPCS Pump Flow
  - LPCS Pump Discharge Pressure
  - Selected Valve Positions

SELECTED SYSTEM METER INDICATIONS AND VALVE POSITION INDICATIONS
(Continued)

- ADS
  - SRV Tailpipe Temperature Recorder
- DG (1, and 2)
  - Service Water to DG Flow (alarm only)
  - DG Vars
  - DG Watts
  - DG Frequency
  - DG 3 Φ Volts
  - Div Battery Volts (alarm only)
  - Emergency Bus Volts
  - Incoming Bus Volts
  - Running Bus Volts
  - Synchroscope

Appendix H

NUTAC VETIP Report

Nuclear
Utility
Task
Action
Committee

nutac

ON GENERIC LETTER 83-28, SECTION 2.2.2

Vendor Equipment Technical Information Program

February, 1984

8404060252

FINAL DRAFT

GENERIC LETTER 83-28

SECTION 2.2.2

Draft Report

Developed By

Nuclear Utility Task Action Committee

for

Generic Letter 83-28, Section 2.2.2

February 9, 1984

Publications produced by a Nuclear Utility Task Action Committee (NUTAC) represent a consensus of the utilities participating in the NUTAC. These publications are not intended to be interpreted as industry standards. Instead, the publications are offered as suggested guidance with the understanding that individual utilities are not obligated to use the suggested guidance.

This publication has been produced by the NUTAC on Generic Letter 83-28, Section 2.2.2., with the support of the Institute of Nuclear Power Operations (INPO). The officers of this NUTAC were Chairman Edward P. Griffing and Vice Chairman Walter E. Andrews.

Utilities that participated in this NUTAC include the following:

Alabama Power Company
American Electric Power Service Corporation
Arizona Public Service Company
Arkansas Power & Light Company
Baltimore Gas and Electric Company
Boston Edison Company
Carolina Power & Light Company
Cincinnati Gas & Electric Company
Cleveland Electric Illuminating Company
Commonwealth Edison Company
Consolidated Edison Company of New York, Inc.
Consumers Power Company
Detroit Edison Company
Duke Power Company
Duquesne Light Company
Florida Power Corporation
Florida Power & Light Company
GPU Nuclear Corporation
Georgia Power Company
Gulf States Utilities Company
Houston Lighting & Power Company
Illinois Power Company
Iowa Electric Light and Power Company
Kansas Gas and Electric Company
Long Island Lighting Company
Louisiana Power & Light Company
Maine Yankee Atomic Power Company
Mississippi Power & Light Company
Nebraska Public Power District
New York Power Authority
Niagara Mohawk Power Corporation
Northeast Utilities
Northern States Power Company
Omaha Public Power District
Pacific Gas and Electric Company
Pennsylvania Power & Light Company
Philadelphia Electric Company
Portland General Electric Company
Public Service Company of Colorado
Public Service Company of Indiana, Inc.
Public Service Company of New Hampshire
Public Service Electric and Gas Company
Rochester Gas and Electric Corporation
Sacramento Municipal Utility District
South Carolina Electric & Gas Company
Southern California Edison Company
Tennessee Valley Authority
Texas Utilities Generating Company
The Toledo Edison Company
Union Electric Company
Vermont Yankee Nuclear Power Corporation
Virginia Electric and Power Company
Washington Public Power Supply System
Wisconsin Electric Power Company
Wisconsin Public Service Corporation
Yankee Atomic Electric Company

EXECUTIVE SUMMARY

This report was prepared by the Nuclear Utility Task Action Committee (NUTAC) on Generic Letter 83-28 "Required Actions Based on Generic Implications of Salem ATWS Events," Section 2.2.2. It describes the Vendor Equipment Technical Information Program (VETIP) developed by the NUTAC in response to the concerns on vendor information and interface addressed in Section 2.2.2 of the generic letter. VETIP is a program that enhances information exchange and evaluation among utilities constructing or operating nuclear power plants and provides for more effective vendor interface.

The NUTAC was comprised of representatives of 56 utilities that are members of the Institute of Nuclear Power Operations (INPO). Staff support for the NUTAC was provided by INPO. This report unanimously presents the final conclusions of the NUTAC and is provided to assist individual utilities in developing specific programs to meet the intent of the generic letter.

Generic Letter 83-28 was developed following investigations by the NRC on the Salem events. As a result of these investigations, the NRC determined that better control and utilization of information regarding safety related components might have helped to prevent these events. The NUTAC identified a program to better ensure that plant personnel have timely access to such information.

The NUTAC efforts were guided by the recognition that individual utilities have the greatest experience with and are most cognizant of the application of safety-related equipment. Vendor involvement with such equipment is generally greatest during construction and initial operation of the plant. Vendors are not familiar with the surveillance or maintenance histories, nor with the application of the equipment or its environment. This type of information is most readily available at the plant level within individual utilities.

Based on this recognition, the NUTAC investigated the mechanisms currently available to facilitate information exchange among utilities. The NUTAC identified four activities that currently address information about

safety-related components. These are routine utility/vendor and utility/ regulator interchange, and the SEE-IN and NPRDS programs managed by INPO.

It was the assessment of the NUTAC that these existing activities, if properly integrated and implemented, would provide a framework for an overall program to ensure effective communication of safety related information among all utilities. Accordingly, the program developed to accomplish this goal (VETIP) utilizes the existing efforts as elements of a more comprehensive program.

The VETIP combines these existing programs, incorporating enhancements, with a coordinated program within each utility. A key element of the VETIP is the development by each utility of an active internal program to contribute information to the NPRDS and SEE-IN programs and to utilize the results of these programs.

The effectiveness of the VETIP will be determined by the level of utility participation in these programs. To implement the VETIP, each utility should assess the type of information currently being provided to NPRDS and SEE-IN and expand the scope of reporting if appropriate. Additionally, each utility should evaluate current administrative controls for reporting information and for disseminating the results of the NPRDS and SEE-IN programs to the plant level. These administrative controls may require modification to ensure that effective coordination is established. Concurrent with these efforts, enhancements will be made to both NPRDS and SEE-IN by INPO within its present institutional objectives.

The VETIP has been developed to ensure that nuclear utilities have prompt access to and effective handling of safety-related equipment technical information. In addition, it is responsive to the intent of Generic Letter 83-28 Section 2.2.2. Further details are provided in the body of this report.

FOREWORD

On February 22 and 25, 1983, during startups of the Salem Unit 1 plant, both reactor trip breakers (Westinghouse model DB-50) failed to open on an automatic trip signal. As a consequence, the Nuclear Regulatory Commission (NRC) formed an investigating task force to determine the factual information pertinent to the management and administrative controls that should have ensured proper operation of the trip breakers. The findings and conclusions of the task force are documented in NUREG-0977, "NRC Fact Finding Task Force Report on the ATWS Events at the Salem Nuclear Generating Station, Unit 1, on February 22 and 25, 1983". A second task force determined the extent to which these investigative findings were generic in nature. The NRC subsequently issued NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant" and Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events."

