**Table 14.12-1**
**DBA Containment Response Key Analysis Input Values**
**(Page 1 of 2)**

| Parameter | Unit | Value |
|---|---|---|
| **Reactor** | | |
| Initial Power Level (102% RTP) | MWt | 4,031 |
| Normal Feedwater Temperature at 102% of 3952 MWt | °F | 394.5 |
| Reduced Feedwater Temperature at 102% of 3952 MWt | °F | 339.8 |
| RPV Dome Pressure | psia | 1,055 |
| Decay Heat Model- Short Term DBA LOCA | | ANS 5 1971+20% |
| Decay Heat Model-Long Term | | 1979 ANS 5.1+2σ |
| RPV Free Volume | $ft^3$ | 20,682 |
| RPV Liquid Volume - subcooled | $ft^3$ | 11,790 |
| RPV Liquid Volume - saturated | $ft^3$ | 3,864 |
| **RPV Related Masses for Long Term Calculation** | | |
| Liquid mass in recirculation loops | lbm | 63,560 |
| Liquid mass in the HPCI piping between the RPV nozzle and first normally closed valve | lbm | 8,621 |
| Liquid mass in the RCIC piping between the RPV nozzle and first normally closed valve | lbm | 1,245 |
| Liquid mass in the RHR piping between the RPV and the first normally closed valve | lbm | 9,535 |
| Liquid mass in the core spray piping between the RPV nozzle and the first normal closed valve. | lbm | 2,622 |
| MSIV closure initiation | second | 0.5 |
| MSIV full closure | second | 3.5 |
| **Drywell Vent System** | | |
| Drywell free volume (including vent system) | $ft^3$ | 159,000 to 171,000 (Note 1) |
| Initial drywell pressure | psia | 15.1 to 17.0 |
| Initial drywell Temperature<br>(D=design, B=bounding, R=reference) | °F | 70 (D)<br>130 (B)<br>150 (R) |
| Initial drywell relative humidity (range) | % | 20 to 100 |
| Downcomer submergence- Low water level | ft | 2.92 |

**Table 14.12-1**
**DBA Containment Response Key Analysis Input Values**
**(Page 2 of 2)**

| Parameter | Unit | Value |
|---|---|---|
| Downcomer submergence- High water level | ft | 3.83 |
| Loss coefficient for vent system including entrance and exit losses | real | 5.32 |
| Downcomer internal diameter | ft | 1.958 |
| **Wetwell/Suppression Pool** | | |
| Initial Suppression pool volume including water in vents - low water level | $ft^3$ | 122,940 |
| Initial Suppression pool volume including water in vents - high water level | $ft^3$ | 131,400 |
| Initial pool temperature - maximum | °F | 95 |
| Wetwell air volume excluding volume occupied by the vent system - Low water level | $ft^3$ | 135,000 (Note 2) |
| Wetwell air volume excluding volume occupied by the vent system - High water level | $ft^3$ | 119,400 |
| Initial wetwell/containment air space pressure (range) | psia | 14.4 to 15.9 |
| Initial wetwell/containment airspace temperature (maximum) | °F | 95 |
| Initial wetwell/containment air space relative humidity | % | 100 |
| **RHR** | | |
| K value (single HX) | BTU/sec°F | 265 |
| RHR service water temperature | °F | 95 |
| Drywell spray flow rate (2 RHR pumps) | gpm | 12,350 |
| Wetwell spray flow rate (2 RHR pump) | gpm | 650 |
| RHR flow rate in SPC mode (2 RHR pumps) | gpm | 13,000 |
| **Wetwell to Drywell Vacuum Breakers** | | |
| Pressure difference between wetwell and drywell for vacuum breakers to be fully open | psid | 0.5 (Note 3) |
| Number of vacuum breaker assemblies | | 6 |
| Flow area of each vacuum breaker assembly at which loss coefficient is given below | $ft^2$ | 1.41 |
| Loss coefficient or each vacuum breaker assembly | Real | 0.45 |

Notes:
(1) Vent thrust loads and LOCA analyses to minimize the containment pressure are calculated assuming a minimum DW volume of 159,000 $ft^3$.
(2) This value is used for containment long-term analyses.
(3) For LOCA analyses that minimize the containment pressure response, the pressure difference between the wetwell and drywell for the vacuum breakers to be fully open of 0.05 psid is conservatively used.

