

1.1 Definitions (continued)

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LINEAR HEAT GENERATION RATE (LHGR)	The LHGR shall be the heat generation rate per unit length of fuel rod. It is the integral of the heat flux over the heat transfer area associated with the unit length.
LOGIC SYSTEM FUNCTIONAL TEST	A LOGIC SYSTEM FUNCTIONAL TEST shall be a test of all logic components required for OPERABILITY of a logic circuit, from as close to the sensor as practicable up to, but not including, the actuated device, to verify OPERABILITY. The LOGIC SYSTEM FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total system steps so that the entire logic system is tested.
MAXIMUM FRACTION OF LIMITING DENSITY (MFLPD)	The MFLPD shall be the largest value of the fraction of limiting power density (FLPD) in the core. The FLPD shall be the LHGR existing at a given location divided by the specified LHGR limit for that bundle type.
MINIMUM CRITICAL POWER RATIO (MCPR)	The MCPR shall be the smallest critical power ratio (CPR) that exists in the core for each class of fuel. The CPR is that power in the assembly that is calculated by application of the appropriate correlation(s) to cause some point in the assembly to experience boiling transition, divided by the actual assembly operating power.
MODE	A MODE shall correspond to any one inclusive combination of mode switch position, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.
OPERABLE - OPERABILITY	A system, subsystem, division, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, division, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

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(continued)

Table 3.1.4-1 (page 1 of 1)  
Control Rod Scram Times

- NOTES-----
1. OPERABLE control rods with scram times not within the limits of this Table are considered "slow."
  2. Enter applicable Conditions and Required Actions of LCO 3.1.3, "Control Rod OPERABILITY," for control rods with scram times > 7 seconds to 90% insertion. These control rods are inoperable, in accordance with SR 3.1.3.4, and are not considered "slow."
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PERCENT INSERTION	SCRAM TIMES <sup>(a)(b)</sup> (seconds) when REACTOR STEAM DOME PRESSURE $\geq$ 800 psig for GE analyzed cores
5	0.48
20	0.89
50	1.98
90	3.44

- (a) Maximum scram time from fully withdrawn position based on de-energization of scram pilot valve solenoids at time zero.
- (b) Scram times as a function of reactor steam dome pressure when < 800 psig are within established limits.

3.2 POWER DISTRIBUTION LIMITS

3.2.4 Average Power Range Monitor (APRM) Gain and Setpoint

- LCO 3.2.4
- a. FDLRC and the ratio of MFLPD to Fraction of RTP (F RTP) shall be less than or equal to 1.0; or
  - b. Each required APRM Flow Biased Neutron Flux-High Function Allowable Value shall be modified by the lesser of 1/FDLRC or F RTP/MFLPD; or
  - c. Each required APRM gain shall be adjusted such that the APRM readings are  $\geq 100\%$  times the higher of F RTP times FDLRC or of MFLPD.

APPLICABILITY: THERMAL POWER  $\geq 25\%$  RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 Satisfy the requirements of the LCO.	6 hours
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to $< 25\%$ RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.2.4.1 -----NOTE-----            Not required to be met if SR 3.2.4.2 is satisfied for LCO 3.2.4.b or LCO 3.2.4.c requirements.            -----</p> <p>Verify FDLRC and the ratio of MFLPD to F RTP are within limits.</p>	<p>Once within 12 hours after <math>\geq 25\%</math> RTP</p> <p><u>AND</u></p> <p>24 hours thereafter</p>
<p>SR 3.2.4.2 -----NOTE-----            Not required to be met if SR 3.2.4.1 is satisfied for LCO 3.2.4.a requirements.            -----</p> <p>Verify each required:</p> <p>a. APRM Flow Biased Neutron Flux—High Function Allowable Value is modified by less than or equal to the lesser of 1/FDLRC or F RTP/MFLPD; or</p> <p>b. APRM gain is adjusted such that the APRM reading is <math>\geq 100\%</math> times the higher of F RTP times FDLRC or of MFLPD.</p>	<p>12 hours</p>

Table 3.3.5.1-1 (page 1 of 5)  
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Core Spray System					
a. Reactor Vessel Water Level - Low Low	1,2,3, 4(a), 5(a)	4 <sup>(b)</sup>	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -54.15 inches
b. Drywell Pressure - High	1,2,3	4 <sup>(b)</sup>	B	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 1.81 psig
c. Reactor Steam Dome Pressure - Low (Permissive)	1,2,3	2	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 308.5 psig and ≤ 341.7 psig
	4(a), 5(a)	2	B	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 308.5 psig and ≤ 341.7 psig
d. Core Spray Pump Discharge Flow - Low (Bypass)	1,2,3, 4(a), 5(a)	1 per pump	E	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 802 gpm and ≤ 992 gpm
e. Core Spray Pump Start-Time Delay Relay	1, 2, 3 4(a), 5(a)	1 per pump	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 11.0 seconds
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Vessel Water Level - Low Low	1,2,3, 4(a), 5(a)	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -54.15 inches
b. Drywell Pressure - High	1,2,3	4	B	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 1.81 psig
c. Reactor Steam Dome Pressure - Low (Permissive)	1,2,3	2	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 308.5 psig and ≤ 341.7 psig
	4(a), 5(a)	2	B	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 308.5 psig and ≤ 341.7 psig

(continued)

(a) When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2, "ECCS - Shutdown."

(b) Also required to initiate the associated diesel generator (DG).

Table 3.3.5.1-1 (page 2 of 5)  
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
d. Reactor Steam Dome Pressure - Low (Break Detection)	1,2,3	4	B	SR 3.3.5.1.2 SR 3.3.5.1.5 SR 3.3.5.1.6	$\geq 802$ psig and $\leq 898$ psig
e. Low Pressure Coolant Injection Pump Start - Time Delay Relay Pumps B and D	1,2,3, 4(a), 5(a)	1 per pump	C	SR 3.3.5.1.5 SR 3.3.5.1.6	$\leq 5.5$ seconds
f. Low Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)	1,2,3, 4(a), 5(a)	1 per loop	E	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	$\geq 1107$ gpm
g. Recirculation Pump Differential Pressure - High (Break Detection)	1,2,3	4 per pump	C	SR 3.3.5.1.2 SR 3.3.5.1.5 SR 3.3.5.1.6	$\leq 5.9$ psid
h. Recirculation Riser Differential Pressure - High (Break Detection)	1,2,3	4	C	SR 3.3.5.1.2 SR 3.3.5.1.5 SR 3.3.5.1.6	$\leq 2.0$ psid
i. Recirculation Pump Differential Pressure Time Delay - Relay (Break Detection)	1,2,3	2	C	SR 3.3.5.1.5 SR 3.3.5.1.6	$\leq 0.53$ seconds
j. Reactor Steam Dome Pressure Time Delay - Relay (Break Detection)	1,2,3	2	B	SR 3.3.5.1.5 SR 3.3.5.1.6	$\leq 2.12$ seconds
k. Recirculation Riser Differential Pressure Time Delay - Relay (Break Detection)	1,2,3	2	C	SR 3.3.5.1.5 SR 3.3.5.1.6	$\leq 0.53$ seconds

(continued)

(a) When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND ISOLATION CONDENSER (IC) SYSTEM

3.5.1 ECCS - Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of five relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,  
MODES 2 and 3, except high pressure coolant injection (HPCI) and ADS valves are not required to be OPERABLE with reactor steam dome pressure  $\leq$  150 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Low Pressure Coolant Injection (LPCI) pump inoperable.	A.1 Restore LPCI pump to OPERABLE status.	30 days
B. One LPCI subsystem inoperable for reasons other than Condition A.  <u>OR</u>  One Core Spray subsystem inoperable.	B.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
C. One LPCI pump in each subsystem inoperable.	C.1 Restore one LPCI pump to OPERABLE status.	7 days
D. Two LPCI subsystems inoperable for reasons other than Condition C.	D.1 Restore one LPCI subsystem to OPERABLE status.	72 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1 Be in MODE 3.	12 hours
	<u>AND</u> E.2 Be in MODE 4.	36 hours
F. HPCI System inoperable.	F.1 Verify by administrative means IC System is OPERABLE.	Immediately
	<u>AND</u> F.2 Restore HPCI System to OPERABLE status.	14 days
G. One ADS valve inoperable.	G.1 Restore ADS valve to OPERABLE status.	14 days
H. Required Action and associated Completion Time of Condition F or G not met.  <u>OR</u> Two or more ADS valves inoperable.	H.1 Be in MODE 3.	12 hours
	<u>AND</u> H.2 Reduce reactor steam dome pressure to $\leq 150$ psig.	36 hours