On September 1, 1983, a group of utility representatives met at the offices of the Institute of Nuclear Power Operations (INPO) to discuss the establishment of an ad hoc utility group to address issues relative to the NRC Generic Letter 83-28, Section 2.2.2. The representatives decided that such a group could provide direction that would be of generic benefit to the utilities and consequently formed the Nuclear Utility Task Action Committee (NUTAC) on Generic Letter 83-28, Section 2.2.2. The specific charter for the NUTAC (Appendix A) was adopted, and the target date for completion of activities was established as February 1984.

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1. INTRODUCTION

The objective of Generic Letter 83-28, Section 2.2.2 (Appendix D), is to improve the safety and reliability of nuclear power generating stations by ensuring that the utilities are provided with significant and timely technical information concerning reliability of safety-related components. In a typical nuclear station, hundreds of vendors supply the thousands of components that perform safety-related functions. The variations in vintage and design of plants ensure that although common applications of specific components may exist, there are an equal or greater number of unique applications. To attain the objective in a cost-effective and efficient manner, this NUTAC has developed the program outlined in this document. This positive program has been found to be the most realistic approach to attain the objective.

The Vendor Equipment Technical Information Program (VETIP) described in this document establishes a more formal interaction among the major organizations involved with commercial nuclear power generation. The goal of the interaction is to improve the quality and availability of equipment technical information for use by the utilities. The major components of the VETIP are an information transfer system and a centralized evaluation of industry experiences.

This document provides the unanimous NUTAC position on the guidelines for an effective technical information program. The determination of each individual utility to support and utilize these guidelines is the key to the effectiveness of this program for the industry as a whole. The program does not require the use of nor prescribe standard administrative procedures, but it allows the use of plant-specific procedures compatible with the utility's internal organization and needs. However, the recommendations in this document provide the basis for a uniform industry response to NRC questions and requirements relative to a technical information program. This program will be beneficial to the utilities and, at the same time, it will be responsive to Section 2.2.2 of the NRC Generic Letter 83-28.

2. ACRONYMS AND DEFINITIONS

2.1 Acronyms

A/E	- Architect-Engineer
AEOD	- Office of the Analysis and Evaluation of Operational Data
ATWS	- Anticipated Transient Without Scram
CFR	- Code of Federal Regulations
EPRI	- Electric Power Research Institute
ETI	- Equipment Technical Information
IEB, IEN	- Inspection and Enforcement Bulletins and Notices, issued by the NRC
IEEE	- Institute of Electrical and Electronics Engineering
INPO	- Institute of Nuclear Power Operations
LER	- Licensee Event Report, issued by a utility
MOR	- Monthly Operating Report
NPRDS	- Nuclear Plant Reliability Data System
NRC	- Nuclear Regulatory Commission
NSAC	- Nuclear Safety Analysis Center
NSSS	- Nuclear Steam Supply System
NUTAC	- Nuclear Utility Task Action Committee
O&MR	- Operations and Maintenance Reminder
PRA	- Probabilistic Risk Assessment
QA	- Quality Assurance
SEE-IN	- Significant Event Evaluation and Information Network
SER	- Significant Event Report
SOER	- Significant Operating Experience Report
VETIP	- Vendor Equipment Technical Information Program

2.2 Definitions

Component - A component is a mechanical or electrical assembly (including instruments) of interconnected parts that constitute an identifiable device or piece of equipment. Examples of electrical components include a drawout circuit breaker, a circuit card, instruments, or other subassemblies of a larger device that meet this definition. Examples of mechanical components include valves, piping, pumps and pressure vessels, and associated prime movers and/or operators.

Equipment Technical Information (ETI) - For the purposes of this report, this term includes, as a minimum, the following documentation:

- o vendor-supplied engineering and technical information (drawings, manuals, etc.) and changes thereto
- o equipment qualification data (provided by the equipment vendor or qualification lab)
- o industry-developed information, including utility and NRC-originated information (NPRDS, SER, IEB, IEN, etc.)

NUCLEAR NETWORK - An information service provided through INPO. (NUCLEAR NETWORK replaced NUCLEAR NOTEPAD.)

NUREG - Guidance documents issued by the NRC.

Safety-Related - Safety-related structures, systems, and components are those relied upon to remain functional during and following design basis events to ensure (1) the integrity of the reactor coolant pressure boundary, (2) the capability to shut down the reactor and maintain it in a safe shutdown condition, and (3) the capability to prevent or mitigate the consequences of accidents that could result in potential off-site exposures comparable to the guidelines of 10 CFR Part 100.

Vendor - For the purposes of this report, this term is used to identify the manufacturer of the component concerned and/or those who provide the related equipment technical information.

3. VENDOR EQUIPMENT TECHNICAL INFORMATION PROGRAM (VETIP) DESCRIPTION

The VETIP includes interactions among the major organizations involved with commercial nuclear power generation. As illustrated in Figure 1, a utility exchanges safety-related equipment information with vendors, NRC, INPO and other utilities via reports, bulletins, notices, newsletters, and meetings. The purpose of these information exchanges is to share equipment technical information to improve the safety and reliability of nuclear power generating stations. The NUTAC concluded that the lack of information is not a problem, but that the various information systems available are not integrated properly. The purpose of VETIP is to ensure that current information and data will be available to those personnel responsible for developing and maintaining plant instructions and procedures. These information systems and programs currently exist and are capable of identifying to the industry precursors that could lead to a Salem-type event. VETIP is an industry-controlled and mainly hardware-oriented program that does not rely on vendor action, other than the NSSS supplier, to provide information to utilities. Instead, VETIP provides information developed by industry experience through SERs and SOERs to the vendor for comment before it is circulated to the utilities concerned.

The majority of information provided by vendors is commercial in nature. This usually is provided voluntarily by the vendor, but does little to improve the safety or reliability of existing equipment.

A vendor-oriented program to provide information that would improve the safety and reliability of existing equipment relies on the vendor having an internal program to develop the information. Such programs typically are not in existence. Following design and qualification testing, vendors normally do not continue extensive testing or engineering programs in anticipation of equipment problems. Subsequent failures discovered during operations require several steps to complete the information feedback loop. For example, when a problem occurs and a local vendor representative provides a solution, he would have to provide that information to the vendor headquarters. Then, the headquarters would need a tracking program to identify a trend and subsequently a program to provide the information to the industry. In addition, the vendor often is not in the

best position to analyze the failure. The vendor is not always aware of the component's application and environment nor its maintenance and surveillance history.

The VETIP recognizes that the utility user is in a unique position. The utility user alone has immediate access to the maintenance and surveillance history of the equipment. The utility, not the manufacturer, knows the component's actual application and environment. The utility is the primary source of information on the failure, and the utility has the greatest need for the solution. As such, the utility is the central organizer in any approach to the solution, whether or not the manufacturer gets involved. The utility is in the position to know of the failure analysis and its solution at the earliest possible time. The utility can then disseminate the information to other utilities, with an indication of its significance and urgency.

By sharing the operating history, problems, and solutions within the nuclear industry, independent of any normal vendor contacts, the other users will be informed in a much more timely and uniform way. In this way, the distribution of information is controlled entirely by the nuclear utility industry. The programs which comprise the VETIP are currently in existence. The recommended enhancements contained within this report are suggested ways to improve the current use and application of these existing programs.

3.1 Existing Programs

The existing systems and programs included in the VETIP are the Nuclear Plant Reliability Data System (NPRDS) and the Significant Event Evaluation and Information Network (SEE-IN), both managed by INPO. Also, the VETIP includes existing programs that the utilities now conduct with vendors and other sources of ETI, particularly the NSSS vendor interaction programs and the NRC reporting programs that disseminate significant failure information. Utility-vendor interaction is further enhanced by the INPO supplier participant practices. Through participation in this program, NSSS vendors and A/E firms are working toward greater participation in the NPRDS and SEE-IN programs.

3.1.1 Nuclear Plant Reliability Data System (NPRDS)

NPRDS is an industrywide system managed by INPO for monitoring the performance of selected systems and components at nuclear power plants. INPO member utilities have agreed to participate in the program. U.S. plants in commercial operation (except for six atypical, early vintage units) supply basic engineering information and subsequent failure data on the selected systems and components (typically six to seven thousand components from some 30 systems per unit). The value of NPRDS lies in the ready availability of this data base to operation and engineering groups for a broad range of applications. The criteria used to determine the scope of NPRDS reports are as follows:

- o systems and components that provide functions necessary for accident mitigation
- o systems and components for which loss of function can initiate a significant plant transient

Uniform scoping and reporting criteria are set forth in the Nuclear Plant Reliability Data System (NPRDS) Reportable System and Component Scope Manual (INPO 83-020) and in the Reporting Procedures Manual for the Nuclear Plant Reliability Data System.

To support the benefits that can be obtained from NPRDS usage, utilities submit three kinds of information to the NPRDS data base: engineering/test information, failure reports, and operating history. The engineering/test record on a component contains information necessary to identify the component and its application, such as manufacturer, model number, operating environment, size, horsepower, and test frequencies. The information is submitted when the component is placed in service and is stored in the data base. If that component fails to perform as intended, a report is submitted containing a description of the failure mode and cause, the failure's effect on plant operations, corrective actions taken, and other

information necessary to assess the failure. On a quarterly basis, utilities submit information on the number of hours the plant is in different modes of operation. This information is used in conjunction with the engineering and failure reports to generate failure statistics for systems and components.

The data is retrievable from a computer, and the engineering and failure information can be combined in various ways. A search of the failure records can identify problems experienced with components in other plants and the corrective actions taken. There are several hundred searches of the data base in a typical month. Following are some example uses of the data base:

Utility and Plant Staffs

- o accessing comprehensive equipment history files to support maintenance planning and repair
- o avoidance of forced or prolonged outages by identifying other plants with similar or identical equipment that may have spares for a possible loan
- o determination of spare parts stocking, based on industry mean time between failures
- o comparison of component failure rates at a given plant with the industry average failure rates

Design Groups

- o identification of common failure modes and causes
- o selection of vendors based on component application and performance
- o identification of component wearout and aging patterns
- o studies of component performance as a function of operating characteristics, such as test frequency and operating environment
- o input to plant availability improvement programs

Operating Experience Reviewers

- o identification of significant failure modes affecting safety or availability
- o trending of component failure rates
- o development of failure probability estimates for use in fault tree analyses (reliability or PRA studies)

NPRDS data is available to users through various quarterly and annual summary reports and through on-line access of the data from a computer terminal.

3.1.2 Significant Event Evaluation and Information Network (SEE-IN)
Since the early days of nuclear power plant operations, utilities and manufacturers have attempted to share what has been learned from plant operating experience. As nuclear technology becomes more complex and more demanding, the need for sharing operating experience continues to grow and becomes more important. The safety benefits of avoiding problems already encountered and resolved more than justifies the costs and extra effort required for utilities to keep each other informed. The Nuclear Safety Analysis Center (NSAC), with the support of its utility advisory group, began developing a program to share information learned from analyzing nuclear plant experiences. Shortly after its formation in late 1979, the Institute of Nuclear Power Operations (INPO) joined NSAC in the development and implementation of the program. The program has been named "Significant Event Evaluation and Information Network" (SEE-IN). In 1981, the management of the SEE-IN program became the sole responsibility of INPO.

Objective

The objective of SEE-IN is to ensure that the cumulative learning process from operating and maintenance experience is effective and that the lessons learned are reported in a timely manner to improve plant safety, reliability, and availability. This objective is met by screening available nuclear

plant event information systematically, identifying and evaluating the important or significant events, and communicating the results to the utilities and appropriate designers and manufacturers.

Scope

The functional approach to SEE-IN is an eight-step process outlined in Appendix C. While INPO has the program management function, no single organization is responsible for performing all of these functions; rather, the responsibility is spread among key participants in the network. The principle organizations involved in the initial screening of plant event data are the utilities and INPO. Each nuclear utility has an in-house program to screen events that occur in its nuclear plant(s). INPO has a broader charter to screen all nuclear plant events. The sources of input to the screening process include NPRDS, NUCLEAR NETWORK, NRC-mandated reports, IEBs, IENs, etc. The provision to control the data normally is governed by agreements between INPO and the supplying organization (e.g., utilities, NRC, NSSS vendors, international participants, etc.). When a significant event or trend has been identified from the screening process, a Significant Event Report (SER) is prepared by INPO and transmitted to the utilities and other participants on NUCLEAR NETWORK. This event then undergoes an action analysis by INPO. The purpose of the action analysis is to investigate the event or trend in more detail and to develop and evaluate practical remedies. For events requiring utility action, the results of the action analysis are communicated to the utilities, normally in the form of a Significant Operating Experience Report (SOER). In these instances, recommendations are made to resolve the underlying problems. The implementation of applicable recommended remedial actions is the responsibility of the individual utility. Implementation may include changes in plant procedures, equipment design, and/or operator training programs. The two final steps in the SEE-IN process are (1)

feedback and evaluation of actions taken by the utilities as a result of information provided through SEE-IN and (2) periodic assessment of the process effectiveness by INPO.

The SEE-IN program provides copies of draft SERs and SOERs to the affected vendors for review. Vendor comments are considered in preparation of final SEE-IN reports. Once finalized, the reports are sent to the utilities.

The SEE-IN program includes a cross-reference capability to identify SERs, SOERs, LERs, etc. which report component problems that could cause a significant event. This cross-reference facilitates utility review of the component's prior history before using that component in a safety-related application.

