10A.3 STEAM GENERATOR BLOWDOWN

Each steam generator has an upper and lower blowdown line which can be used to control the build-up of soluble and particulate concentrations within the steam generator. The blowdown system, as shown in Figure 10A.3-1, will normally be operated continuously at a rate of 100-200 gpm per steam generator.

The steam generator pressure will vary between 900 and 850 psia for no-load and full-load operation, respectively. The corresponding saturation temperatures are 532°F and 525°F.

10A.3.1 PIPE WHIPS

The steam generator blowdown system normally operates above 275 psig and 200°F; however, as discussed in Section 10A.3.5, no pipe whip restraints are necessary.

10A.3.2 CRITERIA FOR PIPE BREAK LOCATIONS

The criteria used for determining the location of pipe breaks has been presented in Section 10A.1.2.

10A.3.3 CRITERIA FOR PIPE BREAK ORIENTATION

The criteria used for determining the orientation of pipe breaks has been presented in Section 10A.1.3.

10A.3.4 SUMMARY OF DYNAMIC ANALYSIS

Following a postulated break anywhere in the steam generator blowdown line between the containment penetration and the blowdown tank, the stored energy will disperse and the pressure in the pipe will rapidly decay to about half of its initial value due to choking in the small pipe.

Because of the small size of the line and the reduced pressure in the line, the force of the pipe whipping against adjacent structures is very small; therefore, no dynamic analysis is required.

10A.3.5 PROTECTION AGAINST PIPE WHIP, JET IMPINGEMENT, AND REACTIVE FORCES

In the vicinity of the steam generator blowdown lines in the Auxiliary Building there is no safety-related piping which can be broken by the whipping of a ruptured steam generator blowdown line. Also, there are no vital systems or equipment close enough to the steam generator blowdown lines to be damaged by such pipe whip. Adjacent walls and structures will not fail if impacted by these small blowdown lines. Therefore, no pipe whip restraints are necessary.

In the Auxiliary Building, there are no vital systems or equipment close enough to be damaged by jet impingement. Because of the small size of the blowdown lines, the force from a jet will not fail any adjacent walls or structures. Hence, no impingement protection is necessary.

A portion of the steam generator blowdown piping passes through the K-line in the Unit 2 Turbine Building on the 12' Elevation in the area of the safety-related main steam drains 5 and 6. One of the two 6" branches goes to the 21 and 23 condensers, while the other goes to the circulating water discharge. The normal pressure and temperature in these lines is 135 psig and 360°, respectively. Therefore, while the temperature exceeds the 200° high energy line criteria, the pressure is less than the 275 psig criteria. An evaluation was done that shows that a postulated break in an area main steam header

that resulted in both main steam drains being ruptured would not impair the ability to achieve shutdown and would not increase the consequences beyond that of the ruptured steam line alone. The results of the main steam header break are considered more severe than those of a break in a blowdown line. Therefore, no barriers are required to protect this safety-related piping from a rupture or jet impingement from the nearby blowdown piping.

10A.3.6 EVALUATION OF SEISMIC CATEGORY I STRUCTURES

The method of evaluating the adequacy of Category I Auxiliary Building has been summarized in Section 10A.1.6.

10A.3.7 STRUCTURE DESIGN LOADS

There will be no significant additional loads on the structure due to a postulated break in the steam generator blowdown line.

10A.3.8 REVERSAL OF LOADS ON STRUCTURE

There will be no reversal of loads on the structure due to a steam generator blowdown line break.

10A.3.9 STRUCTURAL EFFECT OF OPENINGS ADDED TO THE STRUCTURE

No openings are required to vent the structure following a break in the blowdown line.

10A.3.10 VERIFICATION THAT ANY STRUCTURE FAILURE WILL NOT AFFECT OTHER STRUCTURES REQUIRED FOR SAFETY

There will be no failure of a structure due to a postulated break in the steam generator blowdown line.

10A.3.11 VERIFICATION THAT PIPE RUPTURE WILL NOT AFFECT SAFETY

Safety-related equipment which could be affected by the environment resulting from a pipe rupture is qualified to function under those conditions (Tables 10A-5 and 10A-6). There is insufficient energy release to cause a hazard to any structure by pipe whip or pressurization so the steam environment cannot spread to other areas (Sections 10A.3.1, 10A.3.4, and 10A.1.20).

Therefore, pipe ruptures in the steam generator blowdown system will not affect safety.

10A.3.12 EFFECT ON CONTROL ROOM

The results of the analysis presented in Section 10A.1.20 shows that the Control Room will not be affected by a blowdown line break.

10A.3.13 ENVIRONMENTAL QUALIFICATION OF AFFECTED REQUIRED EQUIPMENT

Environmental qualification is discussed in Section 10A.3.20.

10A.3.14 DESIGN DIAGRAMS AND DRAWINGS

The steam generator blowdown system is shown on Figure 10A.3-1.

The routing of the steam generator blowdown lines through the Auxiliary Building is shown on Figures 10A.3-2 and 10A.3-3.

10A.3.15 FLOODING

Approximately two-thirds of the mass released from a blowdown line break will be in the form of water. This will amount to about 210 gpm which can be adequately drained by the floor drain system.

10A.3.16 QUALITY CONTROL AND INSPECTION PROGRAM

The quality control and inspection programs are presented in Section 10A.1.16.

10A.3.17 LEAK DETECTION

Temperature switches are located in the areas where the steam generator blowdown lines pass through, and will alarm to alert the operator of abnormally high temperatures that could result from a line rupture. However, no credit is taken for these switches (Section 10A.1.17).

10A.3.18 EMERGENCY PROCEDURES

Upon leak or rupture of the steam generator blowdown piping in the Auxiliary Building, the applicable emergency operating procedure would be implemented.

10A.3.19 SEISMIC AND QUALITY CLASSIFICATION

The blowdown lines are designed and constructed to meet ANSI B31.1 requirements, except for the portions of the line that penetrate the Containment up to and including the containment isolation valves, which are designed and constructed to meet B31.7, Class II requirements.

10A.3.20 DESCRIPTION OF ASSUMPTIONS, METHODS AND RESULTS OF ANALYSIS FOR PRESSURE AND TEMPERATURE TRANSIENT IN COMPARTMENT

The locations of the postulated circumferential or longitudinal breaks are shown in Figures 10A.3-2 and 10A.3-3. The flow from these breaks will be choked to a maximum rate of 43 lbs/sec because the fluid in the steam generator is saturated liquid.

The temperature and pressure build-up in the rooms where the blowdown lines are located was determined with the Bechtel computer code COPATTA. This computer code is described in Section 14.20.

The parameters used with this analysis are as follows:

Initial Room Conditions:

Temperature	100°F (EL 45')/140°F (EL 27')
Pressure	0 psig
Relative humidity	70%

Blowdown Tank Room (above Elevation 45'0"):

Volume	29,000 ft^3
Concrete surfaces	8250 ft^2
Vent opening	173.6 ft^2
Vent coefficient	1.0

Penetration Room (below Elevation 45'0"):

Volume	45,565 ft^3
Concrete surfaces	11,210 ft^2
Metal surfaces (grating)	800 ft^2
Vent opening (total)	7.8165 ft^2
Vent coefficient	0.85

For the blowdown tank room the peak pressure and temperature were found to be 0.27 psig at 8.4 minutes, and 234°F at 150 seconds, respectively. Some steam will dissipate into the corridors of the Auxiliary Building through an open passageway, but this small quantity is diluted and exhausted through the ventilation system without adverse effects (Figures 10A.3-4 and 10A.3-5).

