## **ENCLOSURE 3**

# VOGTLE ELECTRIC GENERATING PLANT REQUEST TO REVISE TECHNICAL SPECIFICATIONS REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

# MARKED-UP TECHNICAL SPECIFICATION AND BASES PAGES

The following pages from VEGP Unit 1 and Unit 2 TS LCOs 3.3.1 and 3.3.2 have been marked to show the proposed changes. In addition, clean typed pages reflecting the proposed changes have been provided.

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	FUNCTION	APPLICABLE MODES OR DTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(N)
1.	Namual Reactor	1,2	2		SR 3.3.1.13	NA	-
	Trip	3(*), 4(*), 5(*)	2	c	SR 3.3.1.13	NA	MA
2.	Power Range Neutron Flux						y
	e. 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 3.3.1.15	5 111.3% RTP	(3) 1092 RTP
	b. Low	1 <sup>(b)</sup> ,2	4	ŧ	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.15	≤ 27.3% RTP	JZIX RTP
3.	Power Range Meutron flux High Positive Rate	1,2	•	£	SR 3.3.1.7 SR 3.3.1.11	5 6.3% RTP with time constant 2 2 sec	SSX RTP With time constant 2 2 sec
4.	Intermediate Range Neutron Flux	1 <sup>(b)</sup> , 2 <sup>(c)</sup>	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	5 31.1% RTP	325% RTP
		2 <sup>(d)</sup>	2	٠	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 31.1% R7P	(1) 25% RTP

Table 3.3.1-1 (page 1 + 8) Reactor Trip System Instrumentation

(continued)

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

Below the P-10 (Power Range Neutron Flux) interlocks. (b)

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(1) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

Amendment No. 96 (Unit 1) Amendment No. 74 (Unit 2)

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	COND1710NS	SURVEILLANCE REQUIREMENTS	ALLOWABLE	NOMINAL TRIP SETPOINT(A)
5.	Source Range Neutron flux	2(q)	2	1,7	SR 3.3.1.1 SR 3.3.1.6 SR 3.3.1.11 SR 3.3.1.15	5 1.4 E5 cps	(1.0 ES
		3(a), 4(a), 5(a)	2	J,K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.15	5 1.4 E5 cps	(1.0 E5 CEPS
		3(e), 4(e), 5(e)	1	L	SR 3.3.1.1 SR 3.3.1.11	-	NA
6.	Overtemperature AT	1,2	4	ŧ	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 1 (Page 3.3-20)	Refer to Note 1 (Page 3.3-20)
7.	Overpower &T	1,2	•	t	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3-21)	Refer to Note 2 (Page 3.3-21)

## Table 3.3.1-1 (page 2 of 8) Reactor Trip System Instrumentation

(centinued)

(a) With RTBs closed and Rod Control System capable of rod withdrawel.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(e) With the RTBs open. In this condition, source range function does not provide reactor trip but does provide input to the Kigh Flux at Shutdown flarm System (LCD 3.3.8) and indication.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Amendment	No.	96	(Unit	1)
Amendment			(Unit	2)

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVE ILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP (0)
8.	Pressurizer Pressure						~
	s. Low	1(1)	•	•	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1950 psig	(2) 1960(8) pais
	b. High	1,2	•	ı	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	5 2395 paig	OZJES DE 10
۹.	Pressurizer Water Level - High	1(*)	3	٠	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	5 93.9X	() 92X
10.	Reactor Coolant Flow - Low						r
	a. Single Loop	1 <sup>(h)</sup>	3 per loop	•	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	2 89.4%	(Toox
	в. Тию Loops	1(1)	3 per Leap	٠	ER 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	2 89.4X	(Joor

#### Table 3.3.1-1 (page 3 of 8) Reactor Trip System Instrumentation

(continued)

(f) Above the P-7 (Low Power Reactor Trips slock) interlock.

(g) Time constants utilized in the lead-lag controller for Pressurizer Pressure-Low are 10 seconds for lead and 1 second for lag.

(h) Above the P-8 (Power Range Heutron Flux) interlock.

(i) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Heutron Flux) interlock.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Amendment No. 96 (Unit 1) Amendment No. 74 (Unit 2)

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINA ( SETPOINT()
11.	Undervoltege RCPs	1(1)	2 per bus	м	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.15	2 9481 V	(19600 v
12.	Underfrequency RCPs	1(f)	2 per bus	•	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.15	≥ 57.1 Hz	(2) 57.3 Hz
13.	Steam Generator (SG) Water Level - Low Low	1,2	4 per SG	ı	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 35.9X	(37.8x
-						a succession and a state of the state of the second	(continued)

#### Table 3.3.1-1 (page 4 of 8) Reactor Trip System Instrumentation

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

Amendment No. 96 (Unit 1) Amendment No. 74 (Unit 2)

	,	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOIN(A)
4.	Turb	oine Trip						~
	۰.	Low Fluid Dil Pressure	1(1)	3	0	SR 3.3.1.10 SR 3.3.1.16	2 500 psig	(580 pair
	b.	Turbine Stop Valve Closure	1(1)	4	,	SR 3.3.1.10 SR 3.3.1.14	open	0 96.7% open
15.	Inpa Engi Feat	ety ection (SI) ut from ineered Safety ture Actuation tem (ESFAS)	1,2	2 trains	٩	SR 3.3.1.13	KA	NA -
16.		ctor Trip tem Interlocks						~
	۰.	Intermediate Range Neutron Flux, P-6	2(q)	2		SR 3.3.1.11 SR 3.3.1.12	2 6E-11 amp	01E-10 emp
	b.	Low Power Reactor Trips Block, P-7	۱	1 per train	\$	SR 3.3.1.5	NA	**
	c.	Power Range Neutron Flux, P-8	1	4	5	SR 3.3.1.11 SR 3.3.1.12	5 50.3% RTP	Ø48X RTP
	d.	Power Range Neutron Flux, P-9	1	•	\$	SK 3.3.1.11 SR 3.3.1.12	52.3% RTP	SOX RTP
	e.	Power Range Neutron Flux, P-10 and input	1,2	•	۲	SR 3.3.1.11 SR 3.3.1.12	(1,m)	(1,m)
	۴.	to P-7 Turbine Impulse Pressure, P-13	١	2	\$	SR 3.3.1.10 SR 3.3.1.12	≤ 12.3% Isopulse Pressure Equivalent turbine	G 10% Impulse Pressure Equivalent turbine
					and the A last second of Links and An			(centinued)
(d)	Abo	ve the P-9 (Power	Range Neutron Flux)	interlock.		Nomine		P.
(l) (m)	For		P-7, the Allowable Neutron flux, P-10,					is

Table 3.3.1-1 (page 5 of 8) Reactor Trip System Instrumentation

 (n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.
 Vogtle Units 1 and 2
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 Amendment No. 96 (Unit 1) Amendment No. 74 (Unit 2)

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE	NOMINAL SETPOINTO
7.	Reactor Trip	1,2	2 trains	T,V	SR 3.3.1.4	-	KA
	Reactor [[]P Breakers	3(*), 4(*), 5(*)	2 trains	c	SR 3.3.1.4	<b>NA</b>	MA
	Reactor Trip Breaker	1,2	1 each per RTB	u,v	SR 3.3.1.4	NA	KA.
	Undervoltage and Shunt Trip Wechanisms	3(*), 4(*), 5(*)	1 each per RTB	c	SR 3.3.1.4	MA	NA.
19.	Autometic Trip	1,2	2 trains	0,V	SR 3.3.1.5	NA	NA
	Logic	3(8), 4(8), 5(8)	2 trains	c	SR 3.3.1.5	NA	NA

## Table 3.3.1-1 (page 6 of 8) Reactor Trip System Instrumentation

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

Amendment No. 96 (Unit 1) Amendment No. 74 (Unit 2)

#### Table 3.3.1-1 (page 7 of 8) Reactor Trip System Instrumentation

# Note 1: Overtemperature Delte-T

Nominal

The Overtemperature Delta-T Function Allowable Value shall not exceed the Trip Setpoint defined by the following equation by more than 2.25% of RTP.

