

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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>MS</u> | <u>MS TO AFWP TURBINES</u> | <u>STEAM GENERATOR</u> | <u>MAIN FEEDWATER</u> |
|-----------------|----------------------------------|--|-----------|------------------------------------|----------------------------|---------------------------|
| 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 |

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|-----------------|----------------------------------|---|-----------|------------------------------------|----------------------------|---------------------------|
| 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 |

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|-----------------|----------------------------------|---|-----------|------------------------------------|----------------------------|---------------------------|
| 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 |

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|-----------------|----------------------------------|--|-----------|------------------------------------|----------------------------|---------------------------|
| 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 |

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|-----------------|----------------------------------|--|-----------|------------------------------------|----------------------------|---------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>MS</u> | <u>MS TO AFWP TURBINES</u> | <u>STEAM GENERATOR</u> | <u>MAIN FEEDWATER</u> |
|-----------------|----------------------------------|---|-----------|------------------------------------|----------------------------|---------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>MS</u> | <u>MS TO AFWP TURBINES</u> | <u>STEAM GENERATOR</u> | <u>MAIN FEEDWATER</u> |
|-----------------|----------------------------------|---|-----------|------------------------------------|----------------------------|---------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>AUXILIARY STEAM</u> |
|-----------------|----------------------------------|-----------------------------|--------------------------|---|-------------|-----------------|----------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>AUXILIARY STEAM</u> |
|-----------------|----------------------------------|--|--------------------------|---|-------------|-----------------|----------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>AUXILIARY STEAM</u> |
|-----------------|----------------------------------|---|--------------------------|---|-------------|-----------------|----------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>AUXILIARY STEAM</u> |
|-----------------|----------------------------------|--|--------------------------|---|-------------|-----------------|----------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>AUXILIARY STEAM</u> |
|-----------------|----------------------------------|---------------------------------------|--------------------------|---|-------------|-----------------|----------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>AUXILIARY STEAM</u> |
|-----------------|----------------------------------|---|--------------------------|---|-------------|-----------------|----------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>AUXILIARY STEAM</u> |
|-----------------|----------------------------------|---|--------------------------|---|-------------|-----------------|----------------------------|
| 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

| <u>LOCATION</u> | <u>INSTRUMENT/ VALVE NO.</u> | <u>SERVICE</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>AUXILIARY STEAM</u> |
|-----------------|----------------------------------|------------------------------|--------------------------|---|-------------|-----------------|----------------------------|
| 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

| <u>LOCATION</u> | <u>MECHANICAL</u> | <u>MS</u> | <u>MS TO AFWP TURBINES</u> | <u>STEAM GENERATOR BLOWDOWN</u> | <u>MAIN FEEDWATER</u> |
|-----------------|--|-----------|------------------------------------|---|---------------------------|
| 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 & 4160 Volt Bus | A A | A A | 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

| <u>LOCATION</u> | <u>MECHANICAL</u> | <u>AFW^(b)</u> | <u>SHUTDOWN COOLING^(b)</u> | <u>CVCS</u> | <u>SAMPLING</u> | <u>MAIN FEEDWATER</u> |
|------------------------|---|---------------------------------|--|--------------------|------------------------|----------------------------------|
| 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 & 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.
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- C. Not required for a break in this system.
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- 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.