For the Penetration Room, the pressure and temperature build-up is slowed by venting through a check damper into the MS valve room. From here the escaping steam has a path directly to the outside of the building (Section 10A.1.20). However, the check damper will not pass the full steam flow from the ruptured blowdown line so the pressure and temperature will continue to rise. Doors to the adjacent ventilation equipment room are not designed as pressure retaining and will fail at a pressure less than 1 psig. With these doors open, there is insufficient mass and energy flow from the broken pipes to sustain a room pressure above 0.5 psig. Hence, the pressure in the room will always be less than 1 psig.

The escaping steam can propagate to other areas of the Auxiliary Building but is diluted and exhausted through the ventilation systems without any adverse effects. The maximum temperature reached in the room where the break occurred is 212°F and the maximum pressure is less than 0.1 psig.

10A.3.21 DESCRIPTION OF ASSUMPTIONS, METHODS, AND RESULTS OF ANALYSIS FOR EFFECT ON PRIMARY OR SECONDARY CONTAINMENT STRUCTURE DUE TO PIPE RUPTURE OUTSIDE

The primary Containment Structure will not be affected due to a postulated break in the steam generator blowdown line.

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	MS	MS TO AFWP TURBINES	STEAM GENERATOR	MAIN FEEDWATER
F-2	1-CV-5160	Saltwater Inlet Component Cooling (CC) Heat Exchanger (HX) 11	A	A	A	A
F-2	1-SV-5160	Saltwater Inlet CC HX 11	A	A	A	A
F-2	1-CV-5206	Saltwater Outlet CC HX 11	A	A	A	A
F-2	1-SV-5206	Saltwater Outlet CC HX 11	A	A	A	A
F-2	1-SV-5206A	Saltwater Outlet CC HX 11	A	A	A	A
F-2	1-I/P-5206	Saltwater Outlet CC HX 11	A	A	A	A
J-1	1-HIC-5206	Saltwater Outlet CC HX 11	A	A	A	A
F-2	1-CV-5162	Saltwater Inlet CC HX 12	A	A	A	A
F-2	1-SV-5162	Saltwater Inlet CC HX 12	A	A	A	A
F-2	1-CV-5208	Saltwater Outlet CC HX 12	A	A	A	A
F-2	1-SV-5208	Saltwater Outlet CC HX 12	A	A	A	A
F-2	1-SV-5208A	Saltwater Outlet CC HX 12	A	A	A	A
F-2	1-I/P-5208	Saltwater Outlet CC HX 11	A	A	A	A
J-1	1-HIC-5208	Saltwater Outlet CC HX 12	A	A	A	A
F-2	1-CV-5163	Saltwater Outlet CC HX 12	A	A	A	A
F-2	1-SV-5163	Saltwater Outlet CC HX 12	A	A	A	A
F-2	1-CV-5150	Saltwater Inlet SRW HX 11	A	A	A	A
F-2	1-SV-5150	Saltwater Inlet SRW HX 11	A	A	A	A
F-2	1-CV-5209	Saltwater Outlet SRW HX 11A	A	A	A	A
F-2	1-FIC-5209	Saltwater Outlet SRW HX 11A	A	A	A	A
F-2	1-CV-5210	Saltwater Outlet SRW HX 11B	A	A	A	A
F-2	1-FIC-5210	Saltwater Outlet SRW HX 11B	A	A	A	A
J-2	1-PIC-5154	Saltwater Bypass SRW HX 11	A	A	A	A
F-2	1-CV-5154	Saltwater Bypass SRW HX 11	A	A	A	A
J-2	1-I/P-5154	Saltwater Bypass SRW HX 11	A	A	A	A
F-2	1-CV-5152	Saltwater Inlet SRW HX 12	A	A	A	A
F-2	1-SV-5152	Saltwater Inlet SRW HX 12	A	A	A	A
F-2	1-CV-5211	Saltwater Outlet SRW HX 12A	A	A	A	A
F-2	1-FIC-5211	Saltwater Outlet SRW HX 12A	A	A	A	A
F-2	1-CV-5212	Saltwater Outlet SRW HX 12B	A	A	A	A
F-2	1-FIC-5212	Saltwater Outlet SRW HX 12B	A	A	A	A
J-2	1-PIC-5157	Saltwater Bypass SRW HX 12	A	A	A	A
J-2	1-CV-5157	Saltwater Bypass SRW HX 12	A	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	MS	MS TO AFWP TURBINES	STEAM GENERATOR	MAIN FEEDWATER
J-2	1-I/P-5157	Saltwater Bypass SRW HX 12	A	A	A	A
F-2	1-CV-5153	Saltwater Outlet SRW HX 12	A	A	A	A
F-2	1-SV-5153	Saltwater Outlet SRW HX 12	A	A	A	A
F-2	1-CV-1645	SRW to EDG 1B	A	A	A	A
F-2	1-SV-1645	SRW to EDG 1B	A	A	A	A
F-2	1-CV-1646	SRW Outlet EDG 1B	A	A	A	A
F-2	1-SV-1646	SRW Outlet EDG 1B	A	A	A	A
F-5	1-CV-1588	SRW Inlet EDG 1B	A	A	A	A
F-5	1-SV-1588	SRW Inlet EDG 1B	A	A	A	A
K-0	1-SV-10241	EDG 1A1 Starting Air	A	A	A	A
K-0	1-SV-10242	EDG 1A1 Starting Air	A	A	A	A
K-0	1-SV-10271	EDG 1A2 Starting Air	A	A	A	A
K-0	1-SV-10272	EDG 1A2 Starting Air	A	A	A	A
F-5	0-SV-4834	EDG 1B Starting Air	A	A	A	A
F-5	1-SV-4835	EDG 1B Starting Air	A	A	A	A
F-2	1-CV-3824	CC HX 11 Outlet[(a)]	A	A	A	A
F-2	1-SV-3824	CC HX 11 Outlet[(a)]	A	A	A	A
F-2	1-CV-3826	CC HX 12 Outlet[(a)]	A	A	A	A
F-2	1-SV-3826	CC HX 12 Outlet[(a)]	A	A	A	A
F-1	1-CV-3828	CC Outlet Shutdown HX 11[(a)]	A	A	A	A
