

TABLE 15.2-1

TIME SEQUENCE OF EVENTS FOR CONDITION II EVENTS

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
Uncontrolled RCCA Withdrawal from a Subcritical Condition	Initiation of uncontrolled rod withdrawal (7.5×10^{-5} $\Delta K/\text{sec}$ reactivity insertion rate from 10^{-9} of nominal power)	0.0
	Power range high neutron flux low setpoint reached	10.4
	Peak nuclear power occurs	10.6
	Rods begin to drop	10.9
	Peak heat flux occurs	12.7
	Peak average clad temperature occurs	13.5
	Minimum DNBR occurs	12.7
	Peak average fuel temperature occurs	14.2
Uncontrolled RCCA Withdrawal at Power	Initiation of uncontrolled RCCA withdrawal at maximum reactivity insertion rate	

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
1. Case A	(7.5×10^{-4} $\Delta K/sec$)	0
	Power range high neutron flux high trip point reached	6.6
	Rods begin to drop	7.1
	Minimum DNBR occurs	7.4
2. Case B	Initiation of uncontrolled RCCA withdrawal at a small reactivity insertion rate (3.0×10^{-5} $\Delta K/sec$)	0
	Overtemperature ΔT reactor trip signal initiated	472.3
	Rods begin to drop	473.8
	Minimum DNBR occurs	474.1
	Uncontrolled Boron Dilution	
1. Dilution during refueling and startup	Dilution begins	0
	Operator isolates source of dilution; minimum margin to criticality occurs	>1800
2. Dilution during Startup	Dilution begins	0
	Operator isolates source of dilution: minimum margin to criticality occurs	>900

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
2. Dilution during full power operation		
a. Automatic reactor control	Dilution begins	0
	1.3 percent shutdown margin lost	>900
b. Manual reactor control	Dilution begins	0
	Overtemperature ΔT reactor trip signal initiated	89
	Rods begin to drop	91
	1.3 percent shutdown is lost (if dilution continues after trip)	>900
Partial Loss of Forced Reactor Coolant Flow		
1. All loops operating; two pumps coasting down	Coastdown begins	0
	Low-flow reactor trip	1.6
	Rods begin to drop	2.6
	Minimum DNBR occurs	3.9

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
Loss of External Electrical Load	1. With pressurizer control (BOL)	0
	Initiation of steam release from steam generator safety valves	7.4
	Overtemperature ΔT reactor trip signal initiated	10.4
	Rods begin to drop	11.9
	Minimum DNBR occurs	13.1

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
2. Without pressurizer control (Primary Pressure Case)	Loss of electrical load	0
	High pressurizer pressure reactor trip point reached	6.5
	Rods begin to drop	8.5
	Initiation of steam release from steam generator safety valves	9.7
	Peak RCS pressure occurs	9.9
3. With pressurizer control (Secondary Pressure Case)	Loss of electrical load	0
	Initiation of steam release from steam generator safety valves	5.0
	Overtemperature delta T reactor trip signal initiated	9.5
	Rods begin to drop	11.0
	Peak secondary pressure occurs	15.6

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
Loss of normal feedwater	Low-low steam generator water level reactor trip	47.0
	Rods begin to drop	49.0
	Peak water level in pressurizer occurs	52.5
	All steam generators begin to receive auxiliary feed from motor-driven pumps	132.0
Loss of Power to the Station Auxiliaries	Low-low steam generator water level reactor trip	47.0
	Rods begin to drop	49.0
	Reactor coolant pumps begin to coast	51.0
	Peak pressurizer water level occurs	52.5
	All steam generators begin to receive auxiliary feed from motor-driven pumps	132.0

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
Excessive feedwater at full load (single loop)	One feedwater control valve and one feedwater bypass valve fail fully open	0.0
	Overpower Delta-T setpoint reached	18.7
	Rods begin to drop	20.3
	Minimum DNBR occurs	21.0
	High-high steam generator water level setpoint reached	36.6
	Feedwater flow isolated due to high-high steam generator water level	68.6
Excessive feedwater at full load (multi-loop)	Four feedwater control valves and four feedwater bypass valves fail fully open	0
	Overpower Delta-T setpoint reached	18.4
	Rods begin to drop	19.9
	Minimum DNBR occurs	20.6
	High-high steam generator water level setpoint reached	61.4
	Feedwater flow isolated due to high-high steam generator water level	93.4

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
Excessive Load Increase		
1. Manual Reactor Control (BOL)	10% step load increase	0.0
	Peak pressurizer pressure occurs	0.1
	Minimum DNBR occurs	5.1
	Peak nuclear power occurs	165.0
2. Manual Reactor Control (EOL)	10% step load increase	0.0
	Peak pressurizer pressure occurs	0.1
	Peak nuclear power occurs	48.2
	Minimum DNBR occurs	117.0
3. Automatic Reactor Control (BOL)	10% step load increase	0.0
	Peak pressurizer pressure occurs	9.0
	Minimum DNBR occurs	43.0
	Peak nuclear power occurs	43.3
4. Automatic Reactor Control (EOL)	10% step load increase	0.0
	Peak pressurizer pressure occurs	12.7
	Peak nuclear power occurs	20.7
	Minimum DNBR occurs	58.0

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
Accidental Depressurization of the Reactor Coolant System	Inadvertent opening of one RCS safety valve	0.0
	Overtemperature ΔT reactor trip setpoint reached	35.0
	Rod motion begins	36.5
	Minimum DNBR occurs	37.0

TABLE 15.2-1 (Cont)

<u>Accident</u>	<u>Event</u>	<u>Time (sec)</u>
Spurious Operation of the SIS at Power	Charging pumps begin injecting borated water (reactor/turbine trip on SI signal)	0.0
	Pressurizer becomes water-solid(2)	579.3
	Time by which PORV must be open to prevent water relief through the PSVs (2)	616.3
	Manual procedures to terminate the event are completed	≤2700.0

NOTE:

- (1) DNBR does not decrease below its initial value.
- (2) Results are given for Unit 1 and the Unit 2 results are similar

TABLE 15.2-2

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TABLE 15.2-3
NATURAL CIRCULATION FLOW

<u>Reactor Power Percent Full Power</u>	<u>Reactor Coolant Flow Percent Nominal Flow</u>
4.0	5.32
3.5	5.06
3.0	4.79
2.5	4.44
2.0	4.16
1.5	3.78
1.0	3.28