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Attachment 2

Core Operating Limits Report, Reload 21, Cycle 22, Revision 14
(Non-Proprietary Version)

COLR HOPE CREEK 1 Rev 14 (Cycle 22)

CORE OPERATING LIMITS REPORT

FOR

Hope Creek Generating Station Unit 1

RELOAD 21, CYCLE 22

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List of Tables

1.0 Terms and Definitions

ABSP	Automated Backup Stability Protection
APLHGR	Average Planar Linear Heat Generation Rate
ARTS	APRM and RBM Technical Specification Analysis
BSP	Backup Stability Protection
COLR	Core Operating Limits Report
DSS-CD	Detect and Suppress Solution – Confirmation Density
ECCS	Emergency Core Cooling Systems
EOC	End-of-Cycle
EOC-RPT	End-of-Cycle Recirculation Pump Trip
FFWTR	Final Feedwater Temperature Reduction
FWHOOS	Feedwater Heaters Out of Service
GNF	Global Nuclear Fuel
LCO	Limiting Condition for Operation
LHGR	Linear Heat Generation Rate
$LHGRFAC_f$	ARTS LHGR thermal limit flow dependent adjustments and multipliers
$LHGRFAC_p$	ARTS LHGR thermal limit power dependent adjustments and multipliers
MCPR	Minimum Critical Power Ratio
MCPRp	ARTS MCPR thermal limit power dependent adjustments and multipliers
MCPRf	ARTS MCPR thermal limit flow dependent adjustments and multipliers
OPRM	Oscillation Power Range Monitor
RBM	Rod Block Monitor
RDF	Recirculation Drive Flow
RTP	Rated Thermal Power
S_{AD}	Amplitude Discriminator Setpoint
SLO	Single Recirculation Loop Operation
TLO	Two Recirculation Loop Operation

2.0 References

Methodology References

1. "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-26, and the Supplement NEDE-24011-P-A-26-US, January 2018.

User References

2. "GE Hitachi Boiling Water Reactor Detect and Suppress Solution – Confirmation Density," NEDC-33075P-A, Revision 8, November 2013.

3. Renewed Facility Operating License No. NPF-57, PSEG Nuclear LLC, Hope Creek Generating Station, Docket No. 50-354.

4. "Applicability of GE Methods to Expanded Operating Domains," NEDC-33173P-A, Revision 4, November 2012.

5. "GE14 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II)," NEDC-32868P, Revision 6, March 2016.

6. "Supplemental Reload Licensing Report for Hope Creek Reload 21 Cycle 22," Global Nuclear Fuel Document No. 004N2028, Revision 0, February 2018.

7. "Fuel Bundle Information Report for Hope Creek Reload 21 Cycle 22," Global Nuclear Fuel Document No. 004N2029, Revision 0, February 2018.

8. "Option B Licensing Basis & Cycle-Independent Transient Evaluation for Implementation of the Technical Specification Improvement Program (TSIP) Scram Speed," Global Nuclear Fuel Document No. 0000-0119-7785, Revision 0, October 2010.

9. "SRLR Bases Confirmation with Control Rods Inserted at End of Cycle for Hope Creek (KT1)," Global Nuclear Fuel Document No. 002N4856 Rev. 0, February 18, 2015.

10. "GNF2 Advantage Generic Compliance with NEDE-24011-P-A (GESTAR II)," NEDC-33270P, Revision 9, December 2017.

3.0 General Information

This revision of the Core Operating Limits Report provides the core operating limits for Hope Creek Generating Station Unit 1 Cycle 22 operation. This report provides information relative to OPRM setpoints, backup stability protection regions, RBM setpoints, single recirculation loop operation, and core average scram speed. The power distribution limits presented here correspond to the core thermal limits for Average Planar Linear Heat Generation Rate (APLHGR), Minimum Critical Power Ratio (MCPR), and Linear Heat Generation Rate (LHGR). Finally, this report provides references to the most recent revision of the implemented approved methodology.

These operating limit values have been determined using NRC approved methods contained in GESTAR-II (Reference 1).

These operating limit values also include limitations where required by the NRC Safety Evaluation Report for Hope Creek License Amendment Number 174, Extended Power Uprate (Reference 3) for the use of GE Licensing Topical Report NEDC-33173P, Applicability of GE Methods to Expanded Operating Domains (Reference 4).

The following sections contain operating limit values for both the GE14 fuel design and the GNF2 fuel design. The operating limit values apply to both GE14 and GNF2, unless specific values are provided for a fuel design.

The method of calculating core average scram speed, τ, is provided in Option B Licensing Basis & Cycle-Independent Transient Evaluation for Implementation of the Technical Specification Improvement Program (TSIP) Scram Speed (Reference 8).

These operating limits are established such that all applicable fuel thermal-mechanical, core thermal-hydraulic, ECCS, and nuclear limits such as shutdown margin, and transient and accident analysis limits are met.

Various sections of the Hope Creek Technical Specifications reference this COLR. Those sections are listed in Section 5 of this document. Hope Creek Technical Specification 6.9.1.9 also requires that this report, including any mid-cycle revisions, shall be provided upon issuance to the NRC.

4.0 Precautions and Limitations

This document is specific to Hope Creek Generating Station Unit 1 Cycle 22 and shall not be applicable to any other core or cycle design. Revision 14 of the COLR is applicable for Cycle 22 operating from the date of issuance through the end of cycle including consideration of reduced feedwater temperatures for FWHOOS or FFWTR, and a power coastdown to a core thermal power that shall not go below 40% rated core thermal power. End of full power capability is reached when 100% rated power can no longer be maintained by increasing core flow (up to 105% of rated core flow), at allowable feedwater temperatures, in the all-rods-out configuration. The term "all-rods-out" excludes control rods that have been inserted to suppress fuel leakers, address cell friction performance, or other circumstances that would require control rod insertion to meet Technical Specification Operability requirements (Reference 9). Operation beyond the end of full power capability is defined as power coastdown operation which includes an operating assumption that vessel dome pressure will decrease during the power coastdown period as steam flow decreases (maintaining constant vessel dome pressure during the power coastdown period was not generically considered by GESTAR-II for determining the operating limit LCO values described above).

FWHOOS was evaluated for a final feedwater temperature reduction of up to 60°F from the design rated thermal power final feedwater temperature of 433.5°F (433.5°F - 60°F = 373.5°F). Therefore, Cycle 22 FWHOOS operation is limited to feedwater system configurations that result in a final feedwater temperature greater than or equal to 373.5°F at rated thermal power. FWHOOS operation and the associated limitations may be implemented any time during the operating cycle prior to cycle extension utilizing FFWTR.

FFWTR was evaluated for a final feedwater temperature reduction of up to 86°F from the design rated thermal power final feedwater temperature of 433.5°F (433.5°F - 86°F = 347.5°F). Therefore, Cycle 22 FFWTR operation is limited to feedwater system configurations that result in a final feedwater temperature greater than or equal to 347.5°F at rated thermal power which is compliant with Renewed Facility Operating License No. NPF-57 License Condition 2.C.(11): The facility shall not be operated with a rated thermal power feedwater temperature less than 331.5°F for the purpose of extending the normal fuel cycle. FFWTR operation and the associated limitations shall only be implemented for the purposes of cycle extension after rated thermal power cannot be maintained at 100% rated total core flow in the all-rods-out configuration.

5.0 Technical Specifications that Reference the COLR

The following Hope Creek Technical Specifications reference this COLR:

Technical Specification	Title
2.1	Safety Limits
2.2	Reactor Protection System Instrumentation Setpoints
3/4.1.4.3	Rod Block Monitor
3/4.2.1	Average Planar Linear Heat Generation Rate
3/4.2.3	Minimum Critical Power Ratio
3/4.2.4	Linear Heat Generation Rate
3/4.3.1	Reactor Protection System Instrumentation
3/4.3.6	Control Rod Block Instrumentation
3/4.4.1	Recirculation System Recirculation Loops
6.9.1.9	Administrative Controls, Core Operating Limits Report

5.1 Average Planar Linear Heat Generation Rate

LIMITING CONDITION FOR OPERATION

All AVERAGE PLANAR LINEAR HEAT GENERATION RATES (APLHGRs) shall be less than or equal to the limits specified in Table 5.1-1 (GE14) and Table 5.1-2 (GNF2) for two recirculation loop operation (TLO).

When the Technical Specification 3.4.1.1 Action Statement a.1.d is entered from that section's Limiting Condition for Operation, reduce the APLHGR limits to the values specified in Table 5.1-1 and Table 5.1-2 for single recirculation loop operation (SLO).

Linear interpolation shall be used to determine APLHGR limits as a function of exposure for intermediate values in Table 5.1-1 and Table 5.1-2.