F-1	1-SV-3828	CC Outlet Shutdown HX 11[(a)]	A	A	A	A
F-1	1-CV-3830	CC Outlet Shutdown HX 12[(a)]	A	A	A	A
F-1	1-CV-3830	CC Outlet Shutdown HX 12[(a)]	A	A	A	A
F-2	1-LIT-206	Boric Acid Storage Tank 11 Level[(a)]	A	A	A	A
J-1	1-LIA-206	Boric Acid Storage Tank 11 Level[(a)]	A	A	A	A
F-2	1-LIT-208	Boric Acid Storage Tank 12 Level[(a)]	A	A	A	A
J-1	1-LIA-208	Boric Acid Storage Tank 12 Level[(a)]	A	A	A	A
H-1	1-PT-212	Charging Pumps Discharge Header Flow[(a)]	A	A	A	A
J-1	1-PIA-212	Charging Pumps Discharge Header Flow[(a)]	A	A	A	A
J-1	1ZL224XR,G	Charging Pumps Discharge Header Flow[(a)]	A	A	A	A
J-1	1ZL224YR,G	Charging Pumps Discharge Header Flow[(a)]	A	A	A	A
J-1	1ZL224ZR,G	Charging Pumps Discharge Header Flow[(a)]	A	A	A	A
J-1	1ZL224ZAR,G	Charging Pumps Discharge Header Flow[(a)]	A	A	A	A
F-2	1-MOV-514	Boric Acid Pumps to Chg Pump Suction	A	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	MS	MS TO AFWP TURBINES	STEAM GENERATOR	MAIN FEEDWATER
F-1	1-MOV-508	Boric Acid Tank 12 to Chg Pump Suction	A	A	A	A
F-1	1-MOV-509	Boric Acid Tank 11 to Chg Pump Suction	A	A	A	A
L-1	1-CV-515	Letdown Line Isolation	A	A	A	A
L-1	1-SV-515	Letdown Line Isolation	A	A	A	A
L-1	1-CV-516	Letdown Line Isolation	A	A	A	A
L-1	1-SV-516	Letdown Line Isolation	A	A	A	A
F-1	1-PT-302X	Low Pressure Safety Injection (LPSI) Pump 11 Discharge	A	A	A	A
J-1	1-PI-302X	LPSI Pump 11 Discharge	A	A	A	A
F-1	1-PT-302Y	LPSI Pump 12 Discharge	A	A	A	A
J-1	1-PI-302Y	LPSI Pump 12 Discharge	A	A	A	A
F-1	1-MOV-658	LPSI Pumps Discharge to SDC HX[(a)]	A	A	A	A
F-1	1-PT-303X	SDC HX 11 Inlet[(a)]	A	A	A	A
J-1	1-PT-303X	SDC HX 11 Inlet[(a)]	A	A	A	A
F-1	1-PT-303Y	SDC HX 12 Inlet[(a)]	A	A	A	A
J-1	1-PI-303Y	SDC HX 12 Inlet[(a)]	A	A	A	A
F-1	1-TE-303X	SDC HX 11 Outlet[(a)]	A	A	A	A
J-1	1-TI-303X	SDC HX 11 Outlet[(a)]	A	A	A	A
F-1	1-TE-303Y	SDC HX 12 Outlet[(a)]	A	A	A	A
J-1	1-TI-303Y	SDC HX 12 Outlet[(a)]	A	A	A	A
F-2	1-CV-657	SDC HX Flow[(a)]	A	A	A	A
F-2	1-I/P-657	SDC HX Flow[(a)]	A	A	A	A
J-1	1-HIC-3657	SDC HX Flow[(a)]	A	A	A	A
F-2	1-CV-306	LPSI Flow[(a)]	A	A	A	A
F-2	1-I/P-306	LPSI Flow[(a)]	A	A	A	A
J-1	1-FIC-306	LPSI Flow[(a)]	A	A	A	A
F-4	1-FY-306	LPSI Flow[(a)]	A	A	A	A
F-2	1-FT-306	LPSI Flow[(a)]	A	A	A	A
F-1	1-PT-307	LPSI Header Pressure[(a)]	A	A	A	A
J-1	1-PI-307	LPSI Header Pressure[(a)]	A	A	A	A
F-2	1-TE-351X	LPSI Header Temperature[(a)]	A	A	A	A
F-2	1-TT-351X	LPSI Header Temperature[(a)]	A	A	A	A
F-2	1-FT-312	LPSI Flow to Loop 11A[(a)]	A	A	A	A
J-1	1-FI-312	LPSI Flow to Loop 11A[(a)]	A	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	MS	MS TO AFWP TURBINES	STEAM GENERATOR	MAIN FEEDWATER
F-2	1-FT-322	LPSI Flow to Loop 11B[a]	A	A	A	A
J-1	1-FI-322	LPSI Flow to Loop 11B[a]	A	A	A	A
H-1	1-FT-332	LPSI Flow to Loop 12A[a]	A	A	C	A
J-1	1-FI-332	LPSI Flow to Loop 12A[a]	A	A	A	A
H-1	1-FT-342	LPSI Flow to Loop 12B[a]	A	A	C	A
J-1	1-FI-342	LPSI Flow to Loop 12B[a]	A	A	A	A
H-1	1-MOV-615	LPSI Flow to Loop 11A	A	A	C	A
H-1	1-MOV-625	LPSI Flow to Loop 11B	A	A	C	A
H-2	1-MOV-635	LPSI Flow to Loop 12A	A	A	A	A
H-2	1-MOV-645	LPSI Flow to Loop 12B	A	A	A	A
H-1	1-MOV-651	SDC Return Header[a]	A	A	C	A
H-1	1-MOV-652	SDC Return Header[a]	A	A	C	A
F-1	1-PT-301X	High Pressure Safety Injection (HPSI) Pump 11 Discharge	A	A	A	A
J-1	1-PI-301X	HPSI Pump 11 Discharge	A	A	A	A
F-1	1-PT-301Y	HPSI Pump 12 Discharge	A	A	A	A
J-1	1-PI-301Y	HPSI Pump 12 Discharge	A	A	A	A
F-1	1-PT-301Z	HPSI Pump 13 Discharge	A	A	A	A
J-1	1-PI-301Z	HPSI Pump 13 Discharge	A	A	A	A
F-1	1-MOV-654	HPSI Header	A	A	A	A
H-1	1-MOV-616	HPSI Flow to Loop 11A	A	A	C	A
H-1	1-MOV-626	HPSI Flow to Loop 11B	A	A	C	A
H-2	1-MOV-636	HPSI Flow to Loop 12A	A	A	A	A
H-2	1-MOV-646	HPSI Flow to Loop 12B	A	A	A	A
F-2	1-FT-311	HPSI Flow to Loop 11A	A	A	A	A
J-1	1-FI-311	HPSI Flow to Loop 11A	A	A	A	A
F-2	1-FT-321	HPSI Flow to Loop 11B	A	A	A	A
J-1	1-FI-321	HPSI Flow to Loop 11B	A	A	A	A
H-1	1-FT-331	HPSI Flow to Loop 12A	A	A	B	A
J-1	1-FI-331	HPSI Flow to Loop 12A	A	A	A	A
H-1	1-FT-341	HPSI Flow to Loop 12B	A	A	B	A
J-1	1-FI-341	HPSI Flow to Loop 12B	A	A	A	A
L-1	1-LT-110X	Pressurizer Level	A	A	A	A