100	AT (1++++=)	1 5 K	(1 - K2 (1 + 745)	$T \frac{1}{(1 + \tau_0 s)} - T'$	- K3(P'-P) - f1 (AFD)	
-----	-------------	-------	-------------------	-----------------------------------	-----------------------	--

Where:

measured loop specific RCS differential temperature, degrees F

- indicated loop specific RCS differential at RTP, degrees F
- lead-leg compensator on measured differential temperature 1+718
- 1+7 26 \*1. \*2

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K2

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time constants utilized in lead-lag compensator for differential temperature: +, 2 8 seconds, T2 5 3 seconds

Lag compensator on measured differential temperature 107 36

time constant utilized inflag compensator for differential temperature, ± 2 seconds

funciamental setpoint, (12% RTP modifier for temperature, (2.24% RTP per degree F

1+7.8 lead-lag compensator on dynamic temperature compensation 1+185

time constants utilized in lead-lag compensator for temperature compensation:  $\tau_4 \ge 28$ 74. 78 seconds, 75 5 4 seconds

measured loop specific RCS average temperature, degrees F

isg compensator on measured average temperature 1+7 .5

time constant utilized in lag compensator for average temperature, = 0 seconds Te

- indicated loop specific RCS average vemperature at RTP, (5)588.4 degrees F
- modifier for pressure, 60.115% RTP per paig K3

measured RCS pressurizer pressure, paig p

reference pressure, (2) 2235 paig p:

Laplace transform variable, inverse seconds

modifier for Axial Flux Difference (AFD): f, (AFD)

1. for AFD between -32% and +10%, = 0% RTP

2. for each % AFD is below -32%, the trip setpoint shall be reduced by 3.25% RTP

3. for each % AFD is above +10%, the trip setpoint shall be reduced by 2.7% RTP

Amendment	No.	96	(Unit	1)
Amendment			(Unit	2)

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RTS Instrumentation 3.3.1

Amenoment No. 96 (Unit 1)

Amendment No. 74 (Unit 2)

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Table 3.3.1-1 (page 8 of 8) Reactor Trip System Instrumentation

#### Note 2: Overpower Delta-T

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where:

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Nominal

The Overpower Delta-T Function ALLOWABLE VALUE shall not exceed the Trip Setpoint defined by the following equation by more than 2.85% of RTP.

100	$\frac{\Delta T}{\Delta T_{0}} \frac{(1 + \tau_{1} s)}{(1 + \tau_{2} s)} \frac{1}{(1 + \tau_{2} s)} = \begin{bmatrix} K_{4} - \begin{bmatrix} K_{5} \frac{(\tau_{7} s)}{(1 + \tau_{7} s)} \frac{1}{(1 + \tau_{9} s)} \end{bmatrix} - K_{6} \begin{bmatrix} T \frac{1}{(1 + \tau_{9})} - T'' \end{bmatrix} - f_{2} (AFD) \end{bmatrix}$
T	measured loop specific RCS differential temperature, degrees F
AT <sub>o</sub>	indicated loop specific RCS differential at RTP, degrees F
1+7 18 1+7 28	lead-lag compensator on measured differential temperature
*1, *2	time constants utilized in lead-lag compensator for differential temperature: $\tau_1 \ge 8$ Leconds, $\tau \le 3$ seconds
1 1+7 35	lag compensator on measured differential temperature
*3	time constant utilized to tag compensator for differential temperature, ≤ 2 seconds
K.4	fordamental setpoint, (309.5% RTP
к5	modifier for temperature change: 22% RTP per degree F for increasing temperature, 2 0% RTP per degree F for decreasing temperature
1+778 1+778	rate-lag compensator on dynamic temperature compensation
*7	time constant utilized in rate-lag compensator for temperature compensation, 2 10 seconds
T	measured loop specific RCS average temperature, degrees F
1-105	lag compensator on measured average temperature
*e	time constant utilized in lag compensator for average temperature, = 0 seconds
Ka	modifier for temperature: (20.20% RTP per degree F for T > T". = 0% RTP for T S T"
T#	indicated loop specific RCS average temperature at RTP, 5582.4 degrees F
	Laplace transform variable, inverse seconds
f 2(AFD)	modifier for Axial Flux Difference (AFD), = OX RTP for all AFC

Vogtle Units 1 and 2

		FUNCTION	APPLICABLE NODES OR OTNER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS		RVEILLANCE BUIREMENTS	ALLOWABLE VALUE	NOMINAL SETPOINT (2)
1.	Saf	ety Injection							
		Manuel Initiation	1,2,3,4	2		SR	3.3.2.6	MA	NA
	b.	Automatic Actuation Logic and Actuation Relays	1,2,3,4	2	c	SR SR SR	3.3.2.2 3.3.2.3 3.3.2.5	NA	KA
	٤.	Containment Pressure - Kigh 1	1,2,3	3	D	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	5 4.4 paig	(3.8 pais
	d.	Pressurizer Pressure - Low	1,2,3(*)	4	D	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	2 1856 peig	(2)1870 paig
	۰.	Steam Line Pressure - Low	1,2,3(8)	3 per steam line	D		3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	(3)570 <sup>(b)</sup>	(E)585 <sup>(b)</sup> pais

Table 3.3.2-1 (page 1 of 7) Engineered Safety Feature Actuation System Instrumentation

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock. (b) Time constants used in the lead/lag controller are  $t_1 \ge 50$  seconds and  $t_2 \le 5$  seconds.

The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to

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		FUNCTION	APPLICABLE MODES OR OTNER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS		VEILLANCE NIREMENTS	ALLOWABLE VALUE	NOMINAL SETPOINT(L)
2.	Con	ontainment Spray	A DESCRIPTION OF A DESCRIPTION OF A DESCRIPTION OF						
		Manual Initiation	1,2,3,4	2	8	SR	3.3.2.6	AM	NA
	b.	Automatic Actuation Logic and Actuation Relays	1,2,3,4	2	¢	SR SR SR	3.3.2.2 3.3.2.3 3.3.2.5	KA	BA
	c.	Containment Pressure							e
		High - 3	1,2,3	*	£	SR SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	≤ 22.4 psig	(21.5 psig

Table 3.3.2-1 (page 2 of 7) Engineered Safety Feature Actuation System Instrumentation

(continued)

The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

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		FUNICTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS		VEILLANCE	ALLOWABLE	NOMINAL SETPOINT(2)
3.		e A Containment ation							
	(.)	Menuel Initiation	1,2,3,4	2		SR	3.3.2.6	MA	NA
	(6)	Autometic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	c	SR SR SR	3.3.2.2 3.3.2.3 3.3.2.5	NA	KA
	(c)	Safety Injection	Refer to fun functions an	ction 1 (Se d requirement	fety Injection) nts.	for	ell initio	ation	
4.	Ste	en Line Isolat(:>n							
		Manual Initiation	1,2(c),3(c)	2	,	\$R	3.3.2.6	KA	NA
	b.	Autometic Actuation Logic and Actuation Releys	1,2(c),3(c)	2	6	SP SR SR	3.3.2.2 3.3.2.3 3.3.2.5	NA.	NA.
									(continued)

Table 3.3.2-1 (page 3 of 7) Engineered Safety Feature Actuation System Instrumentation

(c) Except when one main steam isolation valve and associated bypass isolation valve per steam line is closed.

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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		FUNCTION	APPLICABLE MODES OR OTNER SPECIFIES CONDITIONS	REQUIRED	CONDITIONS		VEILLANCE	ALLOWABLE VALUE	NOMINAL SETPOINT(A)
4.		am Line Isolation continued)							( 14.5 peie
	¢.	Containment Pressure - Kigh 2	1,2 <sup>(c)</sup> , 3 <sup>(c)</sup>	3	D	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	s 15.4 paig	(9 14.5 peig
	d.	Steam Line Pressure							Y .
		(1) Low	1,2 <sup>(c)</sup> , 3 <sup>(e)(c)</sup>	3 per steam line	D	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	2 570 (b) psig	() SES (b) peig
		(2) Negative Rate - High	3(q)(c)	3 per steam line	D	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	s 125 (e) psi/sec	() 100 (e) psi/sec

		3.3.2.1 (par		
Engineered	Safety Fea	ture Actuati	on system	Instrumentetion

(continued)

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(a) Above the P-11 (Pressurizer Pressure) interlock. (b) Time constants used in the lead/lag controller are  $t_1 \ge 50$  seconds and  $t_2 \le 5$  seconds. (c) Except when one main steam isolation valve and associated bypass isolation valve per staam line is closed. (d) Selow the P-11 (Pressurizer Pressure) interlock. (e) Time constant utilized in the rate/lag controller is  $\ge 50$  seconds.

