

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

In MODES 1 and 2, the combination of THERMAL POWER, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the limits specified in the COLR; and the following SLs shall not be exceeded:

2.1.1.1 The departure from nucleate boiling ratio (DNBR) shall be maintained ≥ 1.17 for the WRB-2 DNB correlation, and ≥ 1.13 for the ABB-NV DNB correlation, and ≥ 1.18 for the WLOP DNB.

2.1.1.2 The peak centerline temperature shall be maintained ≤ 5080 °F, decreasing by 58 °F per 10,000 MWD/MTU of burnup.

2.1.2 RCS Pressure SL

In MODES 1, 2, 3, 4, and 5, the RCS pressure shall be maintained ≤ 2735 psig.

2.2 SL Violations

2.2.1 If SL 2.1.1 is violated, restore compliance and be in MODE 3 within 1 hour.

2.2.2 If SL 2.1.2 is violated:

2.2.2.1 In MODE 1 or 2, restore compliance and be in MODE 3 within 1 hour.

2.2.2.2 In MODE 3, 4, or 5, restore compliance within 5 minutes.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.9 RCS Boron Limitations < 500°F

LCO 3.1.9 The boron concentration of the Reactor Coolant System (RCS) shall be greater than the all rods out (ARO) critical boron concentration.

APPLICABILITY: MODE 2 with $k_{\text{eff}} < 1.0$ with any RCS cold leg temperature < 500°F and with Rod Control System capable of rod withdrawal,
MODE 3 with any RCS cold leg temperature < 500°F and with Rod Control System capable of rod withdrawal,
MODES 4 and 5 with Rod Control System capable of rod withdrawal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS boron concentration not within limit.	A.1 Initiate boration to restore RCS boron concentration to within limit.	Immediately
	<u>OR</u>	
	A.2 Initiate action to place the Rod Control System in a condition incapable of rod withdrawal.	Immediately
	<u>OR</u>	
	A.3 -----NOTE----- Not applicable in MODES 4 and 5. ----- Initiate action to increase all RCS cold leg temperatures to $\geq 500^\circ\text{F}$.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.9.1	Verify RCS boron concentration is greater than the ARO critical boron concentration.	24 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
T. One or more required channel(s) or train inoperable.	T.1 Verify interlock is in required state for existing unit conditions.	1 hour
	<u>OR</u>	
	T.2 Be in MODE 2.	7 hours
U. One trip mechanism inoperable for one RTB.	U.1 Restore inoperable trip mechanism to OPERABLE status.	48 hours
	<u>OR</u>	
	U.2 Be in MODE 3.	54 hours

(continued) |

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
V. One channel inoperable.	<p>-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----</p>	
	V.1 Place channel in trip. <u>OR</u>	72 hours
	V.2.1 Be in MODE 2 with $k_{eff} < 1.0$. <u>AND</u>	78 hours
	V.2.2.1 Initiate action to fully insert all rods. <u>AND</u>	78 hours
	V.2.2.2 Initiate action to place the Rod Control System in a condition incapable of rod withdrawal. <u>OR</u>	78 hours
	V.2.3 Initiate action to borate the RCS to greater than all rods out (ARO) critical boron concentration.	78 hours

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
W. One channel inoperable.	<p>-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----</p> <p>W.1 Place channel in trip.</p>	72 hours
<p>X. Required Action and associated Completion Time of Condition W not met.</p> <p><u>OR</u></p> <p>Two or more channels inoperable.</p>	<p>X.1.1 Initiate action to fully insert all rods.</p> <p><u>AND</u></p> <p>X.1.2 Initiate action to place the Rod Control System in a condition incapable of rod withdrawal.</p> <p><u>OR</u></p> <p>X.2 Initiate action to borate the RCS to greater than all rods out (ARO) critical boron concentration.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>

SURVEILLANCE REQUIREMENTS

-----NOTE-----
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Perform CHANNEL CHECK.	12 hours

(continued)

Table 3.3.1-1 (page 1 of 6)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE (a)
1. Manual Reactor Trip	1,2	2	B	SR 3.3.1.14	NA
	3(b), 4(b), 5(b)	2	C	SR 3.3.1.14	NA
2. Power Range Neutron Flux					
a. High	1,2	4	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 112.3% RTP
b. Low	1(c), 2(f)	4	V	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 28.3% RTP
	2(h), 3(i)	4	W, X	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 28.3% RTP
3. Power Range Neutron Flux Rate					
a. High Positive Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 6.3% RTP with time constant ≥ 2 sec
b. High Negative Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 6.3% RTP with time constant ≥ 2 sec
4. Intermediate Range Neutron Flux	1(c), 2(d)	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 35.3% RTP

(continued)

- (a) The Allowable Value defines the Limiting Safety System Setting. See the Bases for the Trip Setpoints.
- (b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
- (c) Below the P-10 (Power Range Neutron Flux) interlock.
- (d) Above the P-6 (Intermediate Range Neutron Flux) interlock.
- (e) Below the P-6 (Intermediate Range Neutron Flux) interlock.
- (f) With $K_{eff} \geq 1.0$.
- (h) With $K_{eff} < 1.0$, and all RCS cold leg temperatures $\geq 500^\circ\text{F}$, and RCS boron concentration \leq the all rods out (ARO) critical boron concentration, and Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
- (i) With all RCS cold leg temperatures $\geq 500^\circ\text{F}$, and RCS boron concentration \leq the ARO critical boron concentration, and Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

Table 3.3.1-1 (page 2 of 6)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE (a)
5. Source Range Neutron Flux	2(e)	2	I,J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 1.6 E5 cps
	3(b), 4(b), 5(b)	2	J,K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11	≤ 1.6 E5 cps
6. Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	Refer to Note 1 (Page 3.3-19)
7. Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	Refer to Note 2 (Page 3.3-20)
8. Pressurizer Pressure					
a. Low	1(g)	4	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 1930 psig
b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≤ 2395 psig
9. Pressurizer Water Level - High	1(g)	3	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.9% of instrument span
10. Reactor Coolant Flow - Low	1(g)	3 per loop	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 88.9% of normalized flow

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- (a) The Allowable Value defines the Limiting Safety System Setting. See the Bases for the Trip Setpoints.
(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(e) Below the P-6 (Intermediate Range Neutron Flux) interlock.
(g) Above the P-7 (Low Power Reactor Trips Block) interlock.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified below:

- a. Pressurizer pressure is greater than or equal to the limit specified in the COLR;
- b. RCS average temperature is less than or equal to the limit specified in the COLR; and
- c. RCS total flow rate $\geq 361,200$ gpm and greater than or equal to the limit specified in the COLR.

APPLICABILITY: MODE 1.

-----NOTE-----
Pressurizer pressure limit does not apply during :

- a. THERMAL POWER ramp > 5% RTP per minute; or
- b. THERMAL POWER step > 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. -----NOTE----- Not applicable to RCS total flow rate. -----</p> <p>One or more RCS DNB parameters not within limits.</p>	<p>A.1 Restore RCS DNB parameter(s) to within limit.</p>	<p>2 hours</p>

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.1.2	Verify RCS average temperature is less than or equal to the limit specified in the COLR.	12 hours
SR 3.4.1.3	Verify RCS total flow rate is $\geq 361,200$ gpm and greater than or equal to the limit specified in the COLR.	12 hours
SR 3.4.1.4	<p>-----NOTE----- Not required to be performed until 7 days after $\geq 95\%$ RTP. -----</p> <p>Verify by precision heat balance that RCS total flow rate is $\geq 361,200$ gpm and greater than or equal to the limit specified in the COLR.</p>	18 months

Table 3.7.1-1 (page 1 of 1)
OPERABLE Main Steam Safety Valves versus Maximum Allowable Power

NUMBER OF OPERABLE MSSVs PER STEAM GENERATOR	MAXIMUM ALLOWABLE POWER (% RTP)	
4	70	
3	51	
2	31	

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR)

- a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:
 1. Specification 3.1.3: Moderator Temperature Coefficient (MTC),
 2. Specification 3.1.5: Shutdown Bank Insertion Limits,
 3. Specification 3.1.6: Control Bank Insertion Limits,
 4. Specification 3.2.3: Axial Flux Difference,
 5. Specification 3.2.1: Heat Flux Hot Channel Factor, $F_Q(Z)$,
 6. Specification 3.2.2: Nuclear Enthalpy Rise Hot Channel Factor ($F_{\Delta H}^N$),
 7. Specification 3.9.1: Boron Concentration,
 8. SHUTDOWN MARGIN for Specification 3.1.1 and 3.1.4, 3.1.5, 3.1.6, and 3.1.8,
 9. Specification 3.3.1: Overtemperature ΔT and Overpower ΔT Trip Setpoints,
 10. Specification 3.4.1: Reactor Coolant System pressure, temperature, and flow DNB limits, and
 11. Specification 2.1.1: Reactor Core Safety Limits.
- b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:
 1. WCAP-11397-P-A, "Revised Thermal Design Procedure." |
 2. WCAP-10216-P-A, "Relaxation of Constant Axial Offset Control - F_Q Surveillance Technical Specification." |
 3. WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology." |

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5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

4. WCAP-16009-P-A, "Realistic Large Break LOCA Evaluation Methodology Using the Automated Statistical Treatment of Uncertainty Method (ASTRUM)."
 5. WCAP-16045-P-A, "Qualification of the Two-Dimensional Transport Code PARAGON."
 6. WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology."
 7. WCAP 10965-P-A, "ANC: A Westinghouse Advanced Nodal Computer Code."
 8. WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report."
 9. WCAP-8745-P-A, "Design Bases for the Thermal Power ΔT and Thermal Overtemperature ΔT Trip Functions."
- 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.

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