**Table 14.12-2**
**Non-Accident Unit Containment Response Key Analysis Input Values**
**(Page 1 of 2)**

| Parameter | Unit | Value |
|---|---|---|
| **Reactor** | | |
| Initial power level 102% RTP | MWt | 4,031 |
| Initial FW temperature at 102% RTP (102% of 3,951MWt) | °F | 396.6 |
| Initial vessel dome pressure at 102% RTP | psia | 1,055 |
| Decay heat model | N/A | 1979 ANS 5.1 + 2$\sigma$ |
| Vessel volumes | | |
| Total vessel free volume | $ft^3$ | 20,682 |
| Vessel liquid volume - subcooled | $ft^3$ | 7,926 |
| Vessel liquid volume - saturated | $ft^3$ | 3,864 |
| Vessel related masses | | |
| Liquid mass in main steam lines to the inboard isolation valve | lbm | 0 |
| Liquid mass in one recirculation loop | lbm | 31,780 |
| Liquid mass in the HPCI piping between the RPV nozzle and first normally closed valve | lbm | 8,621 |
| Liquid mass in RHR/LPCI shutdown piping between the RPV nozzle and first normally closed valve | lbm | 9,535 |
| Liquid mass in the RCIC piping between the RPV nozzle and first normally closed valve | lbm | 1,245 |
| Liquid mass in the CS piping between the RPV nozzle and the first normal closed valve | lbm | 2,622 |
| MSIV Closure | | |
| Time at which MSIVs start to close | sec | 0.5 |
| Time at which MSIVs become fully closed | sec | 3.5 |
| **Drywell** | | |
| Total drywell airspace volume | $ft^3$ | 171,000 |
| Initial drywell pressure | psia | 15.5 |
| Initial drywell temperature | °F | 150 |
| Initial drywell relative humidity | % | 20 |
| **Wetwell/Suppression Pool** | | |
| Initial suppression pool volume low water level (LWL) | $ft^3$ | 122,940 |
| Initial suppression pool temperature | °F | 95 |
| Initial wetwell airspace free volume - LWL in suppression pool | $ft^3$ | 135,000 |
| Initial wetwell airspace pressure | psia | 14.4 |
| Initial wetwell airspace temperature | °F | 95 |
| Initial wetwell airspace relative humidity | % | 100 |

**Table 14.12-2**
**Non-Accident Unit Containment Response Key Analysis Input Values**
**(Page 2 of 2)**

| Parameter | Unit | *Value* |
|---|---|---|
| **RHR** | | |
| Heat exchanger K-value | BTU/sec-°F | 302 |
| Service water temperature | °F | 95 |
| RHR flow rate in suppression pool cooling mode | gpm | 9,700 |
| RHR flow rate in SDC mode | gpm | 9,700 |
| Number of RHR loops for cooling (one RHR loop is one RHR pump and one RHR heat exchanger) | N/A | 1 |
| **RHR Service Water** | | |
| RHRSW flowrate through one RHR heat exchanger | gpm | 4,500 |
| **Condensate Storage Tank** | | |
| Condensate storage tank volume available for RPV inventory makeup | gallon | 135,000 |
| Condensate storage tank temperature | °F | 130 |
| **Drywell Air Cooler** | | |
| Heat removal capability of each drywell air cooler | BTU/hour | 636,000 |

**Table 14.12-3**
**Station Blackout Containment Response Key Analysis Input Values**

| Parameter | Value |
|---|---|
| Initial Reactor Power | 3,952 MWt |
| Initial Reactor Pressure | 1,055 psia |
| Decay Heat | ANS/ANSI 5.1 1979 standard consistent with recommendations of GEH SIL 636 |
| Initial Suppression Pool Temperature | 95°F |
| Initial Suppression Pool Volume (LWL) | 122,940 $ft^3$ |
| Initial Wetwell Pressure | 14.4 psia |
| Initial Drywell Temperature | 150°F |
| Initial Drywell Pressure | 15.5 psia |
| Initial Drywell free airspace volume | 171,000 $ft^3$ |
| Initial Wetwell free airspace volume | 135,000 $ft^3$ |
| Initial WW airspace temperature | 95°F |
| CST Water Temperature | 130°F |
| CST Inventory | 135,000 gallons available |
| Initial Drywell Relative Humidity | 20% |
| Initial Wetwell Relative Humidity | 100% |
| RHR Heat exchanger K factor (per heat exchanger) | 265 BTU/Sec-°F |
| RHR pump flow rate (per pump) | 6,500 gpm |
| RHR service water flow rate to RHR heat exchangers | 4,000 gpm |
| RHR service water temperature | 95°F |
| Leakage rate from primary containment | 2% of containment air mass per day |
| Containment heat sinks modeled | Yes |

**Table 14.12-4**
**Fire Event Containment Response Key Analysis Input Values**

| Input Parameters | Values |
|---|---|
| Reactor Thermal Power | 3,952 MWt |
| RPV Dome Pressure | 1,055 psia |
| Decay Heat | ANS 5.1-1979 without 2σ uncertainty adder and with GEH SIL 636 recommendations |
| Initial Suppression Pool Liquid Volume | 122,940 $ft^3$ (Note 1) |
| Initial Suppression Pool and Wetwell Airspace Temperature | 92 °F (Note 2) |
| Initial Wetwell Pressure | 14.4 psia |
| Initial Drywell Pressure | 15.5 psia |
| Initial Drywell Temperature | 150 °F |
| Initial Wetwell Relative Humidity | 100% |
| Initial Drywell Relative Humidity | 20% |
| Drywell and Wetwell and Pool Heat Sinks Modeled | Yes |
| Drywell Heat Load Modeled | Yes |
| RHR Service Water Temperature | 88 °F (Note 2) |
| RHR Heat Exchanger "K" Factor per Loop | 290 Btu/sec-°F (Note 3) |
| Number of RHR Loops Available | 1 |
| Number of RHR Pump in one RHR Loop | 1 |
| ASDC RHR Flow Rate | 7,500 gpm |
| Condensate available for injection | 90,000 gallons |

Notes

(1) Suppression Pool Volume corresponding to Browns Ferry Technical Specification low suppression pool water level with differential pressure control in service.

(2) Nominal values based on Browns Ferry plant data over seven year period from January 2008 through December 2014. Data analysis for this parameter shows that Browns Ferry operates at least 95% of time below this value.

(3) RHR heat exchanger "K" factor based on RHR flow of 7,500 gpm, RHRSW flow of 4,500 gpm, RHRSW temperature of 88°F and conservative RHR heat exchanger fouling resistance.

**Table 14.12-5**
**ATWS Event Containment Response Key Analysis Input Values**
**(Page 1 of 2)**

| Input Variable | Value |
|---|---|
| Reactor power (MWt) | 3,952 |
| Analyzed Power (MWt) | 3,952 |
| Analyzed Core Flow (Mlbm/hr / % Rated) | 101.475 / 99 |
| Reactor dome pressure (psig) | 1,035 |
| MSIV Closure Time (seconds) | 4.0 |
| High pressure ATWS-RPT setpoint (psig) | 1,177.0 |
| MSL low pressure isolation setpoint (psig) | 825 |
| RCIC flow rate (gpm) | 600 |
| HPCI flow rate (gpm) | 5,000 |
| Number of MSRVs / MSRVs Out-of-service (OOS) | 13 / 1 |
| Number of MSRVs Out-of-service (OOS) | 1 |
| Each MSRV capacity at 1090 psig (Mlbm/hr) | 0.87 |
| MSRV Analytical Opening Setpoints (psig) | 1,174 to 1,194<br>Note 1 |
| SLCS Injection Location | Lower Plenum |
| SLCS Injection Rate (gpm) | 50.0 |
| Number of SLCS pumps credited for injection | 1 |
| Boron-10 Enrichment (Atom %) | 94.0 |
| Sodium Pentaborate Concentration (% by Weight) | 8.7 |
| SLCS Liquid Transport Time (seconds) | 28.5 |
| Initial Suppression Pool Liquid Volume ($ft^3$) | 122,940<br>Note 7 |
| Initial Suppression Pool Temperature (°F) | 95 |
| RHR Heat Exchanger Effectiveness Per Loop (BTU/sec-°F) | 259 / 277<br>Note 2 |
| Number of RHR Suppression Pool Cooling Loops (all events except Loss of Offsite Power Event) | 4<br>Note 3 |
| Number of RHR Suppression Pool Cooling Loops During a Loss of Offsite Power Event | 2<br>Note 4 |

**Table 14.12-5**
**ATWS Event Containment Response Key Analysis Input Values**
**(Page 2 of 2)**

| Input Variable | Value |
|---|---|
| RHR startup delay (seconds after T = 0) | 660<br>Note 5 |
| RHR Service Water Temperature (°F) | 95 |
| Decay Heat Correlation | May-Witt<br>Note 6 |

**Notes:**

(1) In the ODYN analysis methodology, the MSRV setpoints for the ATWS analysis are statistically spread around the upper analytical limit.

