

MFN 05-142  
Enclosure 1

## **ENCLOSURE 1**

**MFN 05-142**

**ESBWR MAAP Run Characteristics**

## MAAP Runs Described in Chapter 8

| Case            | CDF % | Description  | Representative Initiator | SCRAM | Feedwater  | IC       |
|-----------------|-------|--|--------------------------|-------|--|----------|
| T_DP_nIN        | 89.4  | Transient, Depressurization Successful, No Injection                               | Loss of Feedwater        | Yes   | Unavailable  | Disabled |
| T_DP_nIN_nD     | < 0.1 | Transient, Depressurization Successful, No Injection, No Deluge                    | Loss of Feedwater        | Yes   | Unavailable  | Disabled |
| T_AT_SL_IRV_nIN | < 0.1 | ATWS following Transient, SLC Successful, No Injection, Stuck SRV                  | Loss of Preferred Power  | No    | Runback on ATWS<br>Discovery<br>Unavailable After MSIV Closure | Disabled |
| ML_DP_nIN       | 0.7   | Medium LOCA, No Injection  | Equalizing Line Break    | Yes   |  | Disabled |
| T_IRV_DP_nIN    | 0.1   | MSIV Closure with IORV, No Injection   | IORV                     | Yes   | Failed   | Disabled |
| T_IRV_DP_nIN_nD | < 0.1 | MSIV Closure with IORV, No Injection, No Deluge                                    | IORV                     | Yes   | Failed   | Disabled |
| T_IC24_nD       | 0.8   | Transient, No Depressurization, No IC/PCC pool refill                              | LOPP                     | Yes   | Unavailable  | 4        |
| T_IRV_nIN       | 0.2   | IORV, No Injection, No Depressurization  | IORV                     | Yes   | Unavailable  | Disabled |
| T_IRV_nIN_nD    | < 0.1 | IORV, No Injection, No Depressurization, No Deluge                                 | IORV                     | Yes   | Unavailable  | Disabled |
| T_AT_nFWR       | < 0.1 | ATWS following Transient, FW Runback Failure, No Depressurization, No Injection    | MSIV Closure             | No    | Terminated at 3 min due to loss of suction                     | Disabled |
| T_AT_DP         | < 0.1 | ATWS following Transient, No SLCS  | MSIV Closure             | No    | Terminated at 3 min due to loss of suction                     | Disabled |
| MLI_nVB_nCHR    | 7.9   | Medium LOCA, Containment Heat Removal Failure (Core does not uncover for 72 hours) | GDCS Line Break          | Yes   | Unavailable  | Disabled |

| CRD  | ADS                                      | GDCS  | LPCI   | Fire Water | PCCS                               | PCCS Pool Makeup |
|--|--|---|--------|------------|------------------------------------|------------------|
| Failed   | 10 SRV, 8 DPV                            | Failed  | Failed | Failed     |                                    | 6 after 24 hours |
| Failed   | 10 SRV, 8 DPV                            | Failed  | Failed | Failed     |                                    | 6 after 24 hours |
| Off  | 1 Initial Stuck SRV, Later 10 SRV, 8 DPV | Failed  | Failed | Failed     |                                    | 6 after 24 hours |
| Reduced to 115 gpm to maximize water in LDW but still be ineffective, Turned off at 7200 s | 10 SRV, 8 DPV                            | Failed  | Failed | Failed     |                                    | 6 after 24 hours |
| Failed   | 1 Initial Stuck SRV, Later 10 SRV, 8 DPV | Failed  | Failed | Failed     |                                    | 6 after 24 hours |
| Failed   | 1 Initial Stuck SRV, Later 10 SRV, 8 DPV | Failed  | Failed | Failed     |                                    | 6 after 24 hours |
| Failed   | Failed                                   | n/a   | n/a    | n/a        |                                    | 6 Failed         |
| Failed   | 1 Stuck SRV, Others Failed               | Failed  | Failed | Failed     |                                    | 6 after 24 hours |
| Failed   | 1 Stuck SRV, Others Failed               | Failed  | Failed | Failed     |                                    | 6 after 24 hours |
| Failed   | Failed                                   | n/a   | n/a    | n/a        |                                    | 6 after 24 hours |
| Failed   | Failed                                   | n/a   | n/a    | n/a        |                                    | 6 after 24 hours |
| Off  | 10 SRV, 8 DPV                            | 7 Lines, 2 pools (one pool is spilled to LDW) | n/a    | n/a        | 6 but VB failure makes ineffective | after 24 hours   |