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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		FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REGUIRED CHANNELS	CONDITIONS		VEILLANCE	ALLOWABLE	NOMINAL SETPOIN(1)
5.		time Trip and Muscer isolation							
	•.	Autometic Actuation Logic and Actuation	1,2(f)	2 traics	٠		3.3.2.2 3.3.2.3 3.3.2.5	NA	
		2 -Lays							1
	b.	Low RCS Tavg	1,2(*)	•	1		3.3.2.1 3.3.2.4 3.3.2.7	2 561.5 *>	@ 564 *1
		Coincident with Reactor Trip, P-4	Refer to fun	ction be for	ell P-4 requi	remor	vts.		,
	٤.	SG Water Level - High High (P-14)	1,2(*)	4 per SG	ı	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	1 87.91	5 86.0X
	e.	Safety Injection		uction 1 (Saf wd requiremen	ety Injection	) for	ell initie	tion	
6.	ALD	iliary Feedwater							
	•.	Autometic Actuation Logic and Actuation Relays	1,2,3	2 trains	6	58	3.3.2.2 3.3.2.3 3.3.2.5	RA.	<b>NA</b>
	ь.	SC Water Level - Low Low	1,2,3	4 per 56	D	52 52 52 52	3.3.2.4 3.3.2.7	2 35.91	Ø 37.8X
									(centinued)

# Table 3.3.2-1 (page 5 of 7) Engineered Safety Feature Actuation System Instrumentation

(f) Except when one MFIV or MFRV, and its associated bypass valve per feedwater line is closed and deactivated or isolated by a closed manual valve.

(1) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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		FUNCTION	APPLICABLE NODES OR OTNER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS		VEILLANCE	ALLOWABLE	NOMINAL SETPOIN
6.		lliary Feedwater continued)							
	٤.	Sefety Injection	Refer to Fur functions an	nction 1 (Sand requirement	fety injection mts.	n) fo	r ell initi	iation	
	d.	Trip of all Main Feedwater Pumps	1,2(0)	1 per pump	,	SR	3.3.2.6	54Å	MA.
1.	Swi	i-automatic tchover to tainment Sump							
	•.	Automatis Action Logic and Actuation Relays	1,2,3,4 <sup>(h)</sup>	2	¢	SP SR SR	3.3.2.2 3.3.2.3 3.3.2.5	MA	~
	b.	Refueling Water Storage Tank (RWST) Level - Low Low	1,2,3,4	•	ĸ	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	2 264.9 in.	Ø 275.3 in.
		Coincident with Safety Injection	Refer to Fu functions a	nction 1 (5 nd requirem	efety injectio ents.	m) fi	or ell init	iation	

Table 3.3.2-1 (page 6 of 7) Engineered Safety feature Actuation System Instrumentation

(p) When the Main Feedwater System 's operating to supply the SGs.

(h) In MODE 4, only 1 train is required to be OPERABLE to support semi-automatic switchover for the RMR pump that is required to be OPERABLE in accordance with Specification 3.5.3, ECCS-shutdown.

(A) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

(continued)

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS		VEILLANCE	ALLOMABLE	NOMINAL SETPOIN(A)
8. ESFAS Interlocks	a propried and a second sec	See Anne Cornel Artificity and and an and				Exercised Exercises. A scalar viscour a sea	
e. Reactor Trip, P-6	1,2,3	1 per train, 2 trains	'	SR	3.3.2.9	84	**
<ul> <li>b. Pressurizer Pressure, P-11</li> </ul>	1,2,3	3	L	SR SR	3.3.2.4 3.3.2.7	s 2010 paig	2000 pais

## Table 3.3.2-1 (page 7 of 7) Engineered Safety Feature Actuation System Instrumentation

The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

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(i)

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Amendment No. 96 (Unit 1) Amendment No. 74 (Unit 2)

# BASES

## BACKGROUND Reactor Trip Switchgear (continued)

trip mechanism is sufficient by itself, thus providing a diverse trip mechanism.

The decision logic matrix Functions are described in the functional diagrams included in Reference 1. In addition to the reactor trip or ESF, these diagrams also describe the various "permissive interlocks" that are associated with unit conditions. Each train has a built in testing device that can automatically test the decision logic matrix Functions and the actuation devices while the unit is at power. When any one train is taken out of service for testing, the other train is capable of providing unit monitoring and protection until the testing has been completed. The testing device is semiautomatic to minimize testing time.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The RTS functions to maintain the SLs during all AOOs and S, mitigates the consequences of DBAs in all MODES in LCO, and which the RTBs are closed.

Each of the analyzed accidents and transients can be detected by one or more RTS Functions. The accident analysis described in Reference 3 takes credit for most RTS trip Functions. RTS trip Functions not specifically credited in the accident analysis are qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the unit. These RTS trip Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. They may also serve as backups to RTS trip Functions that were credited in the accident analysis.

The LCO requires all instrumentation performing an RTS Function, listed in Table 3.3.1-1 in the accompanying LCO, to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.

The LCO generally requires OPERABILITY of four or three channels in each instrumentation Function, two channels of Manual Reactor Trip in each logic Function, and two trains in each Automatic Trip Logic Function. Four OPERABLE

(continued)

INSERT -

Revision No. 0

# **INSERT FOR BASES PAGE B 3.3-7**

The Nominal Trip Setpoint column is modified by a Note that allows the Trip Setpoint to be set more conservatively than the nominal value. The conservative direction is established by the direction of the inequality applied to the Allowable Value. For example, the Power Range Neutron Flux High trip setpoint may be set to a value less than 109 % during initial startup following a refueling outage until a sufficiently high reactor power is achieved so that the power range channels may be calibrated. In addition, certain Required Actions may require that the Power Range Neutron Flux High trip setpoints be reduced based on plant conditions.

## BASES

INSERT New PP

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

Overtemperature △T (continued)

This results in a two-out-of-four trip logic. Section 7.2.2.3 of Reference 1 discusses control and protection system interactions for this function. Note that this Function also provides a signal to generate a turbine runback prior to reaching the Trip Setpoint. A turbine runback will reduce turbine power and reactor power. A reduction in power will normally alleviate the Overtemperature  $\Delta T$  condition and may prevent a reactor trip.

Delta-Tn, as used in the overtemperature and overpower AT trips, represents the 100% RTP value as measured for each loop. This normalizes each loop's AT trips to the actual operating conditions existing at the time of measurement, thus forcing the trip to reflect the equivalent full power conditions as assumed in the accident analyses. These differences in RCS loop  $\Delta T$ can be due to several factors, e.g., differences in RCS loop flows and slightly asymmetric power distributions between quadrants. While RCS loop flows are not expected to change with cycle life, radial power redistribution between quadrants may occur, resulting in small changes in loop sr cific AT values. Therefore, loop specific  $\Delta T_n$  values are measured as needed to ensure they represent actual core conditions.

The LCO requires all four channels of the Overtemperature  $\Delta T$  trip Function to be OPERABLE. Note that the Overtemperature  $\Delta T$  Function receives input from channels shared with other RTS Functions. Failures that affect multiple Functions require entry into the Conditions applicable to all affected Functions.

In MODE 1 or 2, the Overtemperature  $\Delta T$  trip must be OPERABLE to prevent DNB. In MODE 3, 4, 5, or 6, this trip Function does not have to be OPERABLE because the reactor is not operating and there is insufficient heat production to be concerned about DNB.

(continued)

Vogtle Units 1 and 2

Revision No. 0

## **INSERT FOR BASES PAGE B 3.3-16**

The values for  $K_1$ ,  $K_2$ ,  $K_3$ , T', and P' may be treated as nominal values for the purpose of performing a CHANNEL CALIBRATION. The direction of conservatism for these values is as follows:

$K_1 \leq Identified Value$	$K_2 \ge$ Identified Value	$K_3 \ge Identified Value$
T' ≤ Identified Value	P' ≥ Identified Value	

Note that  $K_1$  is the principle setpoint gain, since it defines the function offset.  $K_2$  and  $K_3$  define the temperature gain and pressure gain respectively. The values for T' and P' are key reference parameters corresponding directly to plant safety analyses initial conditions assumptions for the Overtemperature  $\Delta T$  Function. The as left settings for these parameters should be as close as possible or conservative with respect to the identified values. In order to ensure that the Overtemperature  $\Delta T$  setpoint is consistent with the assumptions of the safety analyses, it is necessary to verify during the CHANNEL OPERATIONAL TEST, that the Overtemperature  $\Delta T$  setpoint is within the appropriate calibration tolerances for conditions where the temperature input is equal to T' and the pressure input is equal to P', and that appropriate penalties are generated to reduce the setpoint for a temperature input greater than T', and again for a pressure input less than P' (Ref. 9).

## BASES

APPLI'ABLE 7. SAFETY ANALYSES, LCO, and APPLICABILITY

INSERT-

New PP

Overpower AT (continued)

Delta-Tp, as used in the overtemperature and overpower AT trips, represents the 100% RTP value as measured for each loop. This normalizes each loop's  $\Delta T$  trips to the actual operating conditions existing at the time of measurement, thus forcing the trip to reflect the equivalent full power conditions as assumed in the accident analyses. These differences in RCS loop  $\Delta T$ cun be due to several factors, e.g., difference in RCS loop flows and slightly asymmetric power distributions between quadrants. While RCS loop flows are not expected to change with cycle life, radial power redistribution between quadrants may occur, resulting in small changes in loop specific  $\Delta T$  values. Therefore, loop specific  $\Delta T_0$  values are measured as needed to ensure they represent actual core conditions.

The LCO requires four channels of the Overpower  $\Delta T$ trip Function to be OPERABLE. Note that the Overpower  $\Delta T$  trip Function receives input from channels shared with other RTS Functions. Failures that affect multiple Functions require entry into the Conditions applicable to all affected Functions.

In MODE 1 or 2, the Overpower  $\Delta T$  trip Function must be OPERABLE. These are the only times that enough heat is generated in the fuel to be concerned about the heat generation rates and overheating of the fuel. In MODE 3, 4, 5, or 6, this trip Function does not have to be OPERABLE because the reactor is not operating and there is insufficient heat production to be concerned about fuel overheating and fuel damage.

## 8. Pressurizer Pressure

The same sensors (PI-0455A, B, & C, PI-0456, PI-0456A, PI-0457, PI-0457A, PI-0458, PI-0458A) provide input to the Pressurizer Pressure — High and — Low trips and the Overtemperature  $\Delta T$  trip. Since the Pressurizer Pressure channels are also used to provide input to the Pressurizer Pressure Control System, the actuation logic must be able to withstand an input failure to

(continued)

Vogtle Units 1 and 2

Revision No. 0

# **INSERT FOR BASES PAGE B 3.3-18**

The values for  $K_4$ ,  $K_5$ ,  $K_6$ , and T'' may be treated as nominal values for the purpose of performing a CHANNEL CALIBRATION. The direction of conservatism for these values is as follows:

 $K_4 \leq \text{Identified Value}$   $K_5 \geq \text{Identified Value}$   $K_6 \geq \text{Identified Value}$ T''  $\leq \text{Identified Value}$ 

Note that for  $K_5$  in the case of decreasing temperature, the gain setting must be  $\geq 0$  to prevent generating setpoint margin on decreasing temperature rates. Similarly, the setting for  $K_6$  is required to be equal to 0 for conditions where  $T \leq T''$ . The value for T'' is a key reference parameter corresponding directly to plant safety analyses initial conditions assumptions for the Overpower  $\Delta T$  Function. The as left settings for these parameters should be as close as possible or conservative with respect to the identified values. In order to ensure that the Overpower  $\Delta T$  setpoint is consistent with the assumptions of the safety analyses, it is necessary to verify during the CHANNEL OPERATIONAL TEST, that the Overpower  $\Delta T$  setpoint is within the appropriate calibration tolerances for conditions where the temperature input is equal to T'', and that the appropriate penalties are generated to reduce the setpoint for a temperature input greater than T'' (Ref. 9).

## BASES

BACKGROUND

Sequencer Output Relays (continued)

sequencer and are part of the control circuitry of these ESF loads. There are two independent trains of sequencers and each is powered by the respective train of 120-Vac ESF electrical power supply. The power supply for the output relays is the sequencer power supply. The applicable output relays are tested in the slave relay testing procedures, and in particular, in conjunction with the specific slave relay also required to actuate to energize the applicable ESF load.

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

The Nominal Trip Setpoint column of Table 3.3.2-1 is modified by a Note that a llows the Trip Setpoints to be set more conservatively than the neminal value. The conservative direction is established by the direction of the inequality applied to the Allowable Value.

Each of the analyzed accidents can be detected by one or more ESFAS Functions. One of the ESFAS Functions is the primary actuation signal for that accident. An ESFAS Function may be the primary actuation signal for more than one type of accident. An ESFAS Function may also be a secondary, or backup, actuation signal for one or more other accidents. For example, Pressurizer Pressure -- Low is a primary actuation signal for small loss of coolant accidents (LOCAs) and a backup actuation signal for steam line breaks (SLBs) outside containment. Functions such as manual initiation, not specifically credited in the accident safety analysis, are qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the unit. These Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. These Functions may also serve as backups to Functions that were credited in the accidence analysis (Ref. 3).

The LCO requires all instrumentation performing an ESFAS Function to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions. 4

The LCO generally requires OPERABILITY of four or three channels in each instrumentation function and two channels in each logic and manual initiation function. The two-out-of-three and the two-out-of-four configurations allow one channel to be tripped during maintenance or testing without causing an ESFAS initiation. If an instrument channel is equipped with installed bypass capability, such that no jumpers or lifted leads are

(continued)

Vogtle Units 1 and 2

B 3.3-66

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RTS	Ins	tr	ume	nt	a	t	1	on
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REFERENCES (continued)	2.	FSAR, Chapter 6.
(concinaca)	3.	FSAR, Chapter 15.
	4.	IEEE-279-1971.
	5.	10 CFR 50.49.
	6.	WCAP-11269, Westinghouse Setpoint Methodology for Protection Systems.
	7.	WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.
	8.	FSAR, Chapter 16.
	9.	Westinghouse Letter GP-16696, Normber 5, 1

SURVEILLANCE	SR 3.3.2.8 (continued)					
REQUIREMENTS	verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.					
	This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 900 psig in the SGs.					
	<u>SR 3.3.2.9</u>					
	SR 3.3.2.9 is the performance of a TADOT as described in SR 3.3.2.6 for the P-4 Reactor Trip Interlock, and the					
	Frequency is once per 18 months. This Frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint.					
REFERENCES	Frequency is once per 18 months. This Frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The					
REFERENCES	Frequency is once per 18 months. This frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint.					
REFERENCES	Frequency is once per 18 months. This frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint. 1. FSAR, Chapter 6.					
REFERENCES	Frequency is once per 18 months. This frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint. 1. FSAR, Chapter 6. 2. FSAR, Chapter 7.					
REFERENCES	<ul> <li>Frequency is once per 18 months. This frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint.</li> <li>1. FSAR, Chapter 6.</li> <li>2. FSAR, Chapter 7.</li> <li>3. FSAR, Chapter 15.</li> </ul>					
REFERENCES	<ul> <li>Frequency is once per 18 months. This frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint.</li> <li>1. FSAR, Chapter 6.</li> <li>2. FSAR, Chapter 6.</li> <li>3. FSAR, Chapter 7.</li> <li>3. FSAR, Chapter 15.</li> <li>4. IEEE-279-1971.</li> </ul>					
REFERENCES	<ul> <li>Frequency is once per 18 months. This Frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint.</li> <li>1. FSAR, Chapter 6.</li> <li>2. FSAR, Chapter 7.</li> <li>3. FSAR, Chapter 15.</li> <li>4. IEEE-279-1971.</li> <li>5. 10 CFR 50.49.</li> <li>6. WCAP-11269, Westinghouse Setpoint Methodology for</li> </ul>					

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BASES

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT <sup>(n)</sup>
1.		1,2	2	8	SR 3.3.1.13	NA	NA
	Trip	3(8), 4(8), 5(8)	2	c	SR 3.3.1.13	NA	NA
	Power Range Neutron Flux						
	a. High	1,2	4	D	SR 3.3.1.1 GR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.15	≤ 111.3% RTP	109% RTP
	b. Low	1 <sup>(b)</sup> ,2	4	f	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.15	≤ 27.3% RTP	25% RTP
	Power Range Neutron Flux High Positive Rate	1,2	4	ŧ	SR 3.3.1.7 SR 3.3.1.11	5 6.3% RTP with time constant 2 2 sec	5% RTP with time constant 2 2 sec
	Intermediate Range Neutron Flux	1 <sup>(b)</sup> , 2 <sup>(c)</sup>	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	5 31.1% RTP	25% RTP
		2(d)	2	н	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	\$ 31.1% RTP	25% RTP

#### Table 3.3.1-1 (page 1 of 8) Reactor Trip System Instrumentation

(continued)

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Amendment	No.	(Unit 1)
Amendment	No.	(Unit 2)

1	abl	e i	3.3	.1-1	(page	2 01	8)
React	or	Tr	ip	Syst	em Inst	trumer	ntation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	RESUIRED	CONDITIONS	SURVEILLANCE REQUINZMENTS	ALLOWABLE	NOMINAL TRIP SETPOINT <sup>(ri)</sup>
Source Range Neutron Flux	2(q)	2	1,J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.15	s 1.4 E5 cps	1.0 E5 cps
	3(8), 4(8), 5(8)	2	J,K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.15	5 1.4 E5 cps	1.0 E5 cps
	3(e), 4'e), 5(e)	1	L	SR 3.3.1.1 SR 3.3.1.11	NA	NA
Overtemperature AT	1,2	4	t	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 1 (Page 3.3-20)	Refer to Note 1 (Page 3.3-20)
Overpower &T	1,2	4	ŧ	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3-21)	Refer to Note 2 (Page 3.3-21)

(continued)

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

- (e) With the RTBs open. In this condition, source range Function does not provide reactor trip but does provide input to the High Flux at Shutdown Alarm System (LCO 3.3.8) and indication.
- (n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDIT	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT <sup>(n)</sup>
	Pressurizer Pressure						
	e. Low	1(f)	4	•	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1950 psig	1960 <sup>(g)</sup> psig
	b. High	1,2	4	ŧ	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	s 2395 psig	2385 psig
۶.	Pressurizer Water Level — High	1(1)	3	٠	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	± 93.9%	92%
	Reactor Coolant Flow Low						
	a. Single Loop	1 <sup>(h)</sup>	3 per loop	•	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.4%	90%
	b. Two Loops	1(1)	3 per loop		SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.4%	90%

Table 3.3.1-1 (page 3 of 8) Reactor Trip System Instrumentation

(continued)

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(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(g) Time constants utilized in the lead-lag controller for Pressurizer Pressure-Low are is onds for lead and 1 second for lag.

(h) Above the P-8 (Power Range Neutron Flux) interlock.

(i) Above the P-7 (Low Power Reactor Trips Block) interlack and below the P-8 (Power Range Neutron Flux) interlock.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Amendment	No.	(Unit 1)
Amendment	No.	(Unit 2)

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(n)
11.	Undervoltage RCPs	1(*)	2 per bus	м	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.15	≥ 9481 V	9600 V
12.	Underfrequency RCPs	1(*)	2 per bus	*	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.15	≥ 57.1 Hz	57.3 Hz
13.	Steam Generator (SG) Water Level - Low Low	1,2	4 per SG	ŧ	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 35.9%	37.8%

Table 3.3.1-1 (page 4 of 8) Reactor Trip System Instrumentation

(continued)

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

Amendment	No.	(Unit 1)
Amendment	No.	(Unit 2)

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT <sup>(n)</sup>
4.	Turbine Trip						
	e. Low Fluid Oil Pressure	1(1)	3	0	SR 3.3.1.10 SR 3.3.1.16	≥ 500 psig	580 psig
	b. Turbine Stop Valve Closure	1())	4	P	SR 3.3.1.10 SR 3.3.1.14	≥ 90% open	96.7% open
5.	Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	e	SR 3.3.1.13	NA	NA
6.	Reactor Trip System Interlocks						
	s. Intermediate Range Neutron flux, P-6	2(q)	2	*	SR 3.3.1.11 SR 3.3.1.12	≥ 6E·11 amp	1E-10 amp
	b. Low Power Reactor Trips Block, P-7	۱	1 per train	\$	SR 3.3.1.5	NA	NĂ
	c. Power Kange Neutron Flux, P-8	۱	4	\$	SR 3.3.1.11 SR 3.3.1.12	≤ 50.3% RTP	48% RTP
	d. Power Range Neutron Flux, P-9	۱	4	s	SR 3.3.1.11 SR 3.3.1.12	5 52.3% RTP	50% RTP
	e. Power Range Neutron Flux, P-10 and input	1,2	4	*	SR 3.3.1.11 SR 3.3.1.12	(1,m)	(l,m)
	to P-7 f. Turbine Impulse Pressure, P-13	۱	2	\$	SR 3.3.1.10 SR 3.3.1.12	≤ 12.3% Impulse Pressure Equivalent turbine	10% Impulse Pressure Equivalent turbine

Table 3.3.1-1 (page 5 of 8) Reactor Trip System Instrumentation

(continued)

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(j) Above the P-9 (Power Range Neutron Flux) interlock.

(1) For the P-10 input to P-7, the Allowable Value is \$ 12.3% RTP and the Nominal Trip Setpoint is 10% RTP.

(m) For the Power Range Neutron Flux, P-10, the Allowable Value is ≥ 7.7% RTP and the Nominal Trip Setpoint is 10% RTP.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

Amendment	NO.	(Unit 1)
Amendment	No.	(Unit 2)

	FUNCTION	APPLICABLE HODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLQUABLE VALUE	NOMINAL TRIP SETPOINT <sup>(n)</sup>
17. Reactor [[]p Breakers[[]p	Reactor JCip	1,2	2 trains	T,V	SR 3.3.1.4	NA	NA
	Breakers	3(0), 4(0), 5(0)	2 trains	c	SR 3.3.1.4	NA	NA
18. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	Breaker	1,2	1 each per RTB	U,V	SR 3.3.1.4	NA	NA
	Shunt Trip	3(a), 4(a), 5(a)	1 each per RTB	c	SR 3.3.1.4	NA	NA
19.	Automatic Trip	1,2	2 trains	Q,V	SR 3.3.1.5	NA	NA
Logic	Logic	3(8), 4(8), 5(8)	2 trains	с	SR 3.3.1.5	NA	NA

#### Table 3.3.1-1 (page 6 of 8) Reactor Trip System Instrumentation

(4) With RTBs closed and Rod Control System capable of rod withdrawal.

(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

Amendment	No.	Unit	1)
Amendment	No.	Unit	2)

#### Table 3.3.1-1 (page 7 of 8) Reactor Trip System Instrumentation

#### Note 1: Overtemperature Delta-T

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The Overtemperature Delta-T Function Allowable Value shall not exceed the Nominal Trip Setpoint defined by the following equation by more than 2.25% of RTP.

	$\frac{\Delta T}{\Delta T_0} \frac{(1+r_1s)}{(1+r_2s)} \frac{1}{(1+r_3s)} \frac{1}{s}$	K K. (1 + 7.45)	1 -1/	- Ka(P'-P) - f, (AFD)
1	ATO (1+T28) (1+T38)	(1 + 755)	(1 + 765)	

Where:

AT measured loop specific RCS differential temperature, degrees F

- AT indicated loop specific RCS differential at RTP, degrees F
- 1+7:8 lead-lag compensator on measured differential temperature
- $\tau_1, \tau_2$  time constants utilized in lead-lag compensator for differential temperature:  $\tau_1 \ge 8$  seconds,  $\tau_2 \le 3$  seconds
- 1+7,8 lag compensator on measured differential temperature
- Ta time constant utilized in lag compensator for differential temperature, ≤ 2 seconds
- K, fundamental setpoint, 112% RTP
- K<sub>2</sub> modifier for temperature, 2.24% RTP per degree F
- 1+748 1+788 lead-lag compensator on dynamic temperature compensation
- $\tau_4$ ,  $\tau_6$  time constants utilized in lead-lag compensator for temperature compensation:  $\tau_4 \ge 28$  seconds,  $\tau_6 \le 4$  seconds
  - measured loop specific RCS average temperature, degrees F
- 1+7.65 lag compensator on measured average temperature
- te time constant utilized in lag compensator for average temperature, = 0 seconds
- T' indicated loop specific RCS average temperature at RTP, 588.4 degrees F
- Ka modifier for pressure, 0.115% RTP per psig
- P measured CCS pressurizer pressure, psig
- P' reference pressure, 2235 psig
- Laplace transform variable, inverse seconds
- f:(AFD) modifier for Axial Flux Difference (AFD):
  - 1. for AFD between -32% and +10%, = 0% RTP
  - 2. for each % AFD is below -32%, the trip setpoint shall be reduced by 3.25% RTP
  - 3. for each % AFD is above +10%, the trip setpoint shall be reduced by 2.7% RTP

# Table 3.3.1-1 (page 8 of 8) Reactor Trip System Instrumentation

## Note 2: Overpower Delte-T

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	10	$0 \frac{\Delta T}{\Delta T_{0}} \frac{(1 + \tau_{1}s)}{(1 + \tau_{2}s)} \frac{1}{(1 + \tau_{3}s)} s \left[ K_{4} - \left[ K_{6} \frac{(\tau_{7}s)}{(1 + \tau_{7}s)} \frac{1}{(1 + \tau_{6}s)} T \right] - K_{6} \left[ T \frac{1}{(1 + \tau_{6})} - T^{\prime \prime} \right] - f_{2} (AFD) \right]$	
Where:	AT.	measured loop specific RCS differential temperature, degrees F	
	ATo	indicated loop specific RCS differential at RTP, degrees F	
	1+718 1+728	lead-lag compensator on measured differential temperature	
	*1, *2	time constants utilized in lead-lag compensator for differential temperature: $\tau_1 \ge 8$ seconds, $\tau \le 3$ seconds	
	1 1+7 38	lag compensator on measured differential temperature	
	*3	time constant utilized in lag compensator for differential temperature, ≤ 2 seconds	
	K4	fundamental setpoint, 109.5% RTP	1
	Ks	modifier for temperature change: 2% RTP per degree F for increasing temperature, $\ge$ 0% RTP per degree F for decreasing temperature	1
	T78 1+778	rate-lag compensator on dynamic temperature compensation	
	*7	time constant utilized in rate-lag compensator for temperature compensation, ≥ 10 seconds	
	1	measured loop specific RCS average temperature, degrees F	
	1 1+res	lag compensator on measured average temperature	
	*o	time constant utilized in leg compensator for average temperature, $=$ 0 seconds	
	Ke	modifier for temperature: 0.20% RTP per degree F for T > T", = 0% RTP for T $\leq$ T"	
	T*	indicated loop specific RCS average temperature at RTP, 588.4 degrees F	
		Laplace transform variable, inverse seconds	
	f 2(AFD)	modifier for Axial Flux Difference (AFD), = 0% RTP for all AFD	

The Overpower Delta-T Function ALLOWABLE VALUE shall not exceed the Nominal Trip Setpoint defined by the following equation by more than 2.85% of RTP.

Vogtle Units 1 and 2

(Unit 1) (Unit 2) Amendment No. Amendment No.

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	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITION3	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE	NOMINAL TRIP SETPOINT <sup>(I)</sup>	1
1.	Safety Injection							
	a. Manual Initiation	1,2,3,4	2		SR 3.3.2.6	NA	NA	
	<ul> <li>Autometic Actuation Logic and Actuation Relays</li> </ul>	1,2,3,4	2	c	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA	
	c. Containment Pressure - High 1	1,2,3	21	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	s 4.4 psig	3.8 psig	1
	d. Pressurizer Pressure - Low	1,2,3(*)	4	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	2 1856 psig	1870 psig	1
	e. Steam Line Pressure - Low	1,2,3 <sup>(a)</sup>	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 570 <sup>(b)</sup> psig	585 <sup>(b)</sup> psig	1

Table 3.3.2-1 (page 1 of 7) Engineered Safety Feature Actuation System Instrumentation

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlo.
(b) Time constants used in the lead/lag controller are t<sub>1</sub> ≥ 50 seconds and t<sub>2</sub> ≤ 5 seconds.
(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

(Unit 1) (Unit 2) Amendment No. Amendment No.

	FUNCTION		APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS	SURVEILLANCE REQUIREMENTS		ALLOWABLE	NOMINAL TRIP SETPOINT <sup>(i)</sup>
2.									
		Manuel Initiation	1,2,3,4	2	8	SR	3.3.2.6	NA	NA
	b.	Automatic Actuation Logic and Actuation Relays	1,2,3,4	2	c	SR SR SR	3.3.2.2 3.3.2.3 3.3.2.5	NA	NA
	c.	Containment Pressure							
		High - 3	1,2,3	4	£	SR SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	s 22.4 psig	21.5 psig
		a par entre a constructioner d'autoritation des montes and	alaran i samarin komo di salaran m						(continued

#### Table 3.3.2-1 (page 2 of 7) Engineered Safety Feature Actuation System Instrumentation

(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

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	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SU. VEILLANCE REQUIREMENTS		ALLOWABLE VALUE	NOMINAL TRIP SETPOINT <sup>(i)</sup>
3.	Phase A Containment Isolation							
	(a) Manual Initiation	1,2,3,4	2	8	SR	3.3.2.6	NA	NA
	(b) Autometic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	c	SR SR SR	3.3.2.2 3.3.2.3 3.3.2.5	NA	NA
	(c) Safety Injection	Refer to Fun functions en	ction 1 (Set d requiremen	ety Injection hts.	) for	all initia	tion	
4.	Steam Line Isolation							
	e. Manual Initiation	1,2(c),3(c)	2	,	SR	3.3.2.6	NA	NA
	<ul> <li>Automatic Actuation Logic and Actuation Relays</li> </ul>	1,2 <sup>(c)</sup> ,3 <sup>(c)</sup>	2	G	SR SR SR	3.3.2.2 3.3.2.3 3.3.2.5	NA	NA
								(continued

#### Table 3.2.2.1 (page 3 cf 7) Engineered Safety Feature Actuation System Instrumentation

(c) Except when one main steam isclation valve and associated bypass isolation valve per steam line is closed.
 (i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Amendment No. (Unit 1) Amendment No. (Unit 2)

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	CONDITIONS		IVEILLANCE NUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT <sup>(I)</sup>
	am Line Isolation continued)							
с.	Conteinment Pressure - High 2	1,2 <sup>(c)</sup> , 3 <sup>(c)</sup>	3	D	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	s 15.4 psig	14.5 psig
d.	Steam Line Pressure							
	(1) Low	1,2 <sup>(c)</sup> , 3 <sup>(a)(c)</sup>	3 per steam line	D	SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	2 570 (b) psig	585 (b) psig
	(2) Negative Rate - High	3(d)(c)	3 per steam line	Ø	SR SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	s 125 (e) psi/sec	100 (e) psi/sec

## Table 3.3.2-1 (page 4 of 7) Engineered Safety Feature Actuation System Instrumentation

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.
(b) Time constants use: in the lead/lag controller are t<sub>1</sub> ≥ 50 seconds and t<sub>2</sub> ≤ 5 seconds.
(c) Except when one main steam isolation valve and associated bypass isolation valve per steam line is closed.
(d) Below the P-11 (Pressurizer Pressure) interlock.
(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.
(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Amendment	No.	(Unit 1)
Amendment	No.	(Unit 2)

		FUNCTION	APPLICABLE NODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS		ILLANCE	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(()
	Turbi Feedw	ne Trip and mater isolation							
	1	Automatic Actuation Logic and Actuation Relays	1,2 <sup>(f)</sup>	2 trains	*	SR	3.3.2.2 3.3.2.3 3.3.2.5	NA	NA
	b. 1	LOW RCS Tavg	1,2(*)	4	1	SR	3.3.2.1 3.3.2.4 3.3.2.7	≥ 561.5 °F	564 °F
		Coincident with Reactor Trip, P-4	Refer to Fur	action Ba for	ell P-4 requ	iremen	ts.		
	с.	SG Water Level — Migh High (P-14)	1,2(f)	4 per SG	I	SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	\$ 87.9%	86.0%
	d.	Sefety Injection	Refer to Fu functions a	nction 1 (Sa nd requirement	lety injection	n) for	all initia	tion	
6.	Aux	iliary Feedwater						NA	NA
	۰.	Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR	3.3.2.2 3.3.2.3 3.3.2.5		_
	b.	SG Water Level - Low Low	1,2,3	4 per Si	G D	SR	3.3.2.7	≥ 35.9%	37.8%
									(continued)

# Table 3.3.2-1 (page 5 of 7) Engineered Safety Feature Actuation System Instrumentation

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(f) Except when one MFIV or MFRV, and its associated bypass valve per feedwater line is closed and deactivated or isolated by a closed manual valve.
(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant construction. conditions.

