pH, chloride, and other chemical parameters are made to determine the cause of the unusual conductivity and instigate proper corrective action. These can be done before limiting conditions, with respect to variables affecting the boundaries of the reactor coolant, are exceeded. Several techniques are available to correct off-standard reactor water quality conditions including removal of impurities from reactor water by the cleanup system, reducing input of impurities causing off-standard conditions by reducing power and reducing the reactor coolant temperature to less than 212°F. The major benefit of reducing the reactor coolant temperature to less than 212°F is to reduce the temperature dependent corrosion rates and thereby provide time for the cleanup system to re-establish proper water quality.

Specifications 3.3.F.1 and 3.3.F.2 require a minimum of four OPERATING recirculation loops during reactor POWER OPERATION. Core parameters have not been established for POWER OPERATION with less than four OPERATING loops. Therefore, Specification 3.3.F.3 requires reactor POWER OPERATION to be terminated and the reactor placed in the REFUEL MODE or SHUTDOWN CONDITION within 12 hours. During four loop POWER OPERATION the idle loop is required to have its discharge valve closed and its discharge bypass and suction valves open. This minimizes the occurrence of a severe cold water addition transient during startup of an idle loop. In addition, with the discharge bypass and suction valves in an idle loop open the coolant inventory in the loop is available during LOCA blowdown.

Specifications 3.3.F.4 and 3.3.F.6 assure that an adequate flow path exists from the annular space, between the pressure vessel wall and the core shroud, to the core region. This provides sufficient hydraulic communication between these areas, thus assuring that reactor water level instrument readings are indicative of the water level in the core region. For the bounding loss of feedwater transient[2], a single fully open recirculation loop transfers coolant from the annulus to the core region at approximately five times the boiloff rate with no forced circulation[3]. With the reactor vessel flooded to a level above 185 inches TAF or when the steam separator and dryer are removed, the core region is in hydraulic communication with the annulus above the core region and all recirculation loops can therefore be isolated. When the steam separator and dryer are removed, safety limit 2.1.D ensures water level is maintained above the core shroud.

References

(1) FDSAR, Volume I, Section IV-2
(2) Letter to NRC dated May 19, 1979, "Transient of May 2, 1979"
(3) General Electric Co. Letter G-EN-9-55, "Revised Natural Circulation Flow Calculation", dated May 29, 1979
(4) Licensing Application Amendment 16, Design Requirements Section
(5) (Deleted)
(6) FDSAR, Volume I, Section IV-2.3.3 and Volume II, Appendix H
(7) FDSAR, Volume I, Table IV-2-1
(8) Licensing Application Amendment 34, Question 14