TABLE 5.1-1 APLHGR Data for GE14

Average Planar Exposure		APLHGR Limit (kW/ft)	
MWd/MTU	MWd/STU	TLO	SLO
0.00	0.00	12.82	10.26
16000	14510	12.82	10.26
21090	19130	12.82	10.26
63500	57610	8.00	6.40
70000	63500	5.00	4.00

TABLE 5.1-2 APLHGR Data for GNF2

Average Planar Exposure		APLHGR Limit (kW/ft)	
MWd/MTU	MWd/STU	TLO	SLO
0.00	0.00	13.78	11.02
18910	17150	13.78	11.02
67000	60780	6.87	5.50
70000	63500	5.50	4.40

5.2 Minimum Critical Power Ratio

LIMITING CONDITION FOR OPERATION

The MINIMUM CRITICAL POWER RATIO (MCPR) shall be equal to or greater than the MCPR limit computed from the following steps:

1. Determine τ as defined in Appendix A.

> NOTE
> The SLO operating condition MCPR values in Tables 5.2-1, 5.2-2, and 5.2-4 implement the increase in the MCPR Safety Limit to meet the requirements of Technical Specification 3.4.1.1 Action Statement a.1.c.

2. Linearly interpolate a MCPR value as a function of τ from the MCPR value at τ=0 and MCPR value at τ=1 as specified in Table 5.2-1 and Table 5.2-2 for the appropriate condition. Repeat for each fuel type.

3. For the power dependent MCPR adjustment, when thermal power is ≥ 24% rated core thermal power, determine a K_p value by linearly interpolating a K_p value as a function of core rated thermal power from Table 5.2-3. Multiply the MCPR value obtained from Step 2 by the K_p value to determine the power dependent MCPR limit for each fuel type.

   When core thermal power is < 24% rated thermal power, no thermal limits are required.

4. For the flow dependent MCPR adjustment, determine the appropriate flow dependent MCPR limit by linearly interpolating between the MCPR limits as a function of rated core flow using the information in Table 5.2-4.

5. Choose the most limiting (highest value) of the power and flow dependent MCPR limits determined in Steps 3 and 4 as the value for the MCPR limit for the Limiting Condition for Operation for each fuel type.

Note that the MCPR limit is a function of core average scram speed (τ), cycle exposure, core thermal power, total core flow, EOC-RPT operability, the number of reactor coolant recirculation loops in operation, and main turbine bypass operability.

EOC-RPT system operability is defined by Hope Creek Technical Specification 3.3.4.2.

Reactor coolant recirculation loop operation is defined by Hope Creek Technical Specification 3.4.1.1.

Main Turbine Bypass operability is defined by Hope Creek Technical Specification 3.7.7.

TABLE 5.2-1 MCPR Operating Limits Cycle Exposure ≤ 8,339 MWd/MTU (≤ 7,565 MWd/STU)

Main Turbine Bypass Operable			
Operating Condition	Scram Speed Option	GE14	GNF2
TLO-EOC-RPT Operable	A	1.48	1.50
	B	1.38	1.40
TLO-EOC-RPT Inoperable	A	1.50	1.51
	B	1.39	1.41
SLO-EOC-RPT Operable	A	1.51	1.53
	B	1.41	1.43
SLO-EOC-RPT Inoperable	A	1.53	1.54
	B	1.42	1.44

Scram Speed Option A τ=1, Scram Speed Option B τ=0
TLO = Two Recirculation Loop Operation
SLO = Single Recirculation Loop Operation

TABLE 5.2-2 MCPR Operating Limits Cycle Exposure > 8,339 MWd/MTU (> 7,565 MWd/STU)

Main Turbine Bypass Operable			
Operating Condition	Scram Speed Option	GE14	GNF2
TLO-EOC-RPT Operable	A	1.59	1.55
	B	1.42	1.45
TLO-EOC-RPT Inoperable	A	1.61	1.57
	B	1.44	1.47
SLO-EOC-RPT Operable	A	1.62	1.58
	B	1.45	1.48
SLO-EOC-RPT Inoperable	A	1.64	1.60
	B	1.47	1.50

Scram Speed Option A τ=1, Scram Speed Option B τ=0
TLO = Two Recirculation Loop Operation
SLO = Single Recirculation Loop Operation

TABLE 5.2-3 Power Dependent MCPR Multiplier (K_p) Data

Operating Condition	Core Thermal Power (% of Rated)			
	24	45	60	≥100
	MCPR Multiplier K_p			
TLO	1.561	1.280	1.150	1.000
SLO	1.561	1.280	1.150	1.000