Vogtle Units 1 and 2

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Amendment	No.	(Unit	1)
Amendment		(Unit	2)

		FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONUTTIONS	REQUIRED	CONDITIONS		EILLANCE	ALLCGABLE VALUE	NOMINAL TRIP SETPOINT <sup>(1)</sup>
h.		liary Feedwater continued)							
	¢.	Safety Injection	Refer to Fun functions an	nction 1 (S nd requirem	afety injectio ents.	m) for	all init	iation	
	d.	Trip of all Main Feedwater Pumps	1,2(8)	1 per pump	J	SR	3.3.2.6	NA	NA
7.	Swi	i-automatic tchover to tainment Sump							
	۰.	Automatic Actuation Logic and Actuation Relays	1,2,3,4 <sup>(h)</sup>	2	c	SR	3.3.2.2 3.3.2.3 3.3.2.5	NA	NA
	b.	Refueling Water Storage Tank (RWST) Level - Low Low	1,2,3,4	4	ĸ	SR SR SR SR	3.3.2.1 3.3.2.4 3.3.2.7 3.3.2.8	≥ 264.9 in.	275.3 in.
		Coincident with Safety Injection	Refer to Fu functions a		Safety Injecti ments.	on) fo	or all init	liation	

Table 3.3.2-1 (page 6 of 7) Engineered Safety Feature Actuation System Instrumentation

(continued)

(g) When the Main Feedwater System is operating to supply the SGs.

 (h) In MODE 4, only 1 train is required to be OPERABLE to support semi-automatic switchover for the RHR pump that is required to be OPERABLE in accordance with Specification 3.5.3, ECCS-shutdown.
 (i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

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(Unit 1) Amendment No. (Unit 2) Amendment No.

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED	COND111063	SURVE11 REQUIR		ALLOWABLE VALUE	NONILSEL TRIP SETPOINT(*)
8. ESFAS Interlocks							
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	'	SR 3.	3.2.9	NA	NA
b. Prossurizer Pressure, P-11	1,2,3	3	L	SR 3. SR 3.	3.2.4	s 2010 ps:g	2000 psig

	Table 3.	3.2-1 (page	7 of 7)	
Engineered	Safety Featur	re Actuation	System	Instrumentation

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(i) The Trip Setpoints muy be set more consurvative than the nominal value as necessary in response to plant conditions.

Vogtle Units 1 and 2

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3.3-36

Amendment No. (Unit 1) Amendment No. (Unit 2)

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BASES	
BACKGROUND	Reactor Trip Switchgear (continued)
	trip mechanism is sufficient by itself, thus providing a diverse trip mechanism.
	The decision logic matrix Functions are described in the functional diagrams included in Reference 1. In addition to the reactor trip or ESF, these diagrams also describe the various "permissive interlocks" that are associated with unit conditions. Each train has a built in testing device that can automatically test the decision logic matrix Functions and the actuation devices while the unit is at power. When any one train is taken out of service for testing, the other train is capable of providing unit monitoring and protection until the testing has been completed. The testing device is semiautomatic to minimize testing time.
APPLICABLE SAFETY ANALYSES, LCO, and	The RTS functions to maintain the SLs during all AOOs and mitigates the consequences of DBAs in all MODES in LCO, and which the RTBs are closed.
APPLICABILITY	Each of the analyzed accidents and transients can be detected by one or more RTS Functions. The accident analysis described in Reference 3 takes credit for most RTS trip Functions. RTS trip Functions not specifically credited in the accident analysis are qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the unit. These RTS trip Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. They may also serve as backups to RTS trip Functions that were credited in the accident analysis.
	The LCO requires all instrumentation performing an RTS Function, listed in Table 3.3.1-1 in the accompanying LCO, to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions. The Nominal Trip Setpoint colum is modified by a Note that allows the Trip Setpoint to be set more conservatively than the nominal value. The conservative direction is established by the direction of

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Vogtle Units 1 and 2 B 3.3-7

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(continued)

RTS Instrumentation B 3.3.1

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued) the inequality applied to the Allowable Value. For example, the Power Range Neutron Flux High trip setpoint may be set to a value less than 109% during initial startup following a refueling outage until a sufficiently high reactor power is achieved so that the power range channels may be calibrated. In addition, certain Required Actions may require that the Power Range Neutron Flux High trip setpoints be reduced based on plant conditions.

The LCO generally requires OPERABILITY of four or three channels in each instrumentation Foliction, two channels of Manual Reactor Trip in each logic Function, and two trains in each Automatic Trip Logic Function. Four OPERABLE

(continued)

Vogtle Units 1 and 2

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Vogtle Units 1 and 2

APPLICABLE

LCO, and APPLICABILITY

SAFETY ANALYSES.

#### Overtemperature ΔT (continued)

This results in a two-out-of-four trip logic. Section 7.2.2.3 of Reference 1 discusses control and protection system interactions for this function. Note that this Function also provides a signal to generate a turbine runback prior to reaching the Trip Setpoint. A turbine runback will reduce turbine power and reactor power. A reduction in power will normally alleviate the Overtemperature  $\Delta T$  condition and may prevent a reactor trip.

Delta-To, as used in the overtemperature and overpower ΔT trips, represents the 100% RTP value as measured for each loop. This normalizes each loop's ∆T trips to the actual operating conditions existing at the time of measurement, thus forcing the trip to reflect the equivalent full power conditions as assumed in the accident analyses. These differences in RCS loop  $\Delta T$ can be due to several factors, e.g., differences in RCS loop flows and slightly asymmetric power distributions between quadrants. While RCS loop flows are not expected to change with cycle life, radial power redistribution between quadrants may occur, resulting in small changes in loop specific  $\Delta T$  values. Therefore, loop specific  $\Delta T_o$  values are measured as needed to ensure they represent actual core conditions.

The values for  $K_1$ ,  $K_2$ ,  $K_3$ , T', and P' may be treated as nominal values for the purpose of performing a CHANNEL CALIBRATION. The direction of conservatism for these values is as follows:

 $\begin{array}{ll} \mathsf{K}_1 \leq \text{Identified Value} \\ \mathsf{K}_2 \geq \text{Identified Value} \\ \mathsf{K}_3 \geq \text{Identified Value} \\ \mathsf{T}' \leq \text{Identified Value} \\ \mathsf{P}' \geq \text{Identified Value} \end{array}$ 

Note that  $K_1$  is the principle setpoint gain, since it defines the function offset.  $K_2$  and  $K_3$  define the temperature gain and pressure gain respectively. The values for T' and P' are key reference parameters corresponding directly to plant safety analyses

(continued)

Vogtle Units 1 and 2

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

#### 6. Overtemperature $\Delta T$ (continued)

initial conditions assumptions for the Overtemperature  $\Delta T$  Function. The as left settings for these parameters should be as close as possible or conservative with respect to the identified values. In order to ensure that the Overtemperature  $\Delta T$  setpoint is consistent with the assumptions of the safety analyses, it is necessary to verify during the CHANNEL OPERATIONAL TEST, that the Overtemperature  $\Delta T$  setpoint is within the appropriate calibration tolerances for conditions where the temperature input is equal to T' and the pressure input is equal to P', and that appropriate penalties are generated to reduce the setpoint for a temperature input less than P' (Ref. 9).

The LCO requires all four channels of the Overtemperature  $\Delta T$  trip Function to be OPERABLE. Note that the Overtemperature  $\Delta T$  Function receives input from channels shared with other RTS Functions. Failures that affect multiple Functions require entry

(continued)

Vogtle Units 1 and 2

LCO, and APPLICABILITY

SAFETY ANALYSES,

### APPLICABLE 6. Overtemperature $\Delta T$ (continued)

into the Conditions applicable to all affected Functions.

