ENCLOSURE 1

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Non-Proprietary Information – Class I (Public)

(4) generation of a condition that results in a consequential loss of function of a necessary containment barrier; and

(5) nuclear system stresses in excess of those allowed for the accident classification by applicable industry codes.

S.2.1.3 Unacceptable Results for Limiting Fault (Design Basis Accidents)

The following are considered to be unacceptable safety results for limiting faults (design basis accidents):

(1) radioactive material release which results in dose consequences that exceed the guideline values of 10CFR100;

(2) failure of fuel cladding which could cause changes in core geometry such that core cooling would be inhibited;

(3) nuclear system stresses in excess of those allowed for the accident classification by applicable industry codes;

(4) containment stresses in excess of those allowed for the accident classification by applicable industry codes when containment is required; and

(5) radiation exposure to plant operations personnel in the main control room in excess of 5 Rem whole body, 30 Rem inhalation and 75 Rem skin.

S.2.2 Descriptions and Frequency Categorization of Significant AOOs, Infrequent Incidents, and Accidents

S.2.2.1 Anticipated Operational Occurrences (Moderate Frequency Events)

To determine the limiting AOO events, the relative dependency of CPR upon various thermal–hydraulic parameters was examined. A sensitivity study was performed to determine the effect of changes in bundle power, bundle flow, subcooling, R–factor and pressure on CPR for fuel designs.

Results of the study are given in Table S–1. As can be seen from this table, CPR is most dependent on the R–factor and bundle power. A slight sensitivity to pressure and flow changes and relative independence to changes in inlet subcooling was also shown. The R–factor is a function of bundle geometry and local power distribution and is assumed to be constant throughout a transient. Therefore, AOOs that would be limiting because of MCPR would primarily involve significant changes in power. Based on this, the AOOs most likely to limit operation because of MCPR considerations are:

(1) generator load rejection without bypass or turbine trip without bypass;

(2) loss of feedwater heating or inadvertent HPCI startup;

(3) control rod withdrawal error;

(4) feedwater controller failure (maximum demand); and

(5) pressure regulator downscale failure (BWR/6 only).

Subsequent AOO analyses verified the results of the above sensitivity study. Descriptions of the typical analyses performed for the above limiting events are given below. For reloads, the potentially limiting events are evaluated to determine the required operating limits. The analytical results for the limiting AOOs and the required operating limits are provided in the plant supplemental reload licensing report.

Two additional fuel loading error conditions, the mislocated bundle and the misoriented bundle event, are evaluated as infrequent incidents. If the applicability requirements in Section S.5.3 for treating the fuel loading error as an infrequent incident cannot be met, then it will be evaluated to meet the fuel cladding integrity safety limit MCPR. Descriptions of these events are given in S.2.2.2.1 for the Infrequent Incident, and S.2.2.1.8 and .9 for the AOO.

Some plant–unique analyses will differ in certain aspects from the typical calculational procedure. These differences may arise because of utility–selected margin improvement options, or because of unique plant configurations, which could result in the identification of additional potential limiting events requiring AOOs analyses. A description of the~~se~~ margin improvement options and their effect upon the AOO analysis is given in Section S.5. ATWS pump trip is assumed in the analysis of those plants listed in Table S–2.

The initial MCPR assumed for AOO analyses is usually greater than or equal to the GETAB operating limit. Figure 5.2–1 in Appendix B illustrates the effect of the initial MCPR on transient ΔCPR for a typical BWR core. This figure indicates that the change in ΔCPR is approximately 0.01 for a 0.05 change in initial MCPR. Therefore, nonlimiting GETAB AOO analyses may be initiated from an MCPR below the operating limit because the higher operating limit MCPR more than offsets the increase in ΔCPR for the event. This may also be applied to limiting AOOs if the difference between the operating limit and the initial MCPR is small (0.01 or 0.02).

S.2.2.1.1 Generator Load Rejection Without Bypass

Fast closure of the turbine control valves is initiated whenever electrical grid disturbances occur which result in significant loss of load on the generator. The turbine control valves are required to close as rapidly as possible to prevent overspeed of the turbine generator rotor. The closing causes a sudden reduction of steam flow, which results in a nuclear system pressure increase. The reactor is scrammed by the fast closure of the turbine control valves.

Starting Conditions and Assumptions. The following plant operating conditions and assumptions form the principal bases for which reactor behavior is analyzed during a load rejection: