

14.25 EXCESSIVE CHARGING EVENT

14.25.1 IDENTIFICATION OF EVENT AND CAUSE

The Excessive Charging Event initiated from maximum pressurizer level was analyzed to assure that the operator has at least 15 minutes from initiation of a high pressurizer level alarm to take corrective action and terminate the event prior to filling the pressurizer solid. The Excessive Charging Event is assumed to occur by inadvertent initiation of charging flow.

14.25.2 CORE AND SYSTEM PERFORMANCE

14.25.2.1 Mathematical Models

The time required to fill the pressurizer solid was calculated using the following equation:

$$T = \frac{V_S - V_{SL} - V_T}{(F_{CH} - F_{LD}) \frac{W_2}{W_1}}$$

where:

- V_S = steam volume in the pressurizer;
- V_{SL} = equivalent saturated liquid volume pressurizer steam volume;
- V_T = volume above the spray nozzles;
- F_{CH} = charging flow rate;
- F_{LD} = letdown flow rate;
- W_1 = specific volume of liquid at charging and letdown conditions; and,
- W_2 = specific volume of liquid at pressurizer conditions.

14.25.2.2 Input Parameters and Initial Conditions

The analysis was performed for three combinations of charging and letdown flows. Table 14.25-1 presents the initial conditions assumed in the analysis and the results of the analysis. The initial conditions assumed in the analysis are consistent with the Technical Specification limits on initial pressurizer level including appropriate instrument loop uncertainties.

14.25.2.3 Results

As seen from Table 14.25-1, all three combinations of charging and letdown flow analyzed provide at least 15 minutes after initiation of high level alarm for the operator to take corrective actions and terminate the event prior to filling the pressurizer solid.

14.25.3 CONCLUSIONS

The operator has at least 15 minutes after initiation of a high level alarm to take corrective action and terminate the event prior to filling the pressurizer solid.

This event is not affected by the transition to Advanced CE-14 HTP™ fuel because the key parameters for this event are plant related system responses which are unchanged from, or bounded by, the current analysis.

TABLE 14.25-1

EXCESSIVE CHARGING EVENT - CORE AND SYSTEM PERFORMANCE FOR CHARGING FLOW AND LETDOWN FLOW

<u>VOLUME CONTROL ASSUMPTIONS</u>			<u>MAXIMUM INITIAL PRESSURIZER LEVEL</u>		<u>HIGH LEVEL ALARM ANALYSIS SETPOINT</u>		<u>TIME TO FILL^(a)</u>	
<u>CHARGING FLOW</u>		<u>LETDOWN FLOW</u>	<u>LIQUID VOLUME</u>	<u>LEVEL^(c)</u>	<u>LIQUID VOLUME</u>	<u>LEVEL^(c)</u>	<u>PRESSURIZER</u>	
<u>(gpm)</u>	<u>CBO</u>	<u>(gpm)</u>	<u>(ft³)</u>	<u>(in)</u>	<u>(ft³)</u>	<u>(in)</u>	<u>(minutes)</u>	
1.	144	6	0	853	218	853	218	16 ^(d)
2.	144	6	29 ^(b)	952	242	1014	257	15
3.	96	6	0	952	242	1094	276	15

^(a) From time of initiation of high pressurizer level alarm.

^(b) Conservatively lower than the 30 gpm minimum letdown flow listed in Figure 4-11.

^(c) Referenced to the 1" level nozzle at the bottom of the pressurizer.

^(d) One minute to recognize computer signal leaving 15 minutes for operator response.