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Presentation to the ACRS Subcommittee

Safety Review of the Clinch River Nuclear Site, Early Site Permit Application Accident Analysis, (SSAR Chapter 15)

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Accident Analysis

SSAR Chapter 15 "Accident Analysis"

- Evaluation of the radiological consequences of postulated Design Basis Accidents (DBAs) for the proposed CRN Site
- Dose analysis used:
  1. PPE accident source term consisting of assumed DBA isotopic releases to environment in lieu of specific plant design information
  2. Site characteristic short term (accident) atmospheric dispersion factors (See review of SSAR Chapter 2)

Regulations and Guidance

- SSAR (10 CFR 52.17(a)(1)) and siting (§50.34(a)(1)) postulated accident dose analysis requirements have the same dose criteria:

  The evaluation must determine that:

  1. An individual located at any point on the boundary of the exclusion area for any 2 hour period following the onset of the postulated fission product release would not receive a radiation dose in excess of 25 rem total effective dose equivalent (TEDE).
  2. An individual located at any point on the outer boundary of the low population zone, who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a radiation dose in excess of 25 rem TEDE.

- SRP 15.0.3 provides review guidance, including evaluation of PPE accident releases.

PPE Accident Source Term

Chapter 15 "Accident Analysis" (cont'd)

- The radionuclide release to the environment for a loss of coolant accident (LOCA) is documented and is considered by the applicant in the ESP application as a part of the PPE in SSAR Table 2.0-3.

- Staff found the PPE LOCA release source term to be not unreasonable for the purposes of site analysis or postulated from considerations of possible accident event.
  - The PPE source term is compared with that of AP1000 design (provided in Vogtle 3 and 4 ESPA) with scaling ratio of 0.235 (800 MWt/3,400 MWt) and ascertained to be not unreasonable.

DBA Dose Analysis

Chapter 15 "Accident Analysis" (cont'd)

- The accident doses at the exclusion area boundary (EAB) and the outer boundary of the low population zone (LPZ) at the CRN Site are obtained by multiplying the vendor supplied dose associated with bounding PPE LOCA source term, by the ratio of the site-specific(site-characteristic) and vendor supplied site-parameter X/Qs.
  - $Dose_{site} = Dose_{vendor} [(X/Q)_{site} / (X/Q)_{vendor}]$
- Analysis meets the dose criteria specified in 10 CFR 50.34(a)(1) and 10 CFR 52.17(a)(1) and the PPE includes the bounding accident releases for the determination.

DBA Dose Analysis

Chapter 15 "Accident Analysis" (cont'd)

- The calculated radiological consequences at CRN Site are within regulatory dose criteria of 25 rem TEDE for the maximum 2-hour period at the EAB and 25 rem TEDE at the outer boundary of the LPZ for the duration of the accident release. The analyses used and PPE source term are not unreasonable. Therefore, staff considers the applicant approach adequate and acceptable in meeting the regulatory requirements of 10 CFR 50.34(a)(1) and 10 CFR 52.17(a)(1).