K_p is linearly interpolated between core thermal power entries.
The K_p multiplier is the same for both GE14 and GNF2.
TLO = Two Recirculation Loop Operation
SLO = Single Recirculation Loop Operation

TABLE 5.2-4 Flow Dependent MCPR Limit ($MCPR_f$)

Operating Condition	Core Flow (% of Rated)			
	30	60	91.1	105
	MCPR Limit			
TLO	1.56		1.20	1.20
SLO	1.59	1.41		

$MCPR_f$ is linearly interpolated between core flow entries.
The $MCPR_f$ value is the same for both GE14 and GNF2.
TLO = Two Recirculation Loop Operation
SLO = Single Recirculation Loop Operation

5.3 Linear Heat Generation Rate

LIMITING CONDITION FOR OPERATION

The LINEAR HEAT GENERATION RATE (LHGR) shall not exceed the limit computed from the following steps:

> NOTE
> The steps performed in 1 through 6 below should be repeated for both UO_2 and gadolinia bearing fuel rods in each bundle type.

1. Determine the exposure dependent LHGR limit using linear interpolation between the table values in Appendix B.

> NOTE
> For two recirculation loop operation (TLO) utilize steps 1, 2, 3, and 6 to determine the LCO LHGR limits.
>
> When the Technical Specification 3.4.1.1 ACTION statement a.1.e is entered from that section's Limiting Condition for Operation (LCO), utilize steps 1, 4, 5, and 6 to determine the LCO LHGR limits for single recirculation loop operation (SLO).

2. For the power dependent LHGR adjustment for TLO, determine a $LHGRFAC_p$ value by linearly interpolating a $LHGRFAC_p$ value as a function of rated core thermal power from the TLO entries in Table 5.3-1. Multiply the LHGR values obtained from Step 1 by the $LHGRFAC_p$ value to determine the power dependent LHGR limit.

3. For the flow dependent LHGR adjustment for TLO, determine a $LHGRFAC_f$ value by linearly interpolating a $LHGRFAC_f$ value as a function of rated core flow from the TLO entries in Table 5.3-2. Multiply the LHGR values obtained from Step 1 by the $LHGRFAC_f$ value to determine the flow dependent LHGR limit.

4. For the power dependent LHGR adjustment for SLO, determine a $LHGRFAC_p$ value by linearly interpolating a $LHGRFAC_p$ value as a function of rated core thermal power from the SLO entries in Table 5.3-1. Multiply the LHGR values obtained from Step 1 by the $LHGRFAC_p$ value to determine the power dependent LHGR limit.

5. For the flow dependent LHGR adjustment for SLO, determine a $LHGRFAC_f$ value by linearly interpolating a $LHGRFAC_f$ value as a function of rated core flow from

the SLO entries in Table 5.3-2. Multiply the LHGR values obtained from Step 1 by the $LHGRFAC_f$ value to determine the flow dependent LHGR limit.

6. Choose the most limiting (lowest value) of the power and flow dependent LHGR limits determined in Steps 2 and 3 (TLO) or 4 and 5 (SLO) as the value for the LHGR limit for the Limiting Condition for Operation.

TABLE 5.3-1 Power Dependent Linear Heat Generation Rate Multiplier ($LHGRFAC_p$)

Operating Condition	Core Thermal Power (% of Rated)		
	24	59.89	≥ 100
	$LHGRFAC_p$ Multiplier		
TLO	0.603		1.000
SLO	0.603	0.790	

$LHGRFAC_p$ is linearly interpolated between core thermal power entries.
The $LHGRFAC_p$ multiplier is the same for both GE14 and GNF2.
TLO = Two Recirculation Loop Operation
SLO = Single Recirculation Loop Operation

TABLE 5.3-2 Flow Dependent Linear Heat Generation Rate Multiplier ($LHGRFAC_f$)

Operating Condition	Core Flow (% of Rated)					
	30	50	52.7	60	82.2	105
	$LHGRFAC_f$ Multiplier					
TLO	0.500	0.782			1.000	1.000
SLO	0.500	0.782	0.800	0.800		

$LHGRFAC_f$ is linearly interpolated between core flow entries.
The $LHGRFAC_f$ multiplier is the same for both GE14 and GNF2.
TLO = Two Recirculation Loop Operation
SLO = Single Recirculation Loop Operation

5.4 OPRM Setpoints

5.4.1 Technical Specifications Table 2.2.1-1, Function 2.f, OPRM Upscale

A DSS-CD evaluation was completed for Hope Creek Cycle 22 in accordance with the licensing methodology described in Reference 2. The DSS-CD evaluation confirms that the DSS-CD solution is applicable to Hope Creek Cycle 22 and confirms S_{AD} = 1.10 for Hope Creek Cycle 22 operation.