J-1	1-LIC-110X	Pressurizer Level	A	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	MS	MS TO AFWP TURBINES	STEAM GENERATOR	MAIN FEEDWATER
L-1	1-LT-110Y	Pressurizer Level	A	A	A	A
J-1	1-LIC-110Y	Pressurizer Level	A	A	A	A
L-1	1-PT-102A-D	Pressurizer Pressure	A	A	A	A
J-1	1-PI-102A-D	Pressurizer Pressure	A	A	A	A
L-1	1-TT-112HA-HD	Reactor Loop 11A-B Temperature	A	A	A	A
L-1	1-TT-122HA-HD	Reactor Loop 12A-B Temperature	A	A	A	A
L-1	1-LT-1111	Steam Generator (SG) 11 Downcomer Level	A	A	A	A
J-1	1-LR-1111	SG 11 Downcomer Level	A	A	A	A
L-1	1-LT-1121	SG 12 Downcomer Level	A	A	A	A
J-1	1-LR-1121	SG 12 Downcomer Level	A	A	A	A
L-1	1-PT-1013A-D	SG 11 Pressure	A	A	A	A
J-1	1-PI-1013A-D	SG 11 Pressure	A	A	A	A
L-1	1-PT-1023A-D	SG 12 Pressure	A	A	A	A
J-1	1-PI-1023A-D	SG 12 Pressure	A	A	A	A
H-1	1-MOV-617	Auxiliary HPSI Flow to Loop 11A	A	A	C	A
H-1	1-MOV-627	Auxiliary HPSI Flow to Loop 11B	A	A	C	A
H-1	1-MOV-637	Auxiliary HPSI Flow to Loop 12A	A	A	A	A
H-1	1-MOV-647	Auxiliary HPSI Flow to Loop 12B	A	A	A	A
F-4	1-CV-4043	MS Isolation	B	B	A	B
F-4	1-CV-4048	MS Isolation	B	B	A	B
E-1	1-PT-4507	AFW Discharge Header - Steam Train	A	A	A	A
F-2	1-PT-4548	AFW Discharge Header - Motor Train	A	A	A	A
J-1	1-PI-4507	AFW Discharge Header - Steam Train	A	A	A	A
J-1	1-PI-4548	AFW Discharge Header - Steam Train	A	A	A	A
H-0	1-FT-4509B	AFW Flow to SG 11 - Steam Train	A	A	A	A
H-0	1-FT-4510B	AFW Flow to SG 12 - Steam Train	A	A	A	A
F-2	1-FT-4524A	AFW Flow to SG 11 - Motor Train	A	A	A	A
F-2	1-FT-4534A	AFW Flow to SG 12 - Motor Train	A	A	A	A
J-1	1-FIC-4511A	AFW Flow to SG 11 - Steam Train	A	A	A	A
J-1	1-FIC-4512A	AFW Flow to SG 12 - Steam Train	A	A	A	A
J-1	1-FIC-4525A	AFW Flow to SG 11 - Motor Train	A	A	A	A
J-1	1-FIC-4535A	AFW Flow to SG 12 - Motor Train	A	A	A	A
H-1	1-I/P-4511A	AFW Flow to SG 11 - Steam Train	A	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	MS	MS TO AFWP TURBINES	STEAM GENERATOR	MAIN FEEDWATER
H-1	1-I/P-4512A	AFW Flow to SG 12 - Steam Train	A	A	A	A
F-3	1-I/P-4525A	AFW Flow to SG 11 - Motor Train	A	A	A	A
F-3	1-I/P-4535A	AFW Flow to SG 12 - Motor Train	A	A	A	A
H-1	1-CV-4511	AFW Flow to SG 11 - Steam Train	A	A	B	A
H-1	1-CV-4512	AFW Flow to SG 12 - Steam Train	A	A	B	A
F-3	1-CV-4525	AFW Flow to SG 11 - Motor Train	A	A	A	A
F-3	1-CV-4535	AFW Flow to SG 12 - Motor Train	A	A	A	A
F-5	1-I/E-4509B5	AFW Flow to SG 11 - Steam Train	A	A	A	A
F-5	1-FY-4509B	AFW Flow to SG 11 - Steam Train	A	A	A	A
F-5	1-E/I-4509B3	AFW Flow to SG 11 - Steam Train	A	A	A	A
F-4	1-I/E-4524A5	AFW Flow to SG 11 - Motor Train	A	A	A	A
F-4	1-FY-4524A	AFW Flow to SG 11 - Motor Train	A	A	A	A
F-4	1-E/I-4524A3	AFW Flow to SG 11 - Motor Train	A	A	A	A
F-4	1-I/E-4534A5	AFW Flow to SG 12 - Steam Train	A	A	A	A
F-4	1-FY-4534A	AFW Flow to SG 12 - Steam Train	A	A	A	A
F-4	1-E/I-4534A3	AFW Flow to SG 12 - Steam Train	A	A	A	A
F-5	1-I/E-4510B5	AFW Flow to SG 12 - Motor Train	A	A	A	A
F-5	1-FY-4510B	AFW Flow to SG 12 - Motor Train	A	A	A	A
F-5	1-E/I-4510B3	AFW Flow to SG 12 - Motor Train	A	A	A	A
H-1	1-CV-4521	Isolation AFW Flow to SG 11-Steam Train	A	A	B	A
H-1	1-CV-4520	Isolation AFW Flow to SG 11-Steam Train	A	A	B	A
F-2	1-CV-4522	Isolation AFW Flow to SG 11-Motor Train	A	A	A	A
F-3	1-CV-4523	Isolation AFW Flow to SG 11-Motor Train	A	A	A	A
H-1	1-CV-4530	Isolation AFW Flow to SG 12-Steam Train	A	A	B	A
H-1	1-CV-4531	Isolation AFW Flow to SG 12-Steam Train	A	A	B	A
F-2	1-CV-4532	Isolation AFW Flow to SG 12-Motor Train	A	A	A	A
F-3	1-CV-4533	Isolation AFW Flow to SG 12-Motor Train	A	A	A	A
H-1	1-SV-4520	Isolation AFW Flow to SG 11-Steam Train	A	A	B	A
H-1	1-SV-4521	Isolation AFW Flow to SG 11-Steam Train	A	A	B	A
F-2	1-SV-4522	Isolation AFW Flow to SG 11-Motor Train	A	A	A	A
F-3	1-SV-4523	Isolation AFW Flow to SG 11-Motor Train	A	A	A	A
H-1	1-SV-4530	Isolation AFW Flow to SG 12-Steam Train	A	A	B	A
H-1	1-SV-4531	Isolation AFW Flow to SG 12-Steam Train	A	A	B	A
F-2	1-SV-4532	Isolation AFW Flow to SG 12-Motor Train	A	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	MS	MS TO AFWP TURBINES	STEAM GENERATOR	MAIN FEEDWATER
F-3	1-SV-4533	Isolation AFW Flow to SG 12-Motor Train	A	A	A	A