In MODE 1 or 2, the Overtemperature  $\Delta T$  trip must be OPERABLE to prevent DNB. In MODE 3, 4, 5, or 6, this trip Function does not have to be OPERABLE because the reactor is not operating and there is insufficient heat production to be concerned about DNB.

(continued)

Vogtle Units 1 and 2

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

#### Overpower ΔT

The Overpower  $\Delta T$  trip Function (TDI-0411B, TDI-0421B, TDI-0431B, TDI-0441B, TDI-0411A, TDI-0421A, TDI-0431A, TDI-0441A) ensures that protection is provided to ensure the integrity of the fuel (i.e., no fuel pellet melting and less than 1% cladding strain; under all possible overpower conditions. This trip Function also limits the required range of the Overtemperature  $\Delta T$  trip Function and provides a backup to the Power Range Neutron Flux — High Setpoint trip. The Overpower  $\Delta T$  trip Function ensures that the allowable heat generation rate (kW/ft) of the fuel is not exceeded. It uses the  $\Delta T$  of each loop as a measure of reactor power with a setpoint that is automatically varied with the following parameters:

- reactor coolant average temperature the Trip Setpoint is varied to correct for changes in coolant density and specific heat capacity with changes in coolant temperature; and
- rate of change of reactor coolant average temperature — including dynamic compensation for RTD response time delays.

The Overpower  $\Delta T$  trip Function is calculated for each loop as per Note 2 of Table 3.3.1-1. Trip occurs if Overpower AT is indicated in two loops. Since the temperature signals are used for other control functions, the actuation logic must be able to withstand an input failure to the control system, which may then require the protection function actuation and a single failure in the remaining channels providing the protection function actuation. This results in a two-out-of-four trip logic. Section 7.2.2.3 of Reference 1 discusses control and protection system interactions for this function. Note that this Function also provides a signal to generate a turbine runback prior to reaching the Allowable Value. A turbine runback will reduce turbine power and reactor power. A reduction in power will normally alleviate the Overpower  $\Delta T$  condition and may prevent a reactor trip.

(continued)

Vogtle Units 1 and 2

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

7.

BASES

Overpower  $\Delta T$  (continued)

Delta-To, as used in the overtemperature and overpower ΔT trips, represents the 100% RTP value as measured for each loop. This normalizes each loop's ∆T trips to the actual operating conditions existing at the time of measurement, thus forcing the trip to reflect the equivalent full power conditions as assumed in the accident analyses. These differences in RCS loop  $\Delta T$ can be due to several factors, e.g., difference in RCS loop flows and slightly asymmetric power distributions between guadrants. While RCS loop flows are not expected to change with cycle life, radial power redistribution between quadrants may occur, resulting in small changes in loop specific ∆T values. Therefore, loop specific  $\Delta T_o$  values are measured as needed to ensure they represent actual core conditions.

The values for  $K_4$ ,  $K_5$ ,  $K_6$ , and T" may be treated as nominal values for the purpose of performing a CHANNEL CALIBRATION. The direction of conservatism for these values is as follows:

 $K_4 \leq \text{Identified Value}$   $K_5 \geq \text{Identified Value}$   $K_6 \geq \text{Identified Value}$  $T'' \leq \text{Identified Value}$ 

Note that for Ks in the case of decreasing temperature, the gain setting must be  $\geq 0$  to prevent generating setpoint margin on decreasing temperature rates. Similarly, the setting for  $K_6$  is required to be equal to 0 for conditions where  $T \leq T^{"}$ . The value for  $T^{"}$  is a key reference parameter corresponding directly to plant safety analyses initial conditions assumptions for the Overpower AT Function. The as left settings for these parameters should be as close as possible or conservative with respect to the identified values. In order to ensure that the Overpower  $\Delta T$  setpoint is consistent with the assumptions of the safety analyses, it is necessary to verify during the CHANNEL OPERATIONAL TEST, that the Overpower  $\Delta T$  setpoint is within the appropriate calibration tolerances for conditions where the temperature input is equal to T", and that the appropriate penalties are generated to

(continued)

Vogtle Units 1 and 2

#### 7. Overpower $\Delta T$ (continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

reduce the setpoint for a temperature input greater than  $T^*$  (Ref. 9).

The LCO requires four channels of the Overpower  $\Delta T$ trip Function to be OPERABLE. Note that the Overpower  $\Delta T$  trip function receives input from channels shared with other RTS Functions. Failures that affect multiple Functions require entry into the Conditions applicable to all affected Functions.

In MODE 1 or 2, the Overpower △T trip Function must be OPERABLE. These are the only times that enough heat is generated in the fuel to be concerned about the heat generation rates and overheating of the fuel. In MODE 3, 4, 5, or 6, this trip Function does not have to be OPERABLE because the reactor is not operating and there is insufficient heat production to be concerned about fuel overheating and fuel damage.

#### 8. Pressurizer Pressure

The same sensors (PI-0455A, B, & C, PI-0456, PI-0456A, PI-0457, PI-0457A, PI-0458, PI-0458A) provide input to the Pressurizer Pressure — High and — Low trips and the Overtemperature  $\Delta T$  trip. Since the Pressurizer Pressure channels are also used to provide input to the Pressurizer Pressure Control System, the actuation logic must be able to withstand an input failure to

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Vogtle Units 1 and 2

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REFERENCES	2.	FSAR, Chapter 6.
(continued)	3.	FSAR, Chapter 15.
	4.	IEEE-279-1971.
	5.	10 CFR 50.49.
	6.	WCAP-11269, Westinghouse Setpoint Methodology for Protection Systems.
	7.	WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.
	8.	FSAR, Chapter 16.
	9.	Westinghouse Letter GP-16696, November 5, 1997.

#### BACKGROUND Sequencer Output Relays (continued)

sequencer and are part of the control circuitry of these ESF loads. There are two independent trains of sequencers and each is powered by the respective train of 120-Vac ESF electrical power supply. The power supply for the output relays is the sequencer power supply. The applicable output relays are tested in the slave relay testing procedures, and in particular, in conjunction with the specific slave relay also required to actuate to energize the applicable ESF load.

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

Each of the analyzed accidents can be detected by one or more ESFAS Functions. One of the ESFAS Functions is the primary actuation signal for that accident. An ESFAS Function may be the primary actuation signal for more than one type of accident. An ESFAS Function may also be a secondary, or backup, actuation signal for one or more other accidents. For example, Pressurizer Pressure — Low is a primary actuation signal for small loss of coolant accidents (LOCAs) and a backup actuation signal for steam line breaks (SLBs) outside containment. Functions such as manual initiation, not specifically credited in the accident safety analysis, are qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the unit. These Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. These Functions may also serve as backups to Functions that were credited in the accident analysis (Ref. 3).

The LCO requires all instrumentation performing an ESFAS Function to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions. The Nominal Trip Setpoint column of Table 3.3.2-1 is modified by a note that allows the Trip Setpoints to be set more conservatively than the nominal value. The conservative direction is established by the direction of the inequality applied to the Allowable Value.

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Vogtle Units 1 and 2

ESFAS	Instrume	ent	a	ti	on
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APPLICABLE SAFETY ANALYSIS, LCO, AND APPLICABILITY (continued) The LCO generally requires OPERABILITY of four or three channels in each instrumentation function and two channels in each logic and manual initiation function. The two-out-of-three and the two-out-of-four configurations allow one channel to be tripped during maintenance or testing without causing an ESFAS initiation. If an instrument channel is equipped with installed bypass capability, such that no jumpers or lifted leads are

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Vogtle Units 1 and 2

ESFAS Instrumentation B 3.3.2

BASES

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Vogtle Units 1 and 2

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SURVEILLANCE

REQUIREMENTS

#### SR 3.3.2.8 (continued)

verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 900 psig in the SGs.

#### SR 3.3.2.9

SR 3.3.2.9 is the performance of a TADOT as described in SR 3.3.2.6 for the P-4 Reactor Trip Interlock, and the Frequency is once per 18 months. This Frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint.

REFERENCES	1. FSAR, Chapter 6.
	2. FSAR, Chapter 7.
	3. FSAR, Chapter 15.
	4. IEEE-279-1971.
	5. 10 CFR 50.49.
	<ol> <li>WCAP-11269, Westinghouse Setpoint Methodology for Protection Systems.</li> </ol>
	7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.
	8. FSAR, Chapter 16.
	9 Westinghouse Letter GP-16696 November 5, 1997.