The S_{AD} = 1.10 is applicable under all operating conditions within the OPRM Armed Region.

5.5 Rod Block Monitor

5.5.1 Reactivity Control Systems, Rod Block Monitor

Limiting Condition For Operation

Technical Specifications 3.1.4.3 Both rod block monitor (RBM) channels shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 30% of RATED THERMAL POWER and less than 90% of RATED THERMAL POWER with MCPR less than 1.73, or THERMAL POWER greater than or equal to 90% of RATED THERMAL POWER with MCPR less than 1.43.

5.5.2 Technical Specifications Table 3.3.6-2, Control Rod Block Instrumentation Setpoints, Trip Function 1, Rod Block Monitor

TABLE 5.5.2-1 Control Rod Block Instrumentation Setpoints, Trip Function 1, Rod Block Monitor

Trip Function	Trip Setpoint*	Allowable Value*
a.i) Low Trip Setpoint (LTSP)	123.0	123.4
a.ii) Intermediate Trip Setpoint (ITSP)	118.2	118.6
a.iii) High Trip Setpoint (HTSP)	113.2	113.6
c. Downscale	5	N/A

* % RBM Reference Level

Appendix A: Method of Core Average Scram Speed Calculation

Method of Core Average Scram Speed, τ, Calculation

τ is defined as $$\tau = \frac{(\tau_{ave} - \tau_B)}{\tau_A - \tau_B}$$

where: $$\tau_B = 0.672 + 1.65\left[\frac{N_1}{\sum_{i=1}^{n} N_i}\right]^{1/2}(0.016) \qquad \tau_{ave} = \frac{\sum_{i=1}^{n} N_i \tau_i}{\sum_{i=1}^{n} N_i}$$

τ_A= 0.86 seconds, control rod scram insertion time limit to notch 39 per Specification 3.1.3.3,

n = number of surveillance tests performed to date in cycle,

N_i = number of active control rods measured in the ith surveillance test,

τ_i = average scram time to notch 39 of all rods measured in the ith surveillance test, and

N_1 = total number of active rods measured in Specification 4.1.3.3.a or 4.1.3.3.d.

If $\tau_{ave} \leq \tau_B$, set τ = 0 to apply Option B OLMCPR.

τ shall be 1.0 (τ = 1.0) prior to performance of the initial scram time measurements for the cycle in accordance with Specification 4.1.3.3.

Appendix B: Exposure-Dependent Linear Heat Generation Rate Limits

Exposure-Dependent Linear Heat Generation Rate Limits

The LHGR limits for all fuel and rod types are considered proprietary information of the vendor. Tables B-1 through B-8 contain exposure-dependent LHGR limits. The tables are presented in pairs since the LHGR limits are presented at separate peak pellet exposures for UO_2 and gadolinia bearing fuel rods. Several of the bundle types have the same exposure-dependent LHGR limits, and the applicable bundle types are noted before each set of tables. The gadolinia fuel rod limits provided for each bundle type reflect the bounding gadolinia LHGR limit for all gadolinium concentrations occurring in that bundle type.

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Tables B-1 and B-2 contain limits applicable to the GE14 bundle types that follow.

- GE14-P10CNAB401-9G6.0/6G4.0-100T-150-T6-4343
- GE14-P10CNAB401-9G6.0/6G4.0-100T-150-T6-4238
- GE14-P10CNAB401-14G6.0-100T-150-T6-4059

TABLE B-1: GE14 LHGR Limits – UO_2 Fuel Rods

Peak Pellet Exposure		UO_2 LHGR Limit
MWd/MTU	MWd/STU	kW/ft
[[		
		]]

TABLE B-2: GE14 LHGR Limits – Gadolinia Bearing Rods

Peak Pellet Exposure		Most Limiting Gadolinia LHGR Limit
MWd/MTU	MWd/STU	kW/ft
[[		
		]]

Tables B-3 and B-4 contain limits applicable to the GE14 bundle types that follow.