Program Operation

Plant operating experience data is reviewed from several perspectives including design, component and system performance, plant procedures, human factors, personnel training, maintenance and testing practices, and management systems to identify significant events and trends.

Formal Review Sources

A formal review is conducted on NRC information notices, bulletins, AEOD reports, event-related generic letters, etc. A formal review also is conducted on industry-prepared information (including those required by NRC) such as LERs, monthly operating reports, NRC event-related reports, NSSS technical bulletins, NPRDS data, NUCLEAR NETWORK operating experience entries, international operating experience reports, construction deficiency reports, safety defect reports, and trends identified as significant in the INPO NPRDS and LER data bases. The formal review includes a dual, independent screening process. The review status is documented and tracked by computer.

Other sources of operating experience information are used by the SEE-IN program on an ad hoc basis as reference or supplemental material but do not receive a formal review. The sources include such items as NRC NUREG documents, EPRI and NSAC reports, and other industry reports or data concerned with plant operating experience. The INPO process for screening is shown in Figure 2.

Utility Contact (SEE-IN)

In addition to the formal and reference information sources, another vital information source is direct contact with power plant technical personnel on an ad hoc basis. Each utility designates a SEE-IN contact to respond to questions from INPO on plant events. The majority of such communications is handled over the telephone or via NUCLEAR NETWORK. Files are maintained by INPO on nuclear utilities and contain names and telephone numbers of designated contacts, telecopier numbers, status of nuclear units (i.e., operating, under construction or planned) and NSSS vendor(s).

3.1.3 Interaction With Vendors

In the interest of operating the plant safely and efficiently, the utility-vendor contact is essential. To accomplish this goal, utilities already interact with various vendors.

The contractual obligations for furnishing equipment and software (manuals, drawings, etc.) are fulfilled upon acceptance at the plant site. Interaction between utilities and vendors due to deficiencies may be brought about by the reporting requirements of 10CFR21 and 10CFR50.55(e). The continuing contract with vendors for warranty obligations or maintenance work are two examples of active interaction after an initial purchase. In addition, much of the interaction with the vendors during plant life is initiated in response to

significant failures, to failure trends experienced at the plant, to spare parts procurement, or to subsequent purchase orders of new equipment.

The interaction with the NSSS vendor, who typically supplies a large portion of the safety-related plant equipment, is generally more active than with the other vendors. There are existing channels through which the NSSS suppliers disseminate information of interest to their client utilities. These include the following:

- In regular meetings, NSSS representatives outline recent developments and maintenance/design recommendations. Any special concerns of the utility can be addressed in follow-up correspondence with the NSSS supplier's service department.

- Bulletins or advisories from the NSSS supplier's service department alert client utilities to special problems experienced by similar plants. Typically included in this correspondence are a description of the problem and the corrective actions taken to resolve it. Recommendations for preventive actions or for particular cautions to be considered by the utility usually are included.

- Owners groups provide an additional forum for the exchange of information that may be of generic interest to member utilities. For example, problems in the design or operation of a system or component may be shared with the group and potential resolutions identified. The owners groups' efforts often are directed at seeking improvements or anticipating problems rather than being only reactive in nature. Improvements in availability or testing and maintenance procedures are examples of positive results that have come about through owners groups activities. The NSSS supplier makes his broadly-based knowledge available to the group for the specialized evaluations that may be required.

3.1.4 Regulatory Reporting Requirements

Other existing sources of information are the documents that result from the NRC's reporting requirements. These documents include 10CFR21 reports, 10CFR50.55(e) reports, Licensee Event Reports, and NRC Inspection & Enforcement (IE) Bulletins and Information Notices. 10CFR21 specifies reporting requirements relating to component or system deficiencies that may create a substantial safety hazard. This reporting provides the nuclear utility industry notification of significant noncompliances and defects identified by other utilities, architect-engineers, constructors, vendors, and manufacturers associated with nuclear facilities.

10CFR50.55(e) requires that the holder of a construction permit notify the NRC of each deficiency found in design and construction, which were it to remain uncorrected, could affect the safe operation of the nuclear power plant adversely.

10CFR50.73 requires the holder of an operating license for a nuclear power plant to submit a Licensee Event Report (LER) for events described in 50.73(a)(2). These LERs are incorporated into the INPO LER data base which provides information to identify and isolate precursor events and identify emerging trends or patterns of potential safety significance.

The NRC Office of Inspection and Enforcement (IE) issues various documents, including bulletins and information notices, to inform licensees and construction permit holders of significant concerns that may result from the NRC evaluation of reports, as required by 10CFR21.21, 50.55(e), and

50.73. These documents provide the nuclear utilities with information on events and concerns that are considered significant by the NRC.

3.2 Recommended Enhancements to Existing Programs

The following are recommended enhancements to the existing programs. INPO and the NPRDS Users Group should investigate the feasibility of these recommendations. If found feasible, an implementation program should be developed.

3.2.1 Enhancements to NPRDS

- The present definition of component in NPRDS (extracted from IEEE 603-1980) is more applicable to electrical components. The definition should be improved to describe mechanical components better.

- The present failure reporting guidance needs improvement in the following areas:
  - -- Guidance is needed to provide better information for analyzing the role of piece parts as a factor in causing component failures.
  - -- The guidance should be revised to indicate that utilities should supply information when inadequate vendor information is identified as a causal or contributing factor in a failure. The guidance should provide users of the data base the ability to readily retrieve those failures involving inadequate vendor information (example, key word sorting, coding).
  - -- Present failure reports are often sketchy in providing details of the failure analysis conducted by utilities. The guidance should emphasize the importance of providing more complete results of failure analysis when one is conducted. Although detailed failure analyses are not always conducted for every failure,

when they are conducted they should be provided in NPRDS failure reports. In this way, the SEE-IN program and other utilities can derive more benefit from the work of each utility.

- Utilities should develop internal methods to ensure that their NPRDS reports are clear and complete and that the program guidance is followed appropriately.

- For some failures it may not be possible for utilities to provide a complete failure description within the time frames for reporting to NPRDS. Utilities should still submit preliminary failure reports within the established time frame. Utilities should revise these reports when the necessary information is available. However, the present system does not provide methods for utilities to indicate that reports will be revised later. NPRDS should be modified to permit each utility to readily identify which of their reports still requires follow-up information. Utilities should report a failure event promptly and include an initial analysis. Detailed and complete information should be provided in a timely manner once final analysis has been completed.

- The present scope of NPRDS reporting may not meet all the needs of individual utilities for monitoring the reliability of their own safety-related components. Each utility that decides that additional systems and components should be added to their basic scope of NPRDS systems and components should request that INPO accept these systems. INPO will consider these requests, identify the additional resource requirements needed to handle these requests, and notify utilities when it is able to accept additional information.

