PACKAGE 3.2

POWER DISTRIBUTION LIMITS

CROSS - REFERENCE

CURRENT TECHNICAL SPECIFICATIONS

TO

IMPROVED TECHNICAL SPECIFICATIONS

List of Section Cross - References

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section 3.10				
3.10.A.1		LCO	3.1.1	
3.10.A.1			Relocated - COLR	
3.10.A.2		LCO	3.1.1	
3.10.A.3		LCO	3.1.1	
New		SR	3.1.1.1	
New		LCO	3.1.2	
New		SR	3.1.2.1	
3.10.B.1		LCO	3.2.1	
3.10.B.1		LCO	3.2.2	
3.10.B.1		(Partial)	Relocated - COLR	
3.10.B.2		SR	3.2.1.1	
3.10.B.2		SR	3.2.1.2	
3.10.B.2		SR	3.2.2.1	
3.10.B.2		SR	3.2.3.2	
3.10.B.3.a		LCO	3.2.1	
3.10.B.3.a		LCO	3.2.2	
3.10.B.3.a		(Partial)	Relocated - COLR	

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New		LCO	3.2.1	
New		LCO	3.2.2	
3.10.B.3.b		LCO	3.2.1	
3.10.B.3.b		(Partial)	Relocated - COLR	
New		LCO	3.2.1	
3.10.B.3.c		LCO	3.2.2	
3.10.B.3.d		SR	3.2.1.2	
3.10.B.3.d		(Partial)	Relocated - COLR	
3.10.B.4		LCO	3.2.3	
New		LCO	3.2.3	
3.10.B.5		LCO	3.2.3	
3.10.B.6		LCO	3.2.3	
New		LCO	3.2.3	
3.10.B.7		LCO	3.2.3	
3.10.B.8		LCO	3.2.3	
3.10.B.9			Relocated - TRM	
New		SR	3.2.3.1	
3.10.C.1		LCO	3.2.4	

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New		SR	3.2.4.1	
3.10.C.2			Deleted	
3.10.C.3			Deleted	
3.10.C.4		SR	3.2.4.2	
3.10.C.4		LCO	3.3.1 D	
3.10.C.4		(Partial)	Relocated - Bases	
3.10.D.1		LCO	3.1.5	
New		LCO	3.1.5	
New		SR	3.1.5.1	
3.10.D.2		LCO	3.1.6	
New		LCO	3.1.6	
New		SR	3.1.6.1	
New		SR	3.1.6.2	
New		SR	3.1.6.3	
3.10.D.3		LCO	3.1.5	
3.10.D.3		LCO	3.1.6	
3.10.D.3		LCO	3.1.8	

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New		SR	3.1.8.1	
New		SR	3.1.8.2	
New		SR	3.1.8.3	
New		SR	3.1.8.4	
3.10.E.1		LCO	3.1.4	
3.10.E.2			Deleted	
3.10.F.1		LCO	3.1.7	
3.10.F.1		(Partial)	Relocated - Bases	
3.10.F.2		LCO	3.1.7	
3.10.F.3		LCO	3.1.7	
3.10.F.4		LCO	3.1.7	
3.10.F.5		LCO	3.1.4	
New		LCO	3.1.7	
3.10.G.1			Relocated - Bases	
3.10.G.2		LCO	3.1.4	
3.10.G.3		LCO	3.1.4	
3.10.G.4		LCO	3.1.4	

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3.10.G.5		LCO	3.1.4	
3.10.G.5		(Partial)	Relocated - Bases	
3.10.G.6		LCO	3.1.4	
New		LCO	3.1.4	
3.10.H		SR	3.1.4.3	
3.10.I.1			Relocated - TRM	
3.10.I.2			Relocated - TRM	
3.10.I.3			Relocated - TRM	
3.10.J		LCO	3.4.1	
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3.11.B			Relocated - TRM	
3.11.C			Relocated - TRM	
3.11.D			Relocated - TRM	

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New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
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Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
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Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
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Table 3.5-2A	2b	TABLE	3.3.1-1	2b
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Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
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Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	

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Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
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Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
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Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
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Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1
Table 3.5-2B	4c	TABLE	3.3.5-1	6
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Table 3.5-2B	6b	TABLE	3.3.2-1	5c
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Table 3.5-2B	6d	TABLE	3.3.2-1	5a
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Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
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Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
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Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
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Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	

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Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
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Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
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Table 3.15-1	4	TABLE	3.3.3-1	4
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Table 3.15-1	6	TABLE	3.3.3-1	6
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Table 3.15-1	12	TABLE	3.3.3-1	12
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Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	
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Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
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Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
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Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
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Table 4.1-1A	2a	TABLE	3.3.1-1	6
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
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Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
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Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	
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Table 4.1-1B	4b	SR	3.3.5.4	
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.2	
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	Note 20	SR	3.3.2.5	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

PACAKGE 3.2

POWER DISTRIBUTION LIMITS

CROSS - REFERENCE

IMPROVED TECHNICAL SPECIFICATIONS

TO

CURRENT TECHNICAL SPECIFICATIONS

Section Cross - Reference

Section 3.2

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
ITS Section 3.2				
3.2.1		LCO	3.10.B.1	
3.2.1		LCO	3.10.B.3.a	
3.2.1		LCO	New	
3.2.1		LCO	3.10.B.3.b	
3.2.1		LCO	New	
3.2.1.1		SR	3.10.B.2	
3.2.1.2		SR	3.10.B.2	
3.2.1.2		SR	3.10.B.3.d	
3.2.2		LCO	3.10.B.1	
3.2.2		LCO	3.10.B.3.a	
3.2.2		LCO	3.10.B.3.c	
3.2.2		LCO	New	
3.2.2.1		SR	3.10.B.2	
3.2.3		LCO	3.10.B.4	
3.2.3		LCO	New	
3.2.3		LCO	3.10.B.5	
3.2.3		LCO	3.10.B.6	

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.2.3		LCO	New	
3.2.3		LCO	3.10.B.7	
3.2.3		LCO	3.10.B.8	
3.2.3.1		SR	New	
3.2.3.2		SR	3.10.B.2	
3.2.4		LCO	3.10.C.1	
3.2.4		LCO	New	
3.2.4.1		SR	New	
3.2.4.2		SR	Table 3.5-2A	Actn 2
3.2.4.2		SR	Table 3.5-2A	Actn 2c
3.2.4.2		SR	3.10.C.4	

ITS REVIEW PACKAGE CONTENTS

Package:

3.3

1. Part A Introduction
2. Part B Proposed PI ITS and Bases
3. Part C Markup of PI CTS
4. Part D DOC to PI CTS
5. Part E Markup of ISTS and Bases
6. Part F JFD from ISTS
7. Part G NSHD for changes to PI CTS
8. Cross-Reference CTS to ITS
9. Cross-Reference ITS to CTS

PACKAGE 3.3

INSTRUMENTATION

PART A

INTRODUCTION

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

LICENSE AMENDMENT REQUEST DATED December 11, 2000
Conversion to Improved Standard Technical Specifications

3.3
PART A

Introduction to the Discussion of the proposed Changes to the Current Technical Specifications, Justification of Differences from the Improved Standard Technical Specifications, and the supporting No Significant Hazards Determination

Pursuant to 10 CFR Part 50, Sections 50.59 and 50.90, the holders of Operating Licenses DPR-42 and DPR-60 hereby propose changes to the Facility Operating Licenses and Appendix A, Technical Specifications, as follows and as presented in the accompanying Parts B through G of this Package.

BACKGROUND

Over the past several years the nuclear industry and the Nuclear Regulatory Commission (NRC) have jointly developed Improved Standard Technical Specifications (ISTS). The NRC has encouraged licensees to implement these improved technical specifications as a means for improving plant safety through the more operator-oriented technical specifications, improved and expanded bases, reduced action statement induced plant transients, and more efficient use of NRC and industry resources.

This License Amendment Request (LAR) is submitted to conform the Prairie Island Nuclear Generating Plant (PINGP) Current Technical Specifications (CTS) to NUREG-1431, Improved Standard Technical Specifications, Westinghouse plants, Revision 1 issued April 1995 (ISTS). The resulting new Technical Specifications (TS) for Prairie Island (PI) are the PI Improved Technical Specifications (ITS) which incorporates the PI plant specific information.

NUREG-1431 is based on a hypothetical four loop Westinghouse plant. Since PI is similar in design and vintage to the R.E. Ginna Nuclear Power Plant which has already completed conversion to improved technical specifications, this amendment request relies on the Ginna ITS.

This LAR is also supported by Parts B through G. Part B contains a "clean" copy of the proposed PI ITS and Bases. Part C contains a mark-up of the PI CTS. Part D is the Description of Changes (DOC) to the PI CTS. Part E is a mark-up of the ISTS and Bases which shows the deviations from the standard incorporated to meet PI plant specific requirements. Part F gives the Justification for Deviations (JFD) from the ISTS and Part G provides the No Significant Hazards Determinations (NSHD) for changes to the PI CTS. To facilitate review of this LAR, cross-reference numbers from changes and deviations to the corresponding DOC, JFD and NSHD are provided. The methodology for mark-up and cross-references are described in the next section.

MARK-UP METHODOLOGY

The TS conversion package includes mark-ups of the CTS, the ISTS and the ISTS Bases in accordance with this guidance. Mark-up may be electronic or by hand as indicated.

Current Technical Specifications

The mark-up of the CTS is provided to show where current requirements are placed in the ITS, to show the major changes resulting from the conversion process, and to allow reviewers to evaluate significant differences between the CTS and ITS.

This ITS conversion LAR has been prepared in 14 packages following the Chapter/Section outline of the ITS as follows: 1.0, 2.0, 3.0, 3.1 . . . 3.9, 4.0 and 5.0. Accordingly, each package contains all the elements of Parts A through G as described above. The CTS Bases are not included in the CTS mark-up packages since the Bases have been rewritten in their entirety.

The current Specifications addressed by the associated ITS Chapter/Section are cross-referenced in the left margin to the new ITS location by Specification number and type (G-General, SL-Safety Limit, LCO-Limiting Condition for Operation or SR-Surveillance Requirements). Those portions of each CTS page which are not addressed in the associated ITS Chapter/Section are shadowed (electronic) or clouded and crossed out (by hand) and in the right margin is the comment, "Addressed Elsewhere".

The CTS are marked-up to incorporate the substance of NUREG-1431 Revision 1. It is not the intent to mark every nuance required to make the format change from CTS to ITS.

In general, only technical changes have been identified. However, some non-technical changes have also been included when the changes cannot easily be determined to be non-technical by a reviewer, or if an explanation is required to demonstrate that the change is non-technical.

Some apparent changes result from the different conventions and philosophies used in the ITS. Generally these apparent changes will not be marked-up in the CTS if there is no resulting change in plant operating requirements.

Changes are identified by a change number in the right margin which map the changed specification requirement to Part D, Discussion of Changes, and Part G, No Significant Hazards Determination (NSHD) and indicate the NSHD category. The change number form is R3.4-02 where the first two numbers, 3.4 in this example, refer to ITS Chapter/Section number 3.4, and the second number, 02 in this example, is a sequentially assigned number for changes within that Chapter/Section, starting with 01. The prefix letter(s) indicates the classification of the change impact. For CTS changes this is also the NSHD category.

The change impact categories defined below conveniently group the type of changes for consideration of the effect of the change on the current plant license in Part D and are also useful for efficient discussion in Part G the "No Significant Hazards Determination" (NSHD) section. If the same change is made in Part E, then the change impact category will also show up in the change number in Part F. These categories are:

A - Administrative changes, editorial in nature that do not involve technical issues. These include reformatting, renaming (terminology changes), renumbering, and rewording of requirements.

L - Less restrictive requirements included in the PI ITS in order to conform to the guidance of NUREG-1431. Generally these are technical changes to existing TS which may include items such as extending Completion Times or reducing Surveillance Frequencies (extended time interval between surveillances). The less restrictive requirements necessitate individual justification. Each is provided with its specific NSHD.

LR - Less restrictive Removal of details and information from otherwise retained specifications which are removed from the CTS and placed in the Bases, Technical Requirements Manual (TRM), Updated Safety Analysis Report (USAR) or other licensee controlled documents. These changes include details of system design and function, procedural details or methods of conducting surveillances, or alarm or indication-only instrumentation.

M - More restrictive requirements included in the PI ITS in order to provide a complete set of Specifications conforming to the guidance of NUREG-1431. Changes in this category may be completely new requirements or they may be technical changes made to current requirements in the CTS.

R - Relocation of Current Specifications to other controlled documents or deletion of current Specifications which duplicate existing regulatory requirements.

Current requirements in the LCOs or SRs that do not meet the 10 CFR 50.36 selection criteria and may be relocated to the Bases, USAR, Core Operating Limits Report (COLR), Operational Quality Assurance Plan (OQAP), plant procedures or other licensee controlled documents. Relocating requirements to these licensee controlled documents does not eliminate the requirement, but rather, places them under more appropriate regulatory controls, such as 10CFR 50.54 (a)(3) and 10 CFR 50.59, to manage their implementation and future changes. Maintenance of these requirements in the TS commands resources which are not commensurate with their importance to safety and distract resources from more important requirements. Relocation of these items will enable more efficient maintenance of requirements under existing regulations and reduce the need to request TS changes for issues which do not affect public safety.

Deletion of Specifications which duplicate regulations eliminates the need to change Technical Specifications when changes in regulations occur. By law, licensees shall meet applicable requirements contained in the Code of Federal Regulations, or have NRC approved exemptions; therefore, restatement in the Technical Specifications is unnecessary.

The methodology for marking-up these changes is as follows:

As discussed above, administrative changes may not be marked-up in detail. Portions of the specifications which are no longer included are identified by use of the electronic strike-out feature (or crossed out by hand). Information being added is inserted into the specification in the appropriate location and is identified by use of shading features (or handwritten/insert pages).

Improved Standard Technical Specifications (NUREG-1431, Rev. 1)

The ISTS mark-up is to identify changes from the ISTS required to create a plant specific ITS by incorporating plant specific values in bracketed fields and identifying other changes with cross-reference to the Part F Justification For Differences.

All deviations from the ISTS are cross-referenced to the Part F justification for differences by a change number in the right margin. The change number form is CL3.4-05 where the prefix letter(s), CL in this example, indicate the classification of the reason for the difference, the first two numbers, 3.4 in this example, refer to the ITS Chapter/Section number 3.4, and the second number, 05 in this example, is a sequentially assigned number for deviations within that Chapter/Section, starting with a number which is larger than the last number from the Part C CTS mark-up. In some instances where a change has been made to the CTS and ISTS, the Part D change number is given since the justification for difference is the same as the discussion of change. The following categories are used as prefixes to indicate the general reason for each difference:

CL - Current Licensing basis. Issues that have been previously licensed for PI and have been retained in the ITS. This includes Specifications dictated by plant design features or the design basis. Since no plant modifications have been or will be made to accommodate conversion to ITS, the plant design basis features shall be incorporated into the PI ITS.

PA - Plant, Administrative. Plant specific wording preference or minor editorial improvements made to facilitate operator understanding.

TA - Traveler, Approved. Deviations made to incorporate an industry traveler which has been approved by the NRC.

TP - Traveler, Proposed. Deviation made to incorporate a proposed industry traveler which as of the time of submittal has not been approved by the NRC.

X - Other, Deviation from the ISTS for any other reason than those given above.

Material which is deleted from the ISTS is identified by use of the WordPerfect strike-out feature (or crossed out by hand). Information being added to the ISTS to generate the PI ITS due to any of the deviations discussed above is identified by use of WordPerfect red-line features (or handwritten/insert pages).

Bracketed Information

Many parameters, conditions, notes, surveillances, and portions of sections are bracketed in the ISTS recognizing that plant specific values are likely to vary from the "generic" values provided in the standard.

If the bracketed value applies to PI, then the "generic" information is retained without any special indication and the brackets are marked using the WordPerfect strike-out feature. In some instances, bracketed material is not discussed. If bracketed material is discussed, a change number is provided which includes the appropriate prefix as described above. When bracketed "generic" material is not incorporated, the bracketed material and brackets are marked with the WordPerfect strike-out feature (or crossed out by hand), the plant specific information is substituted for the bracketed information and a change number is provided which includes the appropriate prefix. Information added is indicated by the WordPerfect red-line (shading) feature (or handwritten/insert pages).

Optional Sections

Due to differing Westinghouse plant designs and methodologies, some ISTS section numbers include a letter suffix indicating that only one of these sections is applicable to any specific plant. The appropriate section is indicated in the Table of Contents, the suffix letter is deleted, and justification, if required, is included in the appropriate Chapter/Section package.

Bases, Improved Standard Technical Specifications (NUREG-1431, Rev. 1)

The ISTS Bases have been marked-up to support the plant specific PI ITS and allow reviewers to identify changes from NUREG-1431. To the extent possible, the words of NUREG-1431, Rev. 1 are retained to maximize standardization. Where the existing words in the NUREG are incorrect or misleading with respect to Prairie Island, they have been revised. In addition, descriptions have been added to cover plant specific portions of the specifications. Change numbers have been provided for the ISTS Bases with the same format as the ISTS Specification mark-up. In some instances, the same change number is used to describe the change.

Material which is deleted from the ISTS Bases is identified by use of the strike-out feature of WordPerfect (or crossed out by hand). Information being added to the ISTS Bases to generate the PI ITS is identified by use of the red-line (shading) feature of WordPerfect (or handwritten/insert pages).

Bracketed Material

Many parameters and portions of Bases are bracketed in the ISTS recognizing that plant specific values and discussions are likely to vary from the "generic" information provided in the standard.

If the bracketed information applies to PI, then the "generic" information is retained without any special indication and the brackets are marked using the WordPerfect strike-out feature. No change number or justification is provided for use of bracketed material, unless special circumstances warrant discussion.

When bracketed "generic" Bases material is not incorporated, the bracketed material and brackets are marked with the WordPerfect strike-out feature (or crossed out by hand) and the plant specific information substituted for the bracketed information is indicated by the WordPerfect red-line (shading) feature (or handwritten/insert pages). A change number with the same format as those used for the ISTS Specification mark-up is provided.

ACRONYMS

Many acronyms are used throughout this submittal. The intent of the final ITS (Part B) is that in general acronyms be written in full prior to the first use. Commonly used acronyms may not be written in full. Other parts of this package may not always write in full each acronym prior to first use; therefore, a list of acronyms is attached to assist in the review of this package.

Attachment to Part A

LIST OF ACRONYMS

AB	Auxiliary Building
ABSVS	Auxiliary Building Special Ventilation System
AFD	Axial Flux Difference
AFW	Auxiliary Feedwater System
ALARA	As Low As Reasonably Achievable
ALT	Actuation Logic Test
ASA	Applicable Safety Analyses
ASME	American Society of Mechanical Engineers
AOO	Anticipated Operational Occurrences
AOT	Allowed Outage Time
BAST	Boric Acid Storage Tank
BIT	Boron Injection Tank
BOC	Beginning of Cycle
CC	Component Cooling
COT	CHANNEL OPERATIONAL TEST
CAOC	Constant Axial Offset Control
CET	Core Exit Thermocouple
CL	Cooling Water
CLB	Current Licensing Basis
COLR	Core Operating Limits Reports
CRDM	Control Rod Drive Mechanism
CRSVS	Control Room Special Ventilation System
CS	Containment Spray
CST	Condensate Storage Tanks
CTS	Current Technical Specification(s)
DBA	Design Basis Accident
DDCL	Diesel Driven Cooling Water
DG	Diesel Generator
DNB	Departure from Nucleate Boiling
DNBR	Departure from nucleate boiling ratio
ECCS	Emergency Core Cooling System