(Continued)



ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>I. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition C or D.</p> <p><u>OR</u></p> <p>HPCI System and one or more ADS valves inoperable.</p> <p><u>OR</u></p> <p>One or more low pressure ECCS injection/spray subsystems inoperable and one or more ADS valves inoperable.</p> <p><u>OR</u></p> <p>HPCI System inoperable and either one low pressure ECCS injection/spray subsystem is inoperable or Condition C entered.</p>	<p>I.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY																
SR 3.5.1.1	Verify, for each ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.	31 days																
SR 3.5.1.2	Verify each ECCS injection/spray subsystem manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days																
SR 3.5.1.3	Verify correct breaker alignment to the LPCI swing bus.	31 days																
SR 3.5.1.4	Verify each recirculation pump discharge valve cycles through one complete cycle of full travel or is de-energized in the closed position.	In accordance with the Inservice Testing Program																
SR 3.5.1.5	Verify the following ECCS pumps develop the specified flow rate against a test line pressure corresponding to the specified reactor pressure.	In accordance with the Inservice Testing Program																
	<table border="0"> <thead> <tr> <th><u>SYSTEM</u></th> <th><u>FLOW RATE</u></th> <th><u>NO. OF PUMPS</u></th> <th><u>TEST LINE PRESSURE CORRESPONDING TO A REACTOR PRESSURE OF</u></th> </tr> </thead> <tbody> <tr> <td>Core</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Spray</td> <td>≥ 4500 gpm</td> <td>1</td> <td>≥ 90 psig</td> </tr> <tr> <td>LPCI</td> <td>≥ 9000 gpm</td> <td>2</td> <td>≥ 20 psig</td> </tr> </tbody> </table>	<u>SYSTEM</u>	<u>FLOW RATE</u>	<u>NO. OF PUMPS</u>	<u>TEST LINE PRESSURE CORRESPONDING TO A REACTOR PRESSURE OF</u>	Core				Spray	≥ 4500 gpm	1	≥ 90 psig	LPCI	≥ 9000 gpm	2	≥ 20 psig	
<u>SYSTEM</u>	<u>FLOW RATE</u>	<u>NO. OF PUMPS</u>	<u>TEST LINE PRESSURE CORRESPONDING TO A REACTOR PRESSURE OF</u>															
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Spray	≥ 4500 gpm	1	≥ 90 psig															
LPCI	≥ 9000 gpm	2	≥ 20 psig															

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.5.1.9 -----NOTE----- Valve actuation may be excluded. -----  Verify the ADS actuates on an actual or simulated automatic initiation signal.</p>	<p>24 months</p>
<p>SR 3.5.1.10 -----NOTE----- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. -----  Verify each ADS valve opens when manually actuated.</p>	<p>24 months</p>
<p>SR 3.5.1.11 Verify automatic transfer capability of the LPCI swing bus power supply from the normal source to the backup source.</p>	<p>24 months</p>
<p>SR 3.5.1.12 Verify ADS pneumatic supply header pressure is <math>\geq</math> 80 psig.</p>	<p>31 days</p>

## 5.6 Reporting Requirements

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### 5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

9. ANF-89-98(P)(A), Generic Mechanical Design Criteria for BWR Fuel Designs.
10. ANF-91-048(P)(A), Advanced Nuclear Fuels Corporation Methodology for Boiling Water Reactors EXEM BWR Evaluation Model.
11. Commonwealth Edison Company Topical Report NFSR-0091, "Benchmark of CASMO/MICROBURN BWR Nuclear Design Methods."
12. EMF-85-74(P), RODEX2A (BWR) Fuel Rod Thermal Mechanical Evaluation Model.
13. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR)."
14. NEDC-32981P, "GEXL96 Correlation for ATRIUM 9B Fuel," September 2000.

The COLR will contain the complete identification for each of the TS referenced topical reports used to prepare the COLR (i.e., report number, title, revision, date, and any supplements).

- c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
- d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

### 5.6.6 Post Accident Monitoring (PAM) Instrumentation Report

When a report is required by Condition B or F of LCO 3.3.3.1, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

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