F-4	1-CV-4070	MS Header 11 to AFW Turbines	B	B	A	B
F-4	1-CV-4071	MS Header 12 to AFW Turbines	B	B	A	B
H-1	1-SV-4070	MS Header 11 to AFW Turbines	A	A	B	A
H-1	1-SV-4070A	MS Header 11 to AFW Turbines	A	A	B	A
H-1	1-SV-4071	MS Header 12 to AFW Turbines	A	A	B	A
H-1	1-SV-4071A	MS Header 12 to AFW Turbines	A	A	B	A
F-4	1-CV-4070A	MS Header 11 to AFW Turbines	B	B	A	B
F-4	1-CV-4071A	MS Header 12 to AFW Turbines	B	B	A	B
F-2	1-PCV-4510	AFW Air Accumulator 11A	A	A	A	A
F-2	1-PCV-4520	AFW Air Accumulator 11B	A	A	A	A
L-1	1-LT-1114A-D	SG Wide Range Level	A	A	A	A
L-1	1-LT-1124A-D	SG Wide Range Level	A	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	AFW[(b)]	SHUTDOWN COOLING[(b)]	CVCS	SAMPLING	AUXILIARY STEAM
F-2	1-CV-5160	Saltwater Inlet CC HX 11	-	-	A	A	A
F-2	1-SV-5160	Saltwater Inlet CC HX 11	-	-	A	A	A
F-2	1-CV-5206	Saltwater Outlet CC HX 11	-	-	A	A	A
F-2	1-SV-5206	Saltwater Outlet CC HX 11	-	-	A	A	A
F-2	1-SV-5206A	Saltwater Outlet CC HX 11	-	-	A	A	A
F-2	1-I/P-5206	Saltwater Outlet CC HX 11	-	-	A	A	A
J-1	1-HIC-5206	Saltwater Outlet CC HX 11	-	-	A	A	A
F-2	1-CV-5162	Saltwater Inlet CC HX 12	-	-	A	A	A
F-2	1-SV-5162	Saltwater Inlet CC HX 12	-	-	A	A	A
F-2	1-CV-5208	Saltwater Outlet CC HX 12	-	-	A	A	A
F-2	1-SV-5208	Saltwater Outlet CC HX 12	-	-	A	A	A
F-2	1-SV-5208A	Saltwater Outlet CC HX 12	-	-	A	A	A
F-2	1-I/P-5208	Saltwater Outlet CC HX	-	-	A	A	A
J-1	1-HIC-5208	Saltwater Outlet CC HX 12	-	-	A	A	A
F-2	1-CV-5163	Saltwater Outlet CC HX 12	-	-	A	A	A
F-2	1-SV-5163	Saltwater Outlet CC HX 12	-	-	A	A	A
F-2	1-CV-5150	Saltwater Inlet SRW HX 11	-	-	A	A	A
F-2	1-SV-5150	Saltwater Inlet SRW HX 11	-	-	A	A	A
F-2	1-CV-5209	Saltwater Outlet SRW HX 11A	-	-	A	A	A
F-2	1-FIC-5209	Saltwater Outlet SRW HX 11A	-	-	A	A	A
F-2	1-CV-5210	Saltwater Outlet SRW HX 11B	-	-	A	A	A
F-2	1-FIC-5210	Saltwater Outlet SRW HX 11B	-	-	A	A	A
J-2	1-PIC-5154	Saltwater Bypass SRW HX 11	-	-	A	A	A
F-2	1-CV-5154	Saltwater Bypass SRW HX 11	-	-	A	A	A
F-2	1-I/P-5154	Saltwater Bypass SRW HX 11	-	-	A	A	A
F-2	1-CV-5152	Saltwater Inlet SRW HX 12	-	-	A	A	A
F-2	1-SV-5152	Saltwater Inlet SRW HX 12	-	-	A	A	A
F-2	1-CV-5211	Saltwater Outlet SRW HX 12A	-	-	A	A	A
F-2	1-SV-5211	Saltwater Outlet SRW HX 12A	-	-	A	A	A
F-2	1-FIC-5211	Saltwater Outlet SRW HX 12A	-	-	A	A	A
F-2	1-CV-5212	Saltwater Outlet SRW HX 12	-	-	A	A	A
F-2	1-FIC-5212	Saltwater Outlet SRW HX 12B	-	-	A	A	A
J-2	1-PIC-5157	Saltwater Bypass SRW HX 12	-	-	A	A	A
F-2	1-CV-5157	Saltwater Bypass SRW HX 12	-	-	A	A	A
F-2	1-I/P-5157	Saltwater Bypass SRW HX 12	-	-	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	AFW[b]	SHUTDOWN COOLING[b]	CVCS	SAMPLING	AUXILIARY STEAM
F-2	1-CV-5153	Saltwater Outlet SRW HX 12	-	-	A	A	A
F-2	1-SV-5153	Saltwater Outlet SRW HX 12	-	-	A	A	A
F-2	1-CV-1645	SRW to EDG 1B	-	-	A	A	A
F-2	1-SV-1645	SRW to EDG 1B	-	-	A	A	A
F-2	1-CV-1646	SRW Outlet EDG 1B	-	-	A	A	A
F-2	1-SV-1646	SRW Outlet EDG 1B	-	-	A	A	A
F-5	1-CV-1588	SRW Inlet EDG 1B	-	-	A	A	A
F-5	1-SV-1588	SRW Inlet EDG 1B	-	-	A	A	A
K-0	1-SV-10241	EDG 1A1 Starting Air	-	-	A	A	A
K-0	1-SV-10242	EDG 1A1 Starting Air	-	-	A	A	A
K-0	1-SV-10271	EDG 1A2 Starting Air	-	-	A	A	A
K-0	1-SV-10272	EDG 1A2 Starting Air	-	-	A	A	A
F-5	0-SV-4834	EDG 1B Starting Air	-	-	A	A	A
F-5	1-SV-4835	EDG 1B Starting Air	-	-	A	A	A
F-2	1-CV-3824	CC HX 11 Outlet[a]	-	-	A	A	A
F-2	1-SV-3824	CC HX 11 Outlet[a]	-	-	A	A	A
F-2	1-CV-3826	CC HX 12 Outlet[a]	-	-	A	A	A
F-2	1-SV-3826	CC HX 12 Outlet[a]	-	-	A	A	A
F-1	1-CV-3828	CC Outlet Shutdown HX 11[a]	-	-	A	A	A
F-1	1-SV-3828	CC Outlet Shutdown HX 11[a]	-	-	A	A	A
F-1	1-CV-3830	CC Outlet Shutdown HX 12[a]	-	-	A	A	A
F-1	1-CV-3830	CC Outlet Shutdown HX 12[a]	-	-	A	A	A
F-2	1-LIT-206	Boric Acid Storage Tank 11 Level[a]	-	-	A	A	A
J-1	1-LIA-206	Boric Acid Storage Tank 11 Level[a]	-	-	A	A	A
F-2	1-LIT-208	Boric Acid Storage Tank 12 Level[a]	-	-	A	A	A
J-1	1-LIA-208	Boric Acid Storage Tank 12 Level[a]	-	-	A	A	A
H-1	1-PT-212	Charging Pumps Discharge Header Flow[a]	-	-	C	C	A
J-1	1-PIA-212	Charging Pumps Discharge Header Flow[a]	-	-	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	AFW[b]	SHUTDOWN COOLING[b]	CVCS	SAMPLING	AUXILIARY STEAM