EDG	Emergency Diesel Generators
EFPD	Effective Full Power Days
EOC	End of Cycle
ESF	Engineered Safety Feature
ESFAS	Engineered Safety Features Actuation System
FWLB	Feedwater Line Break
GDC	General Design Criteria
GITS	Ginna Improved Technical Specifications
HELB	High Energy Line Break
HZP	Hot Zero Power
IPE	Individual Plant Evaluation
ISTS	Improved Standard Technical Specifications
ITC	Isothermal Temperature Coefficient
ITS	Improved Technical Specifications
LA	License Amendment
LAR	License Amendment Request
LBLOCA	Large Break LOCA
LCO	Limiting Conditions for Operation
LHR	Linear Heat Rate
LOCA	Loss of Coolant Accident
LTOP	Low Temperature Overpressure Protection
MFIV	Main Feedwater Isolation Valve
MFRV	Main Feedwater Regulation Valve
MFW	Main Feedwater
MOSCA	MODE or Other Specified Condition of Applicability
MOV	Motor Operated Valve
MSIV	Main Steam Isolation Valves
MSLB	Main Steam Line Break
MSLI	Main Steam Line Isolation
MSSV	Main Steam Safety Valves
MTC	Moderator Temperature Coefficient
NIS	Nuclear Instrumentation System
NMC	Nuclear Management Company
NPSH	Net Positive Suction Head

NRCV	Non-Return Check Valve
NUREG-1431	The ISTS for Westinghouse plants
OPPS	OverPressure Protection System
PCT	Peak Cladding Temperature
PI	Prairie Island
PITS	Prairie Island Technical Specifications
PIV	Pressure Isolation Valve
PORV	Power Operated Relief Valve
PRA	Probabilistic Risk Assessment
PSV	Pressurizer Safety Valve
PTLR	Pressure and Temperature Limits Report
QTPR	Quadrant Power Tilt Ratio
RCCA	Rod Cluster Control Assembly
RCP	Reactor Coolant Pump
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
RHR	Residual Heat Removal System
RPI	Rod Position Indication
RPS	Reactor Protection System
RTB	Reactor Trip Breaker
RTBB	Reactor Trip Bypass Breaker
RTP	Rated Thermal Power
RTS	Reactor Trip System
RWST	Refueling Water Storage Tank
SBLOCA	Small Break Loss of Coolant Accident
SBVS	Shield Building Ventilation System
SCWS	Safeguards Chilled Water System
SDM	Shut Down Margin
SFDP	Safety Function Determination Program
SFP	Spent Fuel Pool
SG	Steam Generator
SGTR	Steam Generator Tube Rupture
SI	Safety Injection
SL	Safety Limit

SLB	Steam Line Break
SR	Surveillance Requirements
SSC	Structures, Systems and Components
TADOT	Trip Actuating Device Operational Test
TDAFW	Turbine Driven Auxiliary Feedwater
TRM	Technical Requirements Manual
TS	Technical Specifications
TSSC	Technical Specification Selection Criteria
TSTF	Term used for a NUREG change (traveler)
VCT	Volume Control Tank
VFTP	Ventilation Filter Test Program
UHS	Ultimate Heat Sink
USAR	Updated Safety Analysis Report
WCAP	Westinghouse technical report

PACKAGE 3.3

INSTRUMENTATION

PART B

PROPOSED PRAIRIE ISLAND IMPROVED TECHNICAL SPECIFICATIONS AND BASES

List of Pages

PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNITS 1 AND 2

Improved Technical Specifications Conversion Submittal

3.3 INSTRUMENTATION

3.3.1 Reactor Trip System (RTS) Instrumentation

LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

ACTIONS

--NOTE--
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).	Immediately
B. One Manual Reactor Trip channel inoperable.	B.1 Restore channel to OPERABLE status.	48 hours
	<u>OR</u>	
	B.2 Be in MODE 3.	54 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel or train inoperable.	C.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	C.2.1 Initiate action to fully insert all rods.	48 hours
	AND	
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux - High channel inoperable.	---------------NOTES--------------- 1. The inoperable channel may be bypassed for up to 4 hours for surveillance testing and setpoint adjustment of other channels. 2. An additional power range instrumentation channel may be made inoperable for low power PHYSICS TESTS. -------------------------------------	
	D.1.1 Place channel in trip.	6 hours
	AND	