(2) The heat exchanger effectiveness of 259 BTU/sec-°F assumes a RHR flow rate of 6500 gpm and RHR SW flow rate of 3800 gpm through each in-service RHR heat exchanger for events that assume operation of 4 RHR loops (see Note 3 below).
The EPU heat exchanger effectiveness of 277 BTU/sec-°F assumes a RHR flow rate of 6500 gpm and RHR SW flow rate of 4500 gpm through each in-service RHR heat exchanger for the event that assumes operation of 2 RHR loops (see Note 4 below).

(3) An RHR loop is defined as one RHR pump, one RHR heat exchanger and RHR SW flow of 3800 gpm through the RHR heat exchanger. For ATWS events other than LOOP, the plant operators would be directed by BFN Emergency Operating Instructions to maximize suppression pool cooling. Since there is no concurrent event on the non-ATWS unit, four RHR loops are assumed available for suppression pool cooling in the ATWS unit.

(4) An RHR loop is defined as one RHR pump, one RHR heat exchanger and RHR SW flow of 4500 gpm through the RHR heat exchanger. For the LOOP ATWS event, operators will be directed by BFN Emergency Operating Instructions to maximize suppression cooling. Since there is also a LOOP (without ATWS) on the remaining two Browns Ferry Units, only two RHR loops are assumed available for suppression pool cooling on the ATWS unit.

(5) The RHR startup delay time assumes no operator action for containment cooling for the first 10-minutes of the event with an additional 60 seconds for RHR to reach full effectiveness.

(6) The May-Witt decay heat correlation is used in the suppression pool temperature calculation following reactor shutdown. The May-Witt decay heat correlation yields a conservative pool heat-up compared to the 1979 ANS 5.1 + 2$\sigma$ curve.

(7) The value of 122, 940 $ft^3$ for the initial Suppression Pool Liquid Volume does not include the volumes of the ECCS ring header and the RHR piping for each running RHR pump. These two volumes were included in the assumptions for the ATWS containment analysis and result in a total suppression pool liquid volume of 127,000 $ft^3$.

**Table 14.12-6**
**Containment Response Results**

| Parameter | ST DBA LOCA | LT DBA LOCA | LT SSLB[2] | Non-Accident Unit | SBO [3] | Fire Event | ATWS |
|---|---|---|---|---|---|---|---|
| Peak Drywell Pressure (psig) | 50.9 (D)<br>49.1 (B)<br>48.5 (R) | 22.5 | 49.6 psia | N/A | 43.4 psia | 24.2 psia | 8.9 |
| Peak Drywell Airspace Temperature (°F) | 297.5 (D)<br>295.8 (B)<br>295.2 (R) | 287 | 336.9 | N/A | 275.2 | 276.3 | N/A |
| Peak Bulk Suppression Pool Temperature (°F) | 152.8[1] | 179.0 | 182.7 | 185.1 | 203.7 | 207.7 | 174.5 |
| Peak Torus (Wetwell) Pressure (psia) | N/A | 30.2 | 48.0 | N/A | N/A | 24.6 | N/A |
| Peak Torus (Wetwell) Air Temperature (°F) | N/A | 174 | NA | N/A | N/A | 209.0 | N/A |

N/A denotes a noncritical parameter for this analysis.

**Notes:**

(1) Peak Suppression Pool Temperature for RSLB DBA-LOCA at 10 minutes after LOCA initiation. For the RDLB LOCA, the peak suppression pool temperature at 10 minutes after LOCA initiation is 152.0°F.

(2) Peak values from spectrum of SSLB analyses.

(3) Peak values from 0 gpm and 61 gpm reactor coolant system leakage cases