J-1	1ZL224XR,G	Charging Pumps Discharge Header Flow[a]	-	-	A	A	A
J-1	1ZL224YR,G	Charging Pumps Discharge Header Flow[a]	-	-	A	A	A
J-1	1ZL224ZR,G	Charging Pumps Discharge Header Flow[a]	-	-	A	A	A
J-1	1ZL224ZAR,G	Charging Pumps Discharge Header Flow[a]	-	-	A	A	A
F-2	1-MOV-514	Boric Acid Pumps to Chg Pump Suction	-	-	A	A	A
F-1	1-MOV-508	Boric Acid Tank 12 to Chg Pump Suction	-	-	A	A	A
F-1	1-MOV-509	Boric Acid Tank 11 to Chg Pump Suction	-	-	A	A	A
L-1	1-CV-515	Letdown Line Isolation	-	-	A	A	A
L-1	1-SV-515	Letdown Line Isolation	-	-	A	A	A
L-1	1-CV-516	Letdown Line Isolation	-	-	A	A	A
L-1	1-SV-516	Letdown Line Isolation	-	-	A	A	A
F-1	1-PT-302X	LPSI Pump 11 Discharge	-	-	A	A	A
J-1	1-PI-302X	LPSI Pump 11 Discharge	-	-	A	A	A
F-1	1-PT-302Y	LPSI Pump 12 Discharge	-	-	A	A	A
J-1	1-PI-302Y	LPSI Pump 12 Discharge	-	-	A	A	A
F-1	1-MOV-658	LPSI Pumps Discharge to Shutdown HX[a]	-	-	A	A	A
F-1	1-PT-303X	SDC HX 11 Inlet[a]	-	-	A	A	A
J-1	1-PT-303X	SDC HX 11 Inlet[a]	-	-	A	A	A
F-1	1-PT-303Y	SDC HX 12 Inlet[a]	-	-	A	A	A
J-1	1-PI-303Y	SDC HX 12 Inlet[a]	-	-	A	A	A
F-1	1-TE-303X	SDC HX 11 Outlet[a]	-	-	A	A	A
J-1	1-TI-303X	SDC HX 11 Outlet[a]	-	-	A	A	A
F-1	1-TE-303Y	SDC HX 12 Outlet[a]	-	-	A	A	A
J-1	1-TI-303Y	SDC HX 12 Outlet[a]	-	-	A	A	A
F-2	1-CV-657	SDC HX Flow[a]	-	-	A	A	A
F-2	1-I/P-657	SDC HX Flow[a]	-	-	A	A	A
J-1	1-HIC-3657	SDC HX Flow[a]	-	-	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	AFW[b]	SHUTDOWN COOLING[b]	CVCS	SAMPLING	AUXILIARY STEAM
F-2	1-CV-306	LPSI Flow[a]	-	-	A	A	A
F-2	1-I/P-306	LPSI Flow[a]	-	-	A	A	A
J-1	1-FIC-306	LPSI Flow[a]	-	-	A	A	A
F-4	1-FY-306	LPSI Flow[a]	-	-	A	A	A
F-2	1-FT-306	LPSI Flow[a]	-	-	A	A	A
F-1	1-PT-307	LPSI Header Pressure[a]	-	-	A	A	A
J-1	1-PI-307	LPSI Header Pressure[a]	-	-	A	A	A
F-2	1-TE-351X	LPSI Header Temperature[a]	-	-	A	A	A
F-2	1-TT-351X	LPSI Header Temperature[a]	-	-	A	A	A
F-2	1-FT-312	LPSI Flow to Loop 11A[a]	-	-	A	A	A
J-1	1-FI-312	LPSI Flow to Loop 11A[a]	-	-	A	A	A
F-2	1-FT-322	LPSI Flow to Loop 11B[a]	-	-	A	A	A
J-1	1-FI-322	LPSI Flow to Loop 11B[a]	-	-	A	A	A
H-1	1-FT-332	LPSI Flow to Loop 12A[a]	-	-	C	C	A
J-1	1-FI-332	LPSI Flow to Loop 12A[a]	-	-	A	A	A
H-1	1-FT-342	LPSI Flow to Loop 12B[a]	-	-	C	C	A
J-1	1-FI-342	LPSI Flow to Loop 12B[a]	-	-	A	A	A
H-1	1-MOV-615	LPSI Flow to Loop 11A	-	-	A	B	A
H-1	1-MOV-625	LPSI Flow to Loop 11B	-	-	A	B	A
H-2	1-MOV-635	LPSI Flow to Loop 12A	-	-	B	B	A
H-2	1-MOV-645	LPSI Flow to Loop 12B	-	-	B	B	A
H-1	1-MOV-651	SDC Return Header[a]	-	-	A	B	A
H-1	1-MOV-652	SDC Return Header[a]	-	-	A	A	A
F-1	1-PT-301X	HPSI Pump 11 Discharge	-	-	A	A	A
J-1	1-PI-301X	HPSI Pump 11 Discharge	-	-	A	A	A
F-1	1-PT-301Y	HPSI Pump 12 Discharge	-	-	A	A	A
J-1	1-PI-301Y	HPSI Pump 12 Discharge	-	-	A	A	A
F-1	1-PT-301Z	HPSI Pump 13 Discharge	-	-	A	A	A
J-1	1-PI-301Z	HPSI Pump 13 Discharge	-	-	A	A	A
F-1	1-MOV-654	HPSI Header	-	-	A	A	A
H-1	1-MOV-616	HPSI Flow to Loop 11A	-	-	A	C	A
H-1	1-MOV-626	HPSI Flow to Loop 11B	-	-	A	C	A
H-2	1-MOV-636	HPSI Flow to Loop 12A	-	-	C	C	A
H-2	1-MOV-646	HPSI Flow to Loop 12B	-	-	C	C	A
F-2	1-FT-311	HPSI Flow to Loop 11A	-	-	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	AFW[(b)]	SHUTDOWN COOLING[(b)]	CVCS	SAMPLING	AUXILIARY STEAM
J-1	1-FI-311	HPSI Flow to Loop 11A	-	-	A	A	A
F-2	1-FT-321	HPSI Flow to Loop 11B	-	-	A	A	A
J-1	1-FI-321	HPSI Flow to Loop 11B	-	-	A	A	A
H-1	1-FT-331	HPSI Flow to Loop 12A	-	-	C	C	A
J-1	1-FI-331	HPSI Flow to Loop 12A	-	-	A	A	A
H-1	1-FT-341	HPSI Flow to Loop 12B	-	-	C	C	A
J-1	1-FI-341	HPSI Flow to Loop 12B	-	-	A	A	A
L-1	1-LT-110X	Pressurizer Level	-	-	A	A	A
J-1	1-LIC-110X	Pressurizer Level	-	-	A	A	A
L-1	1-LT-110Y	Pressurizer Level	-	-	A	A	A
J-1	1-LIC-110Y	Pressurizer Level	-	-	A	A	A
L-1	1-PT-102A-D	Pressurizer Pressure	-	-	A	A	A
J-1	1-PI-102A-D	Pressurizer Pressure	-	-	A	A	A
L-1	1-TT-112HA-HD	Reactor Loop 11A-B Temperature	-	-	A	A	A
L-1	1-TT-122HA-HD	Reactor Loop 12A-B Temperature	-	-	A	A	A
L-1	1-LT-1111	SG 11 Downcomer Level	-	-	A	A	A
J-1	1-LR-1111	SG 11 Downcomer Level	-	-	A	A	A