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. (continued)	D.1.2	------------NOTE------------ Only required to be performed when THERMAL POWER is > 85% RTP and the power Range Neutron Flux input to QPTR is inoperable. -------------------------------	
		Perform SR 3.2.4.2.	Once per 12 hours
	<u>OR</u>		
	D.2	Be in MODE 3.	12 hours
E. One channel inoperable.	---------------NOTES---------------		
	1.	The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.	
	2.	An additional power range instrumentation channel may be made inoperable for low power PHYSICS TESTS. --	
	E.1	Place channel in trip.	6 hours
	<u>OR</u>		
	E.2	Be in MODE 3.	12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6.	24 hours
	OR	
	F.2 Increase THERMAL POWER to > P-10.	24 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1 ------------NOTE------------ Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM. --------------------------------	
	Suspend operations involving positive reactivity additions.	Immediately
	AND	
	G.2 Reduce THERMAL POWER to < P-6.	2 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. One Source Range Neutron Flux channel inoperable.	H.1 ------------NOTE------------ Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM. -------------------------------- Suspend operations involving positive reactivity additions.	 Immediately
I. Two Source Range Neutron Flux channels inoperable.	I.1 Open Reactor Trip Breakers (RTBs).	Immediately
J. One Source Range Neutron Flux channel inoperable.	J.1 Restore channel to OPERABLE status. <u>OR</u> J.2.1 Initiate action to fully insert all rods. <u>AND</u> J.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. One channel inoperable.	----------------NOTE--------------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---	
	K.1 Place channel in trip.	6 hours
	<u>OR</u>	
	K.2 Reduce THERMAL POWER to < P-7 and P-8.	12 hours
L. One or both channel(s) inoperable on one bus.	----------------NOTE--------------- One inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---	
	L.1 Place channel(s) in trip.	6 hours
	<u>OR</u>	
	L.2 Reduce THERMAL POWER to < P-7 and P-8.	12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
M. One Reactor Coolant Pump Breaker Position channel inoperable.	M.1 Restore channel to OPERABLE status.	48 hours
	OR	
	M.2 Reduce THERMAL POWER to < P-7 and P-8.	54 hours
N. One Turbine Trip channel inoperable	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channel(s). ----------------------------	
	N.1 Place channel in trip.	6 hours
	OR	
	N.2 Reduce THERMAL POWER to < P-9.	12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
O. One train inoperable.	----------------NOTE---------------- One train may be bypassed for up to 8 hours for surveillance testing provided the other train is OPERABLE. --	
	O.1 Restore train to OPERABLE status.	6 hours
	<u>OR</u>	
	O.2 Be in MODE 3.	12 hours
P. One RTB train inoperable.	----------------NOTE---------------- 1. One train may be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. 2. One RTB may be bypassed for up to 4 hours for maintenance on undervoltage or shunt trip mechanisms, provided the other train is OPERABLE. --	
	P.1 Restore RTB to OPERABLE status.	1 hour
	<u>OR</u>	
	P.2 Be in MODE 3.	7 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
Q. One or more channels inoperable.	Q.1 Verify interlock is in required state for existing unit conditions.	1 hour
	OR	
	Q.2 Be in MODE 3.	7 hours
R. One or more channels inoperable.	R.1 Verify interlock is in required state for existing unit conditions.	1 hour
	OR	
	R.2 Be in MODE 2.	7 hours
S. One trip mechanism inoperable for one RTB.	S.1 Restore inoperable trip mechanism to OPERABLE status.	48 hours
	OR	
	S.2 Be in MODE 3.	54 hours

SURVEILLANCE REQUIREMENTS

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

SURVEILLANCE		FREQUENCY
SR 3.3.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.1.2	-----NOTES----- 1. Adjust NIS channel if absolute difference is > 2%. 2. Not required to be performed until 12 hours after THERMAL POWER is ≥ 15% RTP. ----- Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output.	24 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.3	-------------------------NOTES------------------------- 1. Adjust NIS channel if absolute difference is ≥ 3%. 2. Only required to be performed with THERMAL POWER ≥ 15% RTP. --- Compare results of the incore detector measurements to NIS AFD.	Prior to exceeding 75% RTP after each refueling <u>AND</u> 31 effective full power days (EFPD)
SR 3.3.1.4	-------------------------NOTES------------------------- 1. This Surveillance must be performed on the reactor trip bypass breaker when placing the bypass breaker in service. 2. Verification of setpoints not required. --- Perform TADOT.	31 days on a STAGGERED TEST BASIS
SR 3.3.1.5	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.6	-----------------------------NOTE----------------------------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 75% RTP. -- Calibrate excore channels to agree with incore detector measurements.	92 EFPD
SR 3.3.1.7	Perform COT.	92 days
SR 3.3.1.8	-----------------------------NOTE----------------------------- This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions. -- Perform COT.	-------NOTE------ Only required when not performed within previous 92 days --------------------- Prior to reactor startup <u>AND</u> Every 92 days when the unit is in MODES 3, 4 and 5

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.9	-----NOTE----- Verification of setpoint is not required. ---------- Perform TADOT.	92 days
SR 3.3.1.10	-----NOTE----- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	24 months
SR 3.3.1.11	-----NOTE----- 1. Neutron detectors are excluded from CHANNEL CALIBRATION. 2. This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.12	-----------------------------NOTE----------------------------- 1. This Surveillance shall include verification of Reactor Coolant System resistance temperature detector bypass loop flow rate. 2. This Surveillance shall include verification that the time constants are adjusted to the prescribed values. --- Perform CHANNEL CALIBRATION.	24 months
SR 3.3.1.13	Perform COT.	24 months
SR 3.3.1.14	-----------------------------NOTE----------------------------- Verification of setpoint is not required. --- Perform TADOT.	24 months
SR 3.3.1.15	-----------------------------NOTE----------------------------- Verification of setpoint is not required. --- Perform TADOT.	Prior to exceeding the P-9 interlock whenever the unit has been shutdown in excess of 2 days, if not performed within the previous 31 days

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.3.1.16 Verify RTS RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Manual Reactor Trip	1, 2	2	B	SR 3.3.1.14	NA
	3(a), 4(a), 5(a)	2	C	SR 3.3.1.14	NA
2. Power Range Neutron Flux					
a. High	1, 2	4	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 110% RTP
b. Low	1(b),2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 40% RTP
3. Power Range Neutron Flux Rate					
a. High Positive Rate	1, 2	4	E	SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 6% RTP with time constant ≥ 2 sec
b. High Negative Rate	1, 2	4	E	SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 8% RTP with time constant ≥ 2 sec
4. Intermediate Range Neutron Flux	1(b), 2(c)	2	F, G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 40% RTP

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(b) Below the P-10 (Power Range Neutron Flux) interlocks.
(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Source Range Neutron Flux	2(d)	2	H, I	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 1.0E6 cps
	3(a), 4(a), 5(a)	2	I, J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 1.0E6 cps
6. Overtemperature ΔT	1, 2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.12 SR 3.3.1.16	Refer to Note 1 (Page 3.3.1-22)
7. Overpower ΔT	1, 2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.12 SR 3.3.1.16	Refer to Note 2 (Page 3.3.1-23)
8. Pressurizer Pressure					
a. Low	1(e)	4	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 1760 psig
b. High	1, 2	3	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 2400 psig

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.
(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
9. Pressurizer Water Level - High	1(e)	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 90%
10. Reactor Coolant Flow- Low	1(f)	3 per loop	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 91%
11. Loss of Reactor Coolant Pump (RCP)					
a. RCP Breaker Open	1(f)	1 per RCP	M	SR 3.3.1.14	NA
b. Under-frequency Buses 11 and 12 (21 and 22)(g)	1(f)	2 per bus	L	SR 3.3.1.9 SR 3.3.1.10	≥ 58.2 Hz
12. Undervoltage on Buses 11 and 12 (21 and 22)	1(e)	2 per bus	L	SR 3.3.1.9 SR 3.3.1.10	≥ 76% bus voltage
13. Steam Generator (SG) Water Level - Low Low	1, 2	3 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 5%

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.
(f) Above the P-8 (Power Range Neutron Flux) or P-7 (Low Power Reactor Trips Block) interlocks.
(g) Not a direct reactor trip; underfrequency will trip the RCP breakers open.

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
14. Turbine Trip					
a. Low Autostop Oil Pressure	$1^{(h)}$	3	N	SR 3.3.1.10 SR 3.3.1.15	≥ 45 psig
b. Turbine Stop Valve Closure	$1^{(h)}$	2	N	SR 3.3.1.15	NA
15. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1, 2	2 trains	O	SR 3.3.1.14	NA

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

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
16. Reactor Trip System Interlocks					
a. Intermediate Range Neutron Flux, P-6	2(d)	2	Q	SR 3.3.1.11 SR 3.3.1.13	≥ 1.0E-10 amp
b. Low Power Reactor Trips Block, P-7					
1. Power Range Neutron Flux	1	4	R	SR 3.3.1.11 SR 3.3.1.13	≤ 12% RTP
2. Turbine Impulse Pressure	1	2	R	SR 3.3.1.10 SR 3.3.1.13	≤ 12% Full Load
c. Power Range Neutron Flux, P-8	1	4	R	SR 3.3.1.11 SR 3.3.1.13	≤ 11% RTP
d. Power Range Neutron Flux, P-9	1	4	R	SR 3.3.1.11 SR 3.3.1.13	≤ 12% RTP
e. Power Range Neutron Flux, P-10	1, 2	4	Q	SR 3.3.1.11 SR 3.3.1.13	≥ 9% RTP
17. Reactor Trip Breakers(i) (RTBs)	1, 2	2 trains	P	SR 3.3.1.4	NA
	3(a), 4(a), 5(a)	2 trains	C	SR 3.3.1.4	NA

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.
(i) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
18. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms (j)	1, 2	1 each per RTB	S	SR 3.3.1.4	NA
	3(a), 4(a), 5(a)	1 each per RTB	C	SR 3.3.1.4	NA
19. Automatic Trip Logic	1, 2	2 trains	O	SR 3.3.1.5	NA
	3(a), 4(a), 5(a)	2 trains	C	SR 3.3.1.5	NA

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(j) Only applies to breakers OPERABLE and closed.

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

Note 1: Overtemperature ΔT

The Overtemperature ΔT Function Allowable Value is defined by the following Trip Setpoint.

$$\Delta T \le \Delta T_0 \left\{ K_1 - K_2 (T - T') \left[\frac{(1 + \tau_1 s)}{(1 + \tau_2 s)} \right] + K_3 (P - P') - f(\Delta I) \right\}$$

Where: ΔT is measured Reactor Coolant System (RCS) ΔT, °F.
ΔT_0 is the indicated ΔT at RTP, °F.
s is the Laplace transform operator, sec^{-1}.
T is the measured RCS average temperature, °F.
T′ is the nominal T_{avg} at RTP, = 567.3°F.

P is the measured pressurizer pressure, psig
P′ is the nominal RCS operating pressure, = 2235 psig

$K_1 \le 1.11$
$K_2 = 0.009/°F$
$K_3 = 0.000566/psig$
$\tau_1 = 30$ sec
$\tau_2 = 4$ sec

$f(\Delta I) =$	$0.0150\{12 + (q_t - q_b)\}$	when $q_t - q_b \le -12\%$ RTP
	0% of RTP	when -12% RTP $< q_t - q_b \le 9\%$ RTP
	$0.0250\{(q_t - q_b) - 9\}$	when $q_t - q_b > 9\%$ RTP

Where q_t and q_b are percent RTP in the upper and lower halves of the core, respectively, and $q_t + q_b$ is the total THERMAL POWER in percent RTP.

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

Note 2: Overpower ΔT

The Overpower ΔT Function Allowable Value is defined by the following Trip Setpoint.

$$\Delta T \leq \Delta T_0 \left\{ K_4 - K_5 \frac{\tau_3 s T}{1 + \tau_3 s} - K_6 (T - T') - f(\Delta I) \right\}$$

Where: ΔT is measured RCS ΔT, °F.
ΔT_0 is the indicated ΔT at RTP, °F.
s is the Laplace transform operator, sec^{-1}.
T is the measured RCS average temperature, °F.
T' is the nominal T_{avg} at RTP, = 567.3°F.

$K_4 \leq 1.10$

K_5 = 0.0275/°F for increasing T_{avg}
= 0/°F for decreasing T_{avg}

K_6 = 0.002/°F when $T > T'$
= 0/°F when $T \leq T'$

τ_3 = 10 sec

$f(\Delta I)$ = As defined in Note 1

3.3 INSTRUMENTATION

3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1.

ACTIONS

--NOTE--

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
B. One channel or train inoperable.	B.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	B.2.1 Be in MODE 3.	54 hours
	AND	
	B.2.2 Be in MODE 5.	84 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One train inoperable.	-----------------NOTE---------------- One train may be bypassed for up to 8 hours for surveillance testing provided the other train is OPERABLE. ---	
	C.1 Restore train to OPERABLE status.	6 hours
	<u>OR</u>	
	C.2.1 Be in MODE 3.	12 hours
	<u>AND</u>	
	C.2.2 Be in MODE 5.	42 hours
D. One channel inoperable.	-----------------NOTE---------------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---	
	D.1 Place channel in trip.	6 hours
	<u>OR</u>	
	D.2.1 Be in MODE 3.	12 hours
	<u>AND</u>	
	D.2.2 Be in MODE 4.	18 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two Containment Pressure channels inoperable.	----------------NOTE--------------- The tripped channel may be bypassed for up to 4 hours for surveillance testing. ---------------------------------------	
	E.1.1 Verify one channel tripped per Required Action D.1.	Immediately
	AND	
	E.1.2 Place the other channel in bypass.	6 hours
	OR	
	E.2.1 Be in MODE 3.	12 hours
	AND	
	E.2.2 Be in MODE 4.	18 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One train inoperable.	----------------NOTE---------------- One train may be bypassed for up to 8 hours for surveillance testing provided the other train is OPERABLE. ---	
	F.1 Restore train to OPERABLE status.	6 hours
	<u>OR</u>	
	F.2.1 Be in MODE 3.	12 hours
	<u>AND</u>	
	F.2.2 Be in MODE 4.	18 hours
G. One channel inoperable.	----------------NOTE---------------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---	
	G.1 Place channel in trip.	6 hours
	<u>OR</u>	
	G.2 Be in MODE 3.	12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. One or both channel(s) inoperable on one bus.	-----------------NOTE---------------- One inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. --	
	H.1 Place channel(s) in trip.	6 hours
	<u>OR</u>	
	H.2 Be in MODE 3.	12 hours
I. One channel or train inoperable.	I.1 Enter applicable Condition(s) and Required Action(s) of Specification 3.7.5 for the associated Auxiliary Feedwater (AFW) train.	Immediately

SURVEILLANCE REQUIREMENTS

-----NOTE-----
Refer to Table 3.3.2-1 to determine which SRs apply for each ESFAS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.2.2	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.3	Perform COT.	92 days
SR 3.3.2.4	-----NOTE----- Verification of setpoint not required. ---------- Perform TADOT.	24 months
SR 3.3.2.5	-----NOTE----- Verification of setpoint not required. ---------- Perform TADOT.	24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.6	---------------------------NOTE--------------------------- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. -- Perform CHANNEL CALIBRATION.	24 months

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Safety Injection					
a. Manual Initiation	1, 2, 3, 4	2	B	SR 3.3.2.5	NA
b. Automatic Actuation Relay Logic	1, 2, 3, 4	2 trains	C	SR 3.3.2.2	NA
c. High Containment Pressure	1, 2, 3	3	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≤ 4.0 psig
d. Pressurizer Low Pressure	1, 2, 3(a)	3	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≥ 1760 psig
e. Steam Line Low Pressure	1, 2, 3(a)	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≥ 500(b) psig
2. Containment Spray					
a. Manual Initiation	1, 2, 3, 4	2	B	SR 3.3.2.4	NA
b. Automatic Actuation Relay Logic	1, 2, 3, 4	2 trains	C	SR 3.3.2.2	NA

(a) Pressurizer Pressure ≥ 2000 psig.
(b) Time constants used in the lead/lag controller are $t_1 \geq 12$ seconds and $t_2 \leq 2$ seconds.

Table 3.3.2-1 (page 2 of 4)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. Containment Spray (continued)					
c. High-High Containment Pressure	1, 2, 3	3 sets of 2	D, E	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≤ 23 psig
3. Containment Isolation					
a. Manual Initiation	1, 2