3.2.2 Enhancements to SEE-IN

- o Reports should be generated for potential failures caused by faulty or missing vendor-supplied information or other ETI. The VETIP recognizes that the utility will uncover errors in ETI (e.g., during review of the information, writing of instructions, testing, etc.) before anyone else. It is recommended that ETI faults be reported over NUCLEAR NETWORK for review by INPO under the SEE-IN program.

- o The SEE-IN program should be broadened by INPO to improve the ability to trend NPRDS data. Present methods of trending are largely qualitative and subjective in nature. They depend largely on the ability of analysts to recognize the need to look for degrading or unacceptable system and component reliability. INPO should develop methods to use NPRDS in a more quantitative fashion to detect trend problems. This enhancement is presently under development by INPO.

3.3 Summary Example

One problem that led to the Salem event was that the information contained in the NSSS vendor technical bulletin (issued in 1974) was not processed appropriately and therefore not incorporated into plant procedures. If the systems which comprise the VETIP were functional in the early 1970s, this oversight probably would not have occurred or would have been rectified. Westinghouse had prepared the technical bulletin based on a precursor event that occurred at another nuclear unit. This type of precursor event would have required that an LER be written and submitted to the NRC. At the same time, an NPRDS failure report would have been submitted to the INPO data base. INPO also would have reviewed the Westinghouse technical bulletin and the LER. The current criteria for significance screening used by INPO personnel identify this type event as a significant single failure. It is highly likely that an SER would have been generated by INPO and disseminated to utilities via NUCLEAR NETWORK.

Utilities would have reviewed the SER through their Operating Experience Report review programs.

In addition, utilities would have had an ongoing program with their NSSS vendors to obtain ETI. Utilities would have had systems in place to track and process this information. Therefore, there are two pathways which would have ensured this type of information was received and evaluated by the utility:

- o NPRDS/SEE-IN (SERs, SOERs)
- o NSSS vendor technical bulletins

The utility's VETIP procedures would have assessed this information and effected positive action to correct the failed component.

4. IMPLEMENTATION OF VETIP

4.1 Responsibilities For Implementation

4.1.1 Utility Implementation Responsibilities

4.1.1.A Existing Programs

- NSSS Vendor Contact

  Each utility should have with its NSSS supplier, a program in place to obtain technical information. This program consists of a technical bulletin system and necessary direct contact with the NSSS supplier.

- NPRDS/SEE-IN

  Each utility should indicate or reaffirm its active participation in the NPRDS and SEE-IN programs. The utility should supply the necessary basic information and should report failures and problems on a timely basis. Adequate internal controls should be in place to ensure that this activity is timely, consistent, and controlled and should include incorporation of future revisions to these programs.

- Other Vendors

  Each utility should continue to seek assistance and ETI from other safety-related equipment vendors when the utility's evaluation of an equipment or ETI problem concludes that such direct interaction is necessary or would be beneficial. These problems and those of lesser significance will continue to be reported by means of the NPRDS and/or the SEE-IN programs.

- Internal Handling of Equipment Technical Information
  The utility should process incoming ETI so the objectives noted below are achieved.

  -- Administrative procedures should provide control of incoming ETI whether it arrives directly from the vendor or from other industry or regulatory sources (i.e., NUCLEAR NETWORK, NPRDS, SEE-IN, NRC bulletins, etc.), so it receives the appropriate engineering/technical review, evaluation, and distribution for the following:
     - prompt warnings to key personnel
     - timely incorporation into maintenance or operating procedures, equipment data/purchasing records, and training programs
     - future procedure review and revision cycles
     - notification on NUCLEAR NETWORK of significant ETI

     The incorporation of such safety-related information (or changes) remains within the scope of the utility's review and approval requirements.

  -- The administrative program should require that maintenance or operating procedures cite appropriate ETI in the reference section of the procedure.

-- Within the performance section of the procedure, appropriate ETI should be incorporated and approved in the engineering, technical and quality review of the safety-related procedure.

o Internal Handling of Vendor Services
The vendor, contractor or technical representative who will perform safety-related services should be an approved/qualified supplier of such nuclear safety-related services. Furthermore, the services should be specified in the procurement documentation so that, depending on the circumstances, a combination of the following controls are established:

The service is performed using utility procedures that have been approved after a technical and quality review cycle typical for other utility service, maintenance, repair, or operating procedures.

-OR-

The service is performed using the vendor, contractor or technical representative procedures that have been reviewed and approved in accordance with utility procurement program, QA program, and administrative review program so that their documents are processed and approved in a manner equivalent to the utility procedures concerning similar activities.

-AND-

The activity will be performed under the cognizance of the utility QA/QC program.

-OR-

The activity will be performed under the cognizance of the vendor, contractor or technical representative QA/QC program that has been reviewed separately and approved in accordance with the utility QA program. In addition, during the performance of the service, the utility QA program will monitor the effectiveness of their performance and compliance with its approved program by suitable surveillance, inspection and audit.

In addition to the above, ETI provided in conjunction with performance of vendor services should be handled as described above.

4.1.1.B Enhanced Programs

- NPRDS

  Each utility should incorporate the enhancements to the NPRDS recommended in Section 3.2. This could involve revisions to existing administrative programs or procedures. It also could require revised training or other actions needed to ensure a meaningful and effective implementation of the NPRDS program enhancements.

- SEE-IN

  Each utility should incorporate the enhancements to the SEE-IN program recommended in Section 3.2. As in the NPRDS program, this could involve revisions to existing administrative programs or procedures or to training or other activities so

the data reported to the SEE-IN program is complete and detailed enough to support the system enhancements being undertaken by INPO.

4.1.2 INPO Implementation Responsibilities

- o Existing Programs
  The NUTAC determined that present NPRDS/SEE-IN programs, properly used, currently provide an adequate framework for the effective exchange of information.

- o Enhanced Programs
  INPO should implement the enhancements of the NPRDS and SEE-IN programs (noted in Section 3.2) to augment this VETIP.

4.2 Schedule for Implementation

4.2.1 Existing Programs

Utilities that find that their existing internal program and procedures do not support those outlined in Sections 3.1 and 4.1.1.A above should make the necessary timely revisions as part of the established review and updating cycle for such documentation. A specific schedule should be established by the individual utility with a target date for full implementation by 1/1/85.

4.2.2 Enhancements to Existing Programs

4.2.2.A INPO should work with the NPRDS users group with the goal of establishing schedules by July 1, 1984, for implementation of the enhancements of the NPRDS program.

4.2.2.B Utilities should incorporate the enhancements to the NPRDS and SEE-IN programs, recommended in Section 3.2 and 4.1.1.B above into their internal program and procedures on a timely basis.

4.2.2.C Schedules should be established which are consistent with an overall goal to implement the recommended enhancements to both programs by January 1, 1986.