| Deluge Lines   | BIMAC   | Vacuum Breakers | SPC | SDC | Vent | Drywell Leak Area (mm <sup>2</sup> ) | SLCS | Drywell Failure Area (cm <sup>2</sup> ) |
|--|---------|-----------------|-----|-----|------|--------------------------------------|------|---|
| 3 lines, 10 cm diameter, Initiated when LDW gas temp is > 533K | Success | Success         | n/a | n/a | n/a  | 3.4 n/a                              | n/a  | n/a                                     |
| Failed   | n/a     | Success         | n/a | n/a | n/a  | 3.4 n/a                              | 730  |   |
| 3 lines, 10 cm diameter, Initiated when LDW gas temp is > 533K | Success | Success         | n/a | n/a | n/a  | 3.4 2 Tanks                          | n/a  |   |
| 3 lines, 10 cm diameter, Initiated when LDW gas temp is > 533K | Success | Success         | n/a | n/a | n/a  | 3.4 n/a                              | n/a  |   |
| 3 lines, 10 cm diameter, Initiated when LDW gas temp is > 533K | Success | Success         | n/a | n/a | n/a  | 3.4 n/a                              | n/a  |   |
| Failed   | n/a     | Success         | n/a | n/a | n/a  | 3.4 n/a                              | 730  |   |
| Failed   | Success | Success         | n/a | n/a | n/a  | 3.4 n/a                              | n/a  |   |
| 3 lines, 10 cm diameter, Initiated when LDW gas temp is > 533K | Success | Success         | n/a | n/a | n/a  | 3.4 n/a                              | n/a  |   |
| Failed   | n/a     | Success         | n/a | n/a | n/a  | 3.4 n/a                              | 730  |   |
| 3 lines, 10 cm diameter, Initiated when LDW gas temp is > 533K | Success | Success         | n/a | n/a | n/a  | 3.4 Off                              | n/a  |   |
| 3 lines, 10 cm diameter, Initiated when LDW gas temp is > 533K | Success | Success         | n/a | n/a | n/a  | 3.4 Failed                           | n/a  |   |
| n/a  | n/a     | Failed          | n/a | n/a | n/a  | 3.4 n/a                              | 730  |   |

| MAAP cases for top 99% of CDF |       |                             |       |   |
|-------------------------------|-------|-----------------------------|-------|---|
| Sequence                      | Class | Applicable Case             | % CDF | Notes   |
| T-LOPP044                     | CDI   | T_DP_nIN                    | 51.5  |   |
| T-FDW044                      | CDI   | T_DP_nIN                    | 37.8  |   |
| ML-L-014                      | CDI   | ML_DP_nIN                   | 0.7   |   |
| LL-S-FDWB013                  | CDI   | Containment assumed to fail | 0.07  | High water in lower drywell leads to Ex-Vessel Explosion  |
| T-IORV014                     | CDI   | T_IRV_DP_nIN                | 0.07  |   |
| T-IORV028                     | CDI   | T_IRV_DP_nIN                | 0.04  |   |
| T-LOPP039                     | CDII  | core not uncovered for 72h  | 3.56  | Containment fails at DW head  |
| LL-S-015                      | CDII  | core not uncovered for 72h  | 3.15  | Containment fails at DW head  |
| T-LOPP042                     | CDII  | core not uncovered for 72h  | 0.61  | Containment fails at DW head  |
| ML-L-016                      | CDII  | MLi_nVB_nCHR                | 0.24  |   |
| T-FDW039                      | CDII  | core not uncovered for 72h  | 0.1   | Containment fails at DW head  |
|                               |       |                             |       | Case not in Chapter 8 rev 0. Containment does not fail for >>24 hours after core damage               |
| T-LOPP049                     | CDIII | T-IC24                      | 0.76  | Case not in Chapter 8 rev 0. Containment does not fail  |
| T-IORV029                     | CDIII | T-nIC-nDP                   | 0.25  |   |
| T-IORV015                     | CDIII | T_IRV_nIN                   | 0.22  |   |
|                               |       | T_IRV_nIN                   | 0.03  |   |
| AT-T-GEN012                   | CDIV  | n/a                         | 0.27  | Local core damage due to uneven boration, but vessel is not challenged. Treated as tech spec leakage. |
|                               | CDIV  | T_AT_SL_IRV_nIN             | 0.11  |   |
| AT-T-PCS012                   | CDIV  | n/a                         | 0.08  | Local core damage due to uneven boration, but vessel is not challenged. Treated as tech spec leakage. |
|                               | CDIV  | T_AT_SL_IRV_nIN             | 0.02  |   |
| AT-T-FDW012                   | CDIV  | n/a                         | 0.03  | Local core damage due to uneven boration, but vessel is not challenged. Treated as tech spec leakage. |
|                               | CDIV  | T_AT_SL_IRV_nIN             | 0     |   |
| AT-T-GEN013                   | CDIV  | T_AT_SL_IRV_nIN             | 0.02  |   |

Total: 99.63