UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION REPORT SUPPLEMENT FOR CESSAR SYSTEM 80

DOCKET NUMBER 50-470

15.3.7 Steam Generator Tube Rupture With Single Failure

Supplement Number 1 to the SER states that CE was required to reanalyze the steam generator tube rupture (SGTR) event assuming a most limiting single failure following the SGTR. Supplement Number 2 set forth the guidelines for the required SGTR reanalysis that, per the Standard Review Plan, operator actions were to be considered to assure that the most severe case had been considered. The reanalysis was to take into account the CE emergency procedure guidelines. Operator action to utilize the atmospheric dump valves (ADVs) could be assumed at an appropriate time following reactor trip, to facilitiate the primary system depressurization and cooldown such that the main steam safety valves were not challenged, and the affected steam generator could be isolated. CE was to assume that if an ADV on the affected steam generator was stuck open at the operating position, the fastest cooldown rate resulted. Credit could be taken for operator action ten (10) minutes after it become apparent that an ADV on the affected steam generator was stuck open, and that the operator could close the block valve upstream of the stuck open ADV. Cycling of the remaining ADVs was to be assumed in the analysis should it become necessary to prevent overfilling the steam generators. For those plants referencing CESSAR System 80 that do not have block valves upstream of the ADVs (e.g., Palo Verde 1, 2 and 3), the staff required a plant specific analysis assuming the ADV remained stuck open for the duration of the accident. The calculated doses were required to be within the guideline values of 10 CFR Part 100.

By letter dated July 22, 1983, CE submitted the reanalysis of the SGTR event based on the assumptions described above. However, CE used a more conservative analysis than required, and assumed that the operator action to close the block valve would not occur for 30 minutes instead of the 10 minutes previously stated. We have reviewed the CE analysis and concluded that the radiological assumptions are consistent with the current licensing guidance presented in SRP Section 15.6.3 and are acceptable. Using these assumptions (See Table 1), CE has estimated the offsite radiological consequences at the Exclusion Area and the Low Population Zone Boundaries to be 60 Rem (thyroid) and 15 Rem (thyroid), respectively.

The staff has also performed an independent evaluation of the offsite radiological consequences of the postulated event at the Exclusion Area Boundary. Using assumptions consistent with SRP Section 15.6.3, as summarized in Table 1, the staff estimated the potential radiological consequences at the Exclusion Area Boundary to be 76 Rem (thyroid) and 1 Rem (whole Body). Considering the level of detail of the CE calculation with respect to the staff's estimate, we believe the CE and staff values are in reasonable agreement. We, therefore, conclude that the CE analysis of a SGTR with a failure of an ADV and isolation within 30 minutes should result in offsite radiological consequences less than the guideline values of 10 CFR Part 100. It should be noted that this analysis is limited exclusively to the CESSAR System 80 design and that any change to the

System 80 design (such as size of the ADVs or no block valves for the ADVs) could make a significant difference in the estimated offsite radiological consequences from the SGTR scenarios described above, and a plant specific calculation may be required for those plants that deviate from the System 80 design.

TABLE 1

SUMMARY OF ASSUMPTIONS USED IN THE STAFF ANALYSIS OF A SGTR WITH A STUCK OPEN ADV

1. The primary coolant activity was assumed at the technical specification value of 1.0 uCi/gm dose equivalent iodine 131 (DEI-131).
2. The secondary coolant activity was assumed at the technical specification limit of 0.1 uCi/gm DEI-131.
3. A spiking factor of 500 times the normal release rate from the fuel was assumed.
4. The technical specification leakrate of 1 gpm was assumed for the unaffected steam generator for the duration of the accident.
5. During the period when the ADV was stuck open, the tubes remained covered with water and, therefore, only the tube leakage which flashes was assumed to be released directly to the atmosphere without any iodine scrubbing (DF=1).
6. A partition factor of 100 was assumed between the steam generator water and steam phases to estimate the additional release of activity from the steam generator water.
7. The atmospheric dispersion factor used for the Exclusion Area Boundary in the staff's analysis was 2.0×10^{-3} sec/m^3.
8. Dilution of primary and secondary system activities due to the HPSI flow and auxiliary feedwater is accounted for in the calculation.