VETIP BLOCK DIAGRAM

2/9/88

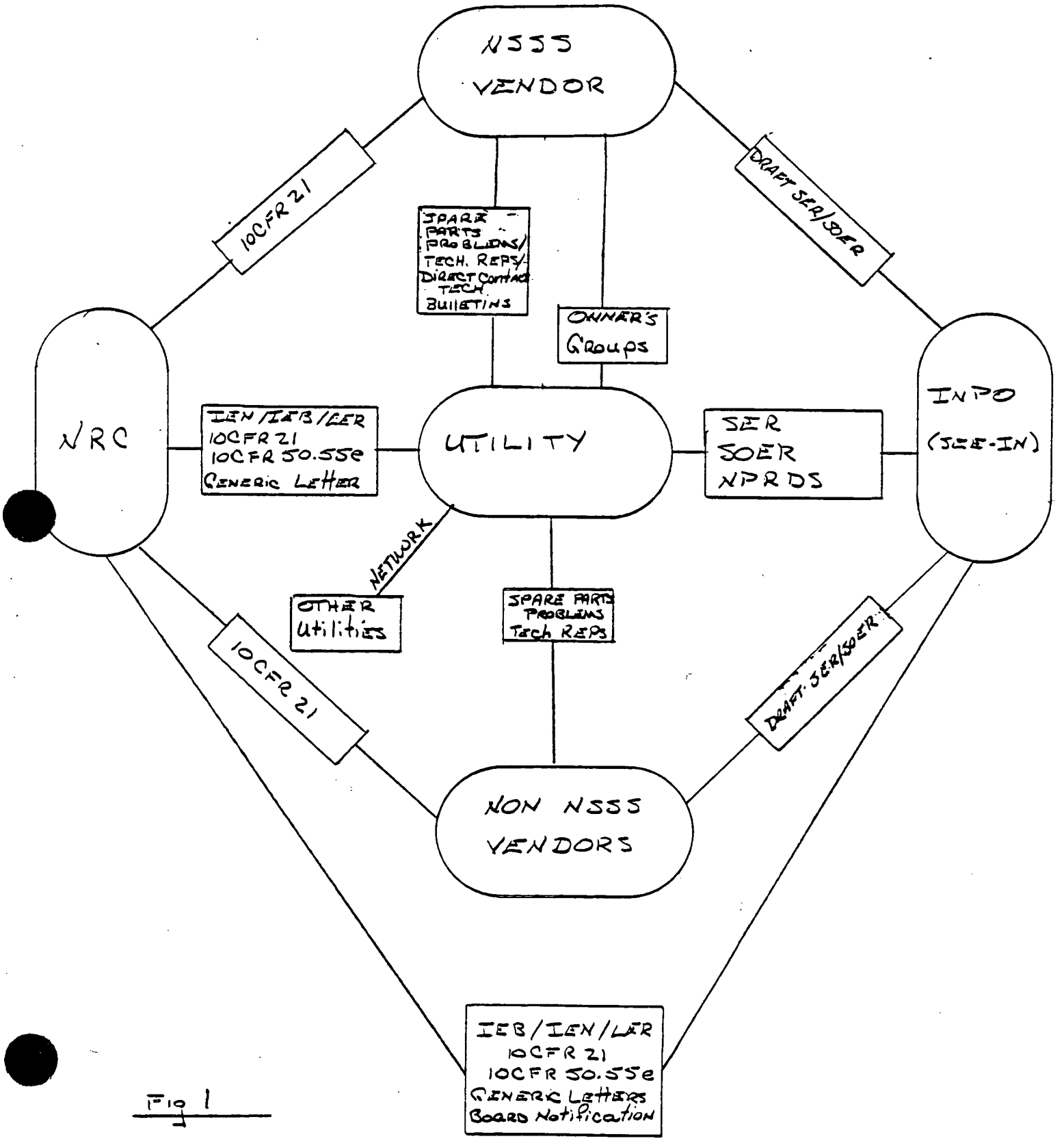
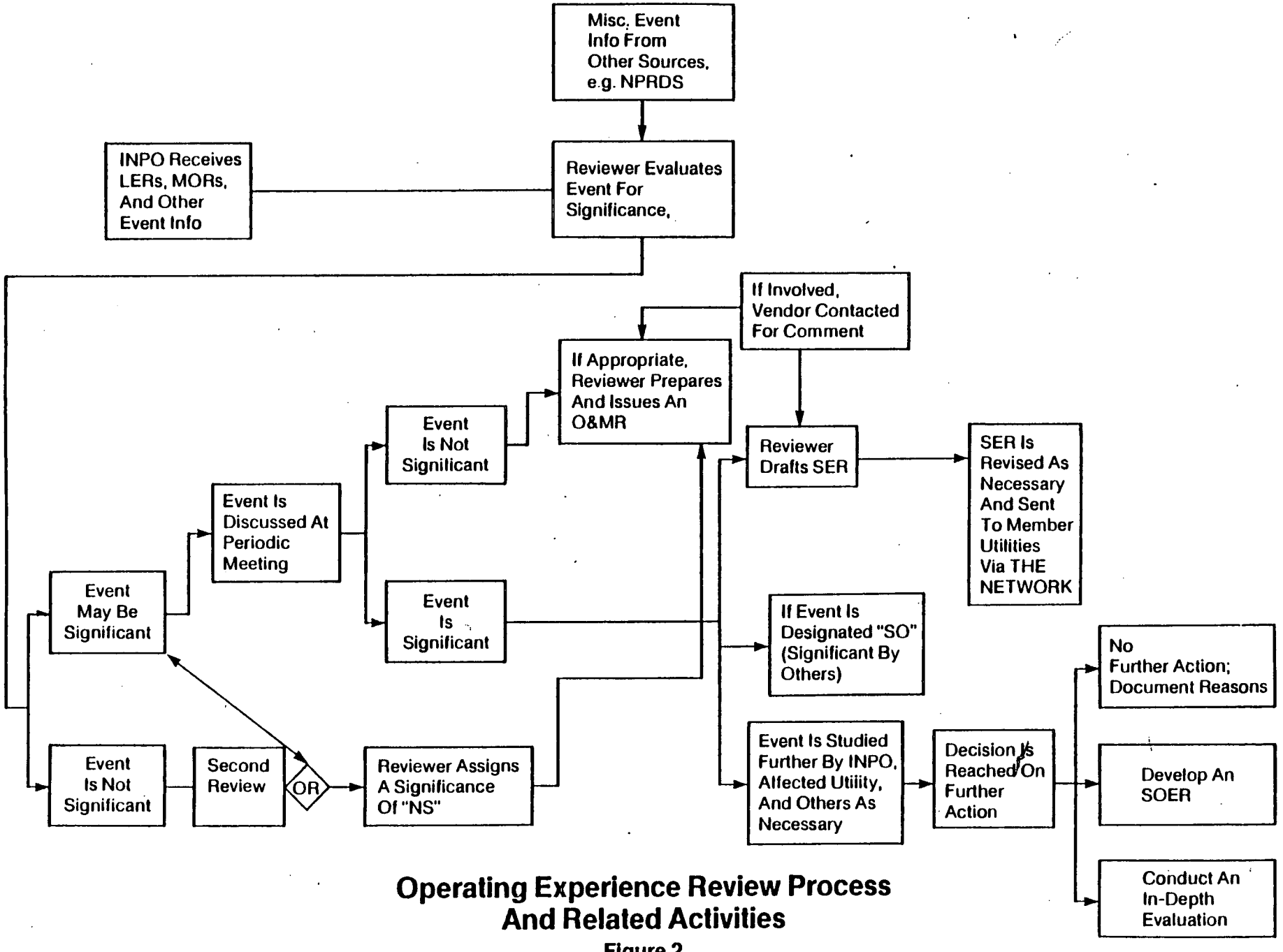


Fig 1



Operating Experience Review Process And Related Activities

Figure 2

APPENDIX A

SPECIFIC CHARTER FOR NUCLEAR UTILITY TASK ACTION COMMITTEE ON GENERIC LETTER 83-28, SECTION 2.2.2

APPENDIX A

SPECIFIC CHARTER FOR
NUCLEAR UTILITY TASK ACTION COMMITTEE
ON GENERIC LETTER 83-28,
SECTION 2.2.2

This Nuclear Utility Task Action Committee (NUTAC) has been established by a group of utility representatives who have recognized a need for nuclear industry guidance on Generic Letter 83-28, Section 2.2.2. The establishment of this NUTAC has been in accordance with the general charter governing the organization and operation of a NUTAC, as approved by the Institute of Nuclear Power Operations (INPO) Board of Directors. This NUTAC is committed to compliance with this specific charter, its bylaws, and the general charter. This charter has been reviewed and approved by the chairman of the Analysis and Engineering Division Industry Review Group and the president of INPO, and the president of INPO authorizes staff support for this NUTAC.

This committee has adopted the following objective to ensure fulfillment of the goal of achieving industry consensus and guidance on Generic Letter 83-28, Section 2.2.2.

- development of guidance for use by utilities in response to Generic Letter 83-28, Section 2.2.2

To ensure that this objective results in products that are of generic benefit to the utilities, voting membership on this committee is limited to permanent employees of U.S. nuclear utilities. The chairman and vice chairman of this committee will be permanent employees of U. S. nuclear utilities and will be elected by the NUTAC from a list of candidates approved by the chairman of the sponsoring IRG. To further ensure that this NUTAC provides products that are of generic benefit to utilities, the NUTAC chairman will maintain close liaison with the sponsoring INPO Industry Review Group.

Additionally, this NUTAC should establish liaison with other recognized industry groups, such as AIF, ANS, EEI, EPRI, and NSSS owners groups and will maintain communication on this industry initiative with the NRC, as appropriate.

Approved: Edward P. Gutfinger 9/1/83 RB McDonald 9/21/83
Chairman, NUTAC Date Chairman, IRG Date

Walter E. Anderson 9/1/83 EB Wilkinson 9/21/83
Vice Chairman, NUTAC Date President, INPO Date

APPENDIX B

LIST OF REFERENCES

APPENDIX B

List of References

1. NRC Generic Letter 83-28 dated July 8, 1983
   Required Actions Based on Generic Implications of Salem ATWS Events

2. NUREG 0977 - NRC Fact-Finding Task Force Report on the ATWS Events at Salem Nuclear Generating Station Unit 1 on February 22 and 25, 1983

3. NUREG 1000 - Generic Implications of ATWS Events at the Salem Nuclear Power Plant

4. Significant Event Evaluation and Information Network (SEE-IN) Program Description (INPO 83-001)

5. Nuclear Plant Reliability Data System (NPRDS) Reportable System and Component Scope Manual (INPO 83-020)

6. Reporting Procedures Manual for the Nuclear Plant Reliability Data System

7. 10CFR21 - Reporting of Defects and Noncompliance

8. 10CFR50 - Domestic Licensing of Production and Utilization Facilities

9. IEEE 603-1980 - Standard Criteria for Safety Systems for Nuclear Generating Stations

APPENDIX C

SEE-IN FUNCTIONS

APPENDIX C

SEE-IN Functions

1. Provide basic report of plant event. (utilities)

2. Screen events for significance and transmit Significant Event Reports (SERs) via NUCLEAR NETWORK. (utilities and INPO with vendor input solicited when specific product is identified)

3. Provide backup data on contributing factors and probable causes and consequences. (utilities and vendors)

4. Perform action analysis on significant events to evaluate possible options for short-term remedies and feasible long-term solutions that might be implemented. (utilities, INPO, and vendors)

5. Disseminate information, along with an alert of potential implication, to the utilities. (INPO)

6. Evaluate the information and implement remedies as appropriate. (utilities)

7. Provide feedback on implementation actions. (utilities and INPO)

8. Evaluate periodically the effectiveness of the process, including steps 1-7 above. (INPO)

APPENDIX D

NRC GENERIC LETTER 83-28
SECTION 2.2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 8, 1983

TO ALL LICENSEES OF OPERATING REACTORS, APPLICANTS FOR OPERATING LICENSE, ANO HOLDERS OF CONSTRUCTION PERMITS

Gentlemen:

SUBJECT: REQUIRED ACTIONS BASED ON GENERIC IMPLICATIONS OF SALEM ATWS EVENTS (Generic Letter 83-28)

The Commission has recently reviewed intermediate-term actions to be taken by licensees and applicants as a result of the Salem anticipated transient without scram (ATWS) events. These actions have been developed by the staff based on information contained in NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant." These actions address issues related to reactor trip system reliability and general management capability.

The actions covered by this letter fall into the following four areas:

1. Post-Trip Review - This action addresses the program, procedures and data collection capability to assure that the causes for unscheduled reactor shutdowns, as well as the response of safety-related equipment, are fully understood prior to plant restart.

2. Equipment Classification and Vendor Interface - This action addresses the programs for assuring that all components necessary for accomplishing required safety-related functions are properly identified in documents, procedures, and information handling systems that are used to control safety-related plant activities. In addition, this action addresses the establishment and maintenance of a program to ensure that vendor information for safety-related components is complete.

3. Post-Maintenance Testing - This action addresses post-maintenance operability testing of safety-related components.

4. Reactor Trip System Reliablity Improvements - This action is aimed at assuring that vendor-recommended reactor trip breaker modifications and associated reactor protection system changes are completed in PWRs, that a comprehensive program of preventive maintenance and surveillance testing is implemented for the reactor trip breakers in PWRs, that the shunt trip attachment activates automatically in all PWRs that use circuit breakers in their reactor trip system, and to ensure that on-line functional testing of the reactor trip system is performed on all LWRs.