L-1	1-LT-1121	SG 12 Downcomer Level	-	-	A	A	A
J-1	1-LR-1121	SG 12 Downcomer Level	-	-	A	A	A
L-1	1-PT-1013A-D	SG 11 Pressure	-	-	A	A	A
J-1	1-PI-1013A-D	SG 11 Pressure	-	-	A	A	A
L-1	1-PT-1023A-D	SG 12 Pressure	-	-	A	A	A
J-1	1-PI-1023A-D	SG 12 Pressure	-	-	A	A	A
H-1	1-MOV-617	Auxiliary HPSI Flow to Loop 11A	-	-	A	C	A
H-1	1-MOV-627	Auxiliary HPSI Flow to Loop 11B	-	-	A	C	A
H-1	1-MOV-637	Auxiliary HPSI Flow to Loop 12A	-	-	C	C	A
H-1	1-MOV-647	Auxiliary HPSI Flow to Loop 12B	-	-	C	C	A
F-4	1-CV-4043	MS Isolation	-	-	A	A	A
F-4	1-CV-4048	MS Isolation	-	-	A	A	A
E-1	1-PT-4507	AFW Discharge Header - Steam Train	-	-	A	A	A
F-2	1-PT-4548	AFW Discharge Header - Motor Train	-	-	A	A	A
J-1	1-PI-4507	AFW Discharge Header - Steam Train	-	-	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	AFW[(b)]	SHUTDOWN COOLING[(b)]	CVCS	SAMPLING	AUXILIARY STEAM
J-1	1-PI-4548	AFW Discharge Header - Steam Train	-	-	A	A	A
H-0	1-FT-4509B	AFW Flow to SG 11 - Steam Train	-	-	A	B	A
H-0	1-FT-4510B	AFW Flow to SG 12 - Steam Train	-	-	A	B	A
F-2	1-FT-4524A	AFW Flow to SG 11 - Motor Train	-	-	A	A	A
F-2	1-FT-4534A	AFW Flow to SG 12 - Motor Train	-	-	A	A	A
J-1	1-FIC-4511A	AFW Flow to SG 11 - Steam Train	-	-	A	A	A
J-1	1-FIC-4512A	AFW Flow to SG 12 - Steam Train	-	-	A	A	A
J-1	1-FIC-4525A	AFW Flow to SG 11 - Motor Train	-	-	A	A	A
J-1	1-FIC-4535A	AFW Flow to SG 12 - Motor Train	-	-	A	A	A
H-1	1-I/P-4511A	AFW Flow to SG 11 - Steam Train	-	-	A	B	A
H-1	1-I/P-4512A	AFW Flow to SG 12 - Steam Train	-	-	A	B	A
F-3	1-I/P-4525A	AFW Flow to SG 11 - Motor Train	-	-	A	A	A
F-3	1-I/P-4535A	AFW Flow to SG 12 - Motor Train	-	-	A	A	A
H-1	1-CV-4511	AFW Flow to SG 11 - Steam Train	-	-	A	B	A
H-1	1-CV-4512	AFW Flow to SG 12 - Steam Train	-	-	A	B	A
F-3	1-CV-4525	AFW Flow to SG 11 - Motor Train	-	-	A	A	A
F-3	1-CV-4535	AFW Flow to SG 12 - Motor Train	-	-	A	A	A
F-5	1-I/E-4509B5	AFW Flow to SG 11 - Steam Train	-	-	A	A	A
F-5	1-FY-4509B	AFW Flow to SG 11 - Steam Train	-	-	A	A	A
F-5	1-E/I-4509B3	AFW Flow to SG 11 - Steam Train	-	-	A	A	A
F-4	1-I/E-4524A5	AFW Flow to SG 11 - Motor Train	-	-	A	A	A
F-4	1-FY-4524A	AFW Flow to SG 11 - Motor Train	-	-	A	A	A
F-4	1-E/I-4524A3	AFW Flow to SG 11 - Motor Train	-	-	A	A	A
F-4	1-I/E-4534A5	AFW Flow to SG 12 - Steam Train	-	-	A	A	A
F-4	1-FY-4534A	AFW Flow to SG 12 - Steam Train	-	-	A	A	A
F-4	1-E/I-4534A3	AFW Flow to SG 12 - Steam Train	-	-	A	A	A
F-5	1-I/E-4510B5	AFW Flow to SG 12 - Motor Train	-	-	A	A	A
F-5	1-FY-4510B	AFW Flow to SG 12 - Motor Train	-	-	A	A	A
F-5	1-E/I-4510B3	AFW Flow to SG 12 - Motor Train	-	-	A	A	A
H-1	1-CV-4521	Isolation AFW Flow to SG 11- Steam Train	-	-	A	B	A
H-1	1-CV-4520	Isolation AFW Flow to SG 11- Steam Train	-	-	A	B	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	AFW[(b)]	SHUTDOWN COOLING[(b)]	CVCS	SAMPLING	AUXILIARY STEAM
F-2	1-CV-4522	Isolation AFW Flow to SG 11-Motor Train	-	-	A	A	A
F-3	1-CV-4523	Isolation AFW Flow to SG 11-Motor Train	-	-	A	A	A
H-1	1-CV-4530	Isolation AFW Flow to SG 12-Steam Train	-	-	A	B	A
H-1	1-CV-4531	Isolation AFW Flow to SG 12-Steam Train	-	-	A	B	A
F-2	1-CV-4532	Isolation AFW Flow to SG 12-Motor Train	-	-	A	A	A
F-3	1-CV-4533	Isolation AFW Flow to SG 12-Motor Train	-	-	A	A	A
H-1	1-SV-4520	Isolation AFW Flow to SG 11-Steam Train	-	-	A	B	A
H-1	1-SV-4521	Isolation AFW Flow to SG 11-Steam Train	-	-	A	B	A
F-2	1-SV-4522	Isolation AFW Flow to SG 11-Motor Train	-	-	A	A	A
F-3	1-SV-4523	Isolation AFW Flow to SG 11-Motor Train	-	-	A	A	A
H-1	1-SV-4530	Isolation AFW Flow to SG 12-Steam Train	-	-	A	B	A
H-1	1-SV-4531	Isolation AFW Flow to SG 12-Steam Train	-	-	A	B	A
F-2	1-SV-4532	Isolation AFW Flow to SG 12-Motor Train	-	-	A	A	A
F-3	1-SV-4533	Isolation AFW Flow to SG 12-Motor Train	-	-	A	A	A
F-4	1-CV-4070	MS Header 11 to AFW Turbines	-	-	A	A	A
F-4	1-CV-4071	MS Header 12 to AFW Turbines	-	-	A	A	A
H-1	1-SV-4070	MS Header 11 to AFW Turbines	-	-	A	B	A
H-1	1-SV-4070A	MS Header 11 to AFW Turbines	-	-	A	B	A
H-1	1-SV-4071	MS Header 12 to AFW Turbines		-	A	B	A
H-1	1-SV-4071A	MS Header 12 to AFW Turbines	-	-	A	B	A
F-4	1-CV-4070A	MS Header 11 to AFW Turbines	-	-	A	A	A

TABLE 10A-5

INSTRUMENTATION REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

LOCATION	INSTRUMENT/ VALVE NO.	SERVICE	AFW[(b)]	SHUTDOWN COOLING[(b)]	CVCS	SAMPLING	AUXILIARY STEAM
F-4	1-CV-4071A	MS Header 12 to AFW Turbines	-	-	A	A	A
F-2	1-PCV-4510	AFW Air Accumulator 11A	-	-	A	A	A
F-2	1-PCV-4520	AFW Air Accumulator #11B	-	-	A	A	A
L-1	1-LT-1114A-D	SG Wide Range Level	-	-	A	A	A
L-1	1-LT-1124A-D	SG Wide Range Level	-	-	A	A	A

LEGEND:

A. Located outside those areas which experience a steam environment or jet impingement.
B. Qualified to be operated in a steam environment or not adversely affected by jet impingement.
C. Not required for a break in this system.
E-1 Turbine Building EL 12'0
E-2 Turbine Building EL 27'0
E-3 Turbine Building EL 45'0
F-1 Auxiliary Building EL (-)15'0 & (-)10'0
F-2 Auxiliary Building EL 3'0
F-3 Auxiliary Building EL 14'9
F-4 Auxiliary Building EL 27'0
F-5 Auxiliary Building EL 45'0
F-6 Auxiliary Building EL 69'0
G-1 Intake Structure EL 3'0
H-1 Penetration Room EL 27'0
H-2 Penetration Room EL 45'0
J-1 Control Room
L-1 Containment
H-0 Penetration Room EL 5'0"
K-0 Diesel Generator Building No. 1A

(a) These items are not required to function immediately, but will be used during subsequent operation to achieve a cold shutdown condition.

(b) Break not credible in this system.

(c) Handswitches for instrumentation and associated equipment are not located in the Control Room or in areas that are not subject to a steam environment.

(d) There are no environmental considerations which requires analysis: refer to respective high energy analysis discussion.

TABLE 10A-6

MECHANICAL AND ELECTRICAL EQUIPMENT REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

HIGH ENERGY SYSTEMS

LOCATION	MECHANICAL	MS	MS TO AFWP TURBINES	STEAM GENERATOR BLOWDOWN	MAIN FEEDWATER
F-1	HPSI Pumps	A	A	C	C
E-1	AFWPs (steam-driven)	A	A	A	A
F-5	EDG & Auxiliaries	A	A	A	A
F-2	SRW Pumps	A	A	A	A
F-3	SRW HX	A	A	A	A
F-3	Saltwater Strainers	A	A	A	A
G-1	Saltwater Pumps	A	A	A	A
F-6	Control Room Heating, Ventilation & Air Conditioning	A	A	A	A
F-1	LPSI Pumps[(a)]	A	A	A	A
F-1	SDC HX[(a)]	A	A	A	A
F-2	CC Pumps[(a)]	A	A	A	A
F-2	CC HX[(a)]	A	A	A	A
F-2	Boric Acid Storage Tanks[(a)]	A	A	A	A
F-2	Boric Acid Pumps[(a)]	A	A	A	A
F-1	Charging Pumps	A	A	A	A
F-4	Spent Fuel Pool Cooling Pumps	A	A	A	A
F-4	Spent Fuel Pool Cooling HX[(a)]	A	A	A	A
F-2	Penetration Room Ventilation[(a)]	C	C	A	C
F-4	Reactor Trip Breakers	A	A	A	A
F-4	Batteries	A	A	A	A
F-4	480 Volt Bus &	A	A	A	A
	4160 Volt Bus	A	A	A	A
F-5	Switchgear Room	A	A	A	A
F-4	Cable Spreading Room	A	A	A	A
F-5	Control Room	A	A	A	A
F-5 & F-6	Motor Control Center for above equipment	A	A	A	A
F-4	Actuators for MSIVs	B	B	A	B
F-2	AFWP (motor-driven)	A	A	A	A

TABLE 10A-6

MECHANICAL AND ELECTRICAL EQUIPMENT REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

HIGH ENERGY SYSTEMS

LOCATION	MECHANICAL	AFW[b]	SHUTDOWN COOLING[b]	CVCS	SAMPLING	MAIN FEEDWATER
F-1	HPSI Pumps	-	-	A	C	C
E-1	AFWPs (steam-driven)	-	-	A	A	A
F-5	EDG & Auxiliaries	-	-	A	A	A
F-2	SRW Pumps	-	-	A	A	A
F-3	SRW HX	-	-	A	A	A
F-3	Saltwater Strainers	-	-	A	A	A
G-1	Saltwater Pumps	-	-	A	A	A
F-6	Control Room Heating, Ventilation & Air Conditioning	-	-	A	A	A
F-1	LPSI Pumps[a]	-	-	A	A	A
F-1	SDC HX[a]	-	-	A	A	A
F-2	CC Pumps[a]	-	-	A	A	A
F-2	CC HX[a]	-	-	A	A	A
F-2	Boric Acid Storage Tanks[a]	-	-	A	A	A
F-2	Boric Acid Pumps[a]	-	-	A	A	A
F-1	Charging Pumps	-	-	A	A	A
F-4	Spent Fuel Pool Cooling Pumps	-	-	A	A	A
F-4	Spent Fuel Pool Cooling HX[a]	-	-	A	A	A
F-2	Penetration Room Ventilation[a]	-	-	C	A	C
F-4	Reactor Trip Breakers	-	-	A	A	A
F-4	Batteries	-	-	A	A	A
F-4	480 Volt Bus &	-	-	A	A	A
	4160 Volt Bus	-	-	A	A	A
F-5	Switchgear Room	-	-	A	A	A
F-4	Cable Spreading Room	-	-	A	A	A
F-5	Control Room	-	-	A	A	A
F-5 & F-6	Motor Control Center for above equipment	-	-	A	A	A
F-4	Actuators for MSIVs	-	-	A	A	A
F-2	AFWP (motor-driven)	-	-	A	A	A

TABLE 10A-6

MECHANICAL AND ELECTRICAL EQUIPMENT REQUIRED TO PLACE THE PLANT IN A SAFE SHUTDOWN CONDITION AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION

HIGH ENERGY SYSTEMS

LEGEND:

A. Located outside those areas which experience a steam environment.
B. Qualified to be operated in a steam environment.
C. Not required for a break in this system.
E-1 Turbine Building, EL 12'0"
E-2 Turbine Building, EL 27'0"
E-3 Turbine Building, EL 45'0"
F-1 Auxiliary Building, EL (-)15'0" & (-)10'0"
F-2 Auxiliary Building, EL 3'0"
F-3 Auxiliary Building, EL 14'9"
F-4 Auxiliary Building, EL 27'0"
F-5 Auxiliary Building, EL 45'0"
F-6 Auxiliary Building, EL 69'0"
G-1 Intake Structure, EL 3'0"

(a) These items are not required to function immediately, but will be used during subsequent operation to achieve a cold shutdown condition.

(b) Break not credible in this system.