also contains a main valve stroke time where the valve flow area linearly changes from 0 percent to 100 percent. The actual dead times and stroke times are user input. The previous SRV model opened the SRV to 100 percent area instantaneously at the lift setpoint. The staff reviewed the evaluation model (EM) and delay times related to the POSRV and considers the model acceptable.

charging flow control valve

The pressurizer level control system controls one ~~CCP~~ and letdown orifice isolation valves to maintain the programmed pressurizer level. Charging flow in CESEC-III is calculated by the applicant based on the user selected input option of no charging, charging against RCS back pressure, or charging against cold leg back pressure. The amount of charging flow is based on user input that defines the number of points in a back pressure versus flowrate table, user supplied back pressure in pounds of force per square inch (psi), and user supplied flow rate in gallons per minute (gpm). The staff reviewed the EM and the flow and discharge pressure of the CCPs and considers the model acceptable.

Based on the acceptability of the new POSRV and CCP model, confirmation of prior CESEC-III approval by the staff and the similarity of the APR1400 reactor plant to existing CE System 80+ and prior plants, the staff concludes that CESEC-III is acceptable to perform licensing calculations for APR1400 non-LOCA events except for ATWS events. The overall conservatism also relies on conservative boundary conditions on the model. CESEC-III is not a best-estimate computer program for all events. However, with appropriate input and boundary conditions, the CESEC-III computer program will generate conservative results.

TORC

TORC is documented in CENPD-161-P [Reference 11] and CENPD-206-P-A [Reference 12]. The staff approved TORC for Chapter 15 non-LOCA safety analysis in an SER [Reference 13]. TORC was also approved as an acceptable method for CE System 80+ non-LOCA thermal analysis in NUREG-1462.

TORC is verified by the applicant through comparison to data for three operating PWRs (i.e., Maine Yankee, Zion-1, and Biblis-A), single phase flow data from a 1/5 scale open-core reactor flow model, a Westinghouse Electric Corporation (Westinghouse) flow blockage test assembly, and two-phase flow data obtained from the European two-phase flow group exercise [Reference 12].

Subsequent to the staff's approval of TORC, a new TORC CHF correlation (KCE-1) was incorporated to characterize APR1400 PLUS7™ fuel performance. The KCE-1 CHF correlation is the same as the Westinghouse CE-1 CHF correlation; however, a new set of coefficients for KCE-1 were determined by a non-linear multiple-regression analysis for the measured CHF data applicable to PLUS7™ fuel. The staff previously reviewed the topical report for the KCE-1 CHF correlation, APR1400-F-C-TR-12002-P [Reference 14], and accepted the use of KCE-1 CHF correlation for PLUS7™ fuel thermal-hydraulic performance and plant safety analyses done with the TORC computer code. The staff evaluation of this topical report is documented in NRC staff SER on KCE-1 CHF correlation topical report [Reference 70].

TORC is limited to steady-state calculations of reactor core thermal-hydraulic performance involving unblocked flow channels or subchannels and with conditions of single-phase flow or homogeneous two-phase flow in the channels or subchannels. The boundary conditions for TORC calculations are obtained as a function of time from a transient analysis code (typically CESEC-III). Conditional upon the prior imposed limitations, the staff reviewed the acceptability of TORC for calculating DNBR for DCD Chapter 15 non-LOCA events and concludes that

Event Initiator		
Break size	Double ended rupture of SG tube Area = 2 x 253.99 mm^2 (2 x 0.3484 in^2)	Largest possible break to produce bounding consequences. DCD Table 5.4.2-1
Credited Systems and Components		
RPS	High SG level trip = 95% narrow range level Hot leg saturation CPC trip = -7.2 ºC (-13 ºF) CEA worth on trip = -8.0 %$\Delta\rho$	Conservative with respect to DCD Table 7.2-4. DCD Table 15.0-2, Conservative with respect to DCD Table 7.2-4 DCD Section 15.0.0.2
SIS	SIAS = 1,885 psia 40 second delay Injection capacity as a function of RCS pressure	Conservatively high with respect to DCD Table 7.3-5A, resulting in earlier HPSI actuation. DCD Section 6.3.1.5 maximum DCD Section 6.3.2-4 ~~minimum~~ pump flow
MSSVs	Lift Setpoint = 1,141.74 psia	4% below lift setpoint in TS 3.7.1. DNBR not sensitive to this parameter.