The enclosure to this letter breaks down these actions into several components. You will find that all actions, except four (Action 1.2, 4.1, 4.3, and 4.5), require software (procedures, training, etc.) changes and/or modifications and do not affect equipment changes or require reactor shutdown to complete. Action 1.2 may result in some changes to the sequence of events recorder or existing plant computers, but will not result in a plant shutdown to implement. Actions 4.1, 4.3 and 4.5.2, if applicable, would require the plant to be shutdown in order to implement.

The reactor trip system is fundamental to reactor safety for all nuclear power plant designs. All transient and accident analyses are predicated on its successful operation to assure acceptable consequences. Therefore, the actions listed below, which relate directly to the reactor trip system, are of the highest priority and should be integrated into existing plant schedules first.

1.1 Post-Trip Review (Program Description and Procedure)

2.1 Equipment Classification and Vendor Interface (Reactor Trip System Components)

3.1 Post-Maintenance Testing (Reactor Trip System Components)

4.1 Reactor Trip System Reliability (Vendor-Related Modifications)

4.2.1 and 4.2.2 Reactor Trip System Reliability (Preventive Maintenance and Surveillance Program for Reactor Trip Breakers)

4.3 Reactor Trip System Reliability (Automatic Actuation of Shunt-trip Attachment for Westinghouse and B&W plants)

Most of the remaining intermediate-term actions concern all other safety-related systems. These systems, while not sharing the same relative importance to safety as the reactor trip system, are essential in mitigating the consequences of transients and accidents. Therefore, these actions should be integrated into existing plant schedules over the longer-term on a medium priority basis. Some of the actions discussed in the enclosure will best be served by Owners' Group participation, and this is encouraged to the extent practical.

Accordingly, pursuant to 10 CFR 50.54(f), operating reactor licensees and applicants for an operating license (this letter is for information only for those utilities that have not applied for an operating license) are requested to furnish, under oath and affirmation, no later than 120 days from the date of this letter, the status of current conformance with the positions contained herein, and plans and schedules for any needed improvements for conformance with the positions. The schedule for the implementation of these improvements is to be negotiated with the Project Manager.

Licensees and applicants may request an extension of time for submittals of the required information. Such a request must set forth a proposed schedule and justification for the delay. Such a request shall be directed to the Director, Division of Licensing, NRR. Any such request must be submitted no later than 60 days from the date of this letter. If a licensee or applicant does not intend to implement any of the enclosed items, the response should so indicate and a safety basis should be provided for each item not intended to be implemented. Value-impact analysis can be used to support such responses or to argue in favor of alternative positions that licensees might propose.

For Operating Reactors, the schedules for implementation of these actions shall be developed consistent with the staff's goal of integrating new requirements, considering the unique status of each plant and the relative safety importance of the improvements, combined with all other existing plant programs. Therefore, schedules for implementation of these actions will be negotiated between the NRC Project Manager and licensees.

For plants undergoing operating license review at this time, plant-specific schedules for the implementation of these requirements shall be developed in a manner similar to that being used for operating reactors, taking into consideration the degree of completion of the power plant. For construction permit holders not under OL review and for construction permit applicants, the requirements of this letter shall be implemented prior to the issuance of an operating license.

This request for information was approved by the Office of Management and Budget under clearance number 3150-0011 which expires April 30, 1985. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management Room 3208, New Executive Office Building, Washington, D. C. 20503.

Sincerely,

Darrell G. Eisenhut, Director
Division of Licensing

Enclosure:
Required Actions Based on Generic
Implications of Salem ATWS Events

2.2 EQUIPMENT CLASSIFICATION AND VENDOR INTERFACE (PROGRAMS FOR ALL SAFETY-RELATED COMPONENTS)

Position

Licensees and applicants shall submit, for staff review, a description of their programs for safety-related* equipment classification and vendor interface as described below:

1. For equipment classification, licensees and applicants shall describe their program for ensuring that all components of safety-related systems necessary for accomplishing required safety functions are identified as safety-related on documents, procedures, and information handling systems used in the plant to control safety-related activities, including maintenance, work orders and replacement parts. This description shall include:

   1. The criteria for identifying components as safety-related within systems currently classified as safety-related. This shall not be interpreted to require changes in safety classification at the systems level.

   2. A description of the information handling system used to identify safety-related components (e.g., computerized equipment list) and the methods used for its development and validation.

   3. A description of the process by which station personnel use this information handling system to determine that an activity is safety-related and what procedures for maintenance, surveillance, parts replacement and other activities defined in the introduction to 10 CFR 50, Appendix B, apply to safety-related components.

   4. A description of the management controls utilized to verify that the procedures for preparation, validation and routine utilization of the information handling system have been followed.

   5. A demonstration that appropriate design verification and qualification testing is specified for procurement of safety-related components. The specifications shall include qualification testing for expected safety service conditions and provide support for the licensees' receipt of testing documentation to support the limits of life recommended by the supplier.

*Safety-related structures, systems, and components are those that are relied upon to remain functional during and following design basis events to ensure: (1) the integrity of the reactor coolant boundary, (2) the capability to shut down the reactor and maintain it in a safe shutdown condition, and (3) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guidelines of 10 CFR Part 100.

6. Licensees and applicants need only to submit for staff review the equipment classification program for safety-related components. Although not required to be submitted for staff review, your equipment classification program should also include the broader class of structures, systems, and components important to safety required by GDC-1 (defined in 10 CFR Part 50, Appendix A, "General Design Criteria, Introduction").

2. For vendor interface, licensees and applicants shall establish, implement and maintain a continuing program to ensure that vendor information for safety-related components is complete, current and controlled throughout the life of their plants, and appropriately referenced or incorporated in plant instructions and procedures. Vendors of safety-related equipment should be contacted and an interface established. Where vendors cannot be identified, have gone out of business, or will not supply information, the licensee or applicant shall assure that sufficient attention is paid to equipment maintenance, replacement, and repair, to compensate for the lack of vendor backup, to assure reliability commensurate with its safety function (GDC-1). The program shall be closely coupled with action 2.2.1 above (equipment qualification). The program shall include periodic communication with vendors to assure that all applicable information has been received. The program should use a system of positive feedback with vendors for mailings containing technical information. This could be accomplished by licensee acknowledgment for receipt of technical mailings. It shall also define the interface and division of responsibilities among the licensee and the nuclear and nonnuclear divisions of their vendors that provide service on safety-related equipment to assure that requisite control of and applicable instructions for maintenance work on safety-related equipment are provided.

Applicability

This action applies to all licensees and OL applicants.

Type of Review

For licensees, a post-implementation review will be conducted. NRR will perform the review and issue a Safety Evaluation.

For OL applicants, the NRR review will be performed consistent with the licensing schedule.

Documentation Required

Licensees and applicants should submit a report that describes the equipment classification and vendor interface programs outlined the position above.