- GE14-P10CNAB401-17G4.0-100T-150-T6-4342
- GE14-P10CNAB401-17GZ-100T-150-T6-4237

TABLE B-3: GE14 LHGR Limits – UO_2 Fuel Rods

Peak Pellet Exposure		UO_2 LHGR Limit
MWd/MTU	MWd/STU	kW/ft
[[		
		]]

TABLE B-4: GE14 LHGR Limits – Gadolinia Bearing Rods

Peak Pellet Exposure		Most Limiting Gadolinia LHGR Limit
MWd/MTU	MWd/STU	kW/ft
[[		
		]]

Tables B-5 and B-6 contain limits applicable to the GNF2 bundle types that follow.

- GNF2-P10CG2B392-13G4.0-100T2-150-T6-4533
- GNF2-P10CG2B392-14G4.0-100T2-150-T6-4534

TABLE B-5: GNF2 LHGR Limits – UO_2 Fuel Rods

Peak Pellet Exposure		UO_2 LHGR Limit
MWd/MTU	MWd/STU	kW/ft
[[		
		]]

TABLE B-6: GNF2 LHGR Limits – Gadolinia Bearing Rods

Peak Pellet Exposure		Most Limiting Gadolinia LHGR Limit
MWd/MTU	MWd/STU	kW/ft
[[		
		]]

Tables B-7 and B-8 contain limits applicable to the GNF2 bundle types that follow.

- GNF2-P10CG2B382-15GZ-100T2-150-T6-4438
- GNF2-P10CG2B382-6G5.0/7G4.0-100T2-150-T6-4439
- GNF2-P10CG2B377-15GZ-100T2-150-T6-4440
- GNF2-P10CG2B375-6G5.0/7G4.0-100T2-150-T6-4441
- GNF2-P10CG2B392-10G5.0/5G4.0-100T2-150-T6-4442
- GNF2-P10CG2B372-12GZ-100T2-150-T6-4531
- GNF2-P10CG2B383-14GZ-100T2-150-T6-4532

TABLE B-7: GNF2 LHGR Limits – UO_2 Fuel Rods

Peak Pellet Exposure		UO_2 LHGR Limit
MWd/MTU	MWd/STU	kW/ft
[[		
		]]

TABLE B-8: GNF2 LHGR Limits – Gadolinia Bearing Rods

Peak Pellet Exposure		Most Limiting Gadolinia LHGR Limit
MWd/MTU	MWd/STU	kW/ft
[[		
		]]

Appendix C: Backup Stability Protection

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Backup Stability Protection Region Intercepts

Table C-1 values reflect the cycle-specific BSP region intercepts determined for Cycle 22 considering nominal feedwater temperature operation and FWHOOS (Reference 6).

Table C-2 provides BSP region intercepts for Cycle 22 for the implementation of FFWTR operation (Reference 6).

TABLE C-1: BSP Region Intercepts (Operation Prior to FFWTR)

Region Boundary Intercept	% Power	% Flow
Region 1 High Flow Control Line	61.5	45.2
Region 1 Natural Circulation Line	44.0	35.0
Region 2 High Flow Control Line	67.6	52.8
Region 2 Natural Circulation Line	31.7	36.3

TABLE C-2: BSP Region Intercepts (Required for FFWTR)

Region Boundary Intercept	% Power	% Flow
Region 1 High Flow Control Line	65.1	49.8
Region 1 Natural Circulation Line	42.2	35.4
Region 2 High Flow Control Line	71.4	57.7
Region 2 Natural Circulation Line	31.7	36.3

Region 1 = BSP Scram Region
Region 2 = BSP Controlled Entry Region

Automated Backup Stability Protection (ABSP) Region Setpoints

Table C-3 values reflect the cycle-specific modified Simulated Thermal Power – Upscale scram setpoints for implementation of the ABSP region (Reference 6).

The ABSP region is conservatively constructed to encompass BSP Region 1 and generates an immediate automatic reactor scram upon entry. The ABSP region provided is applicable for Nominal, FWHOOS, and FFWTR conditions.

TABLE C-3: ABSP Region Setpoints

Parameter	Setpoint
Slope for Trip (m_{TRIP})	0.79 (% RTP/% RDF)
Constant Power Line for Trip ($P_{BSP-TRIP}$)	44.0 (% RTP)
Constant Flow Line for Trip ($W_{BSP-TRIP}$)	37.8 (% RDF)
Flow Breakpoint ($W_{BSP-BREAK}$)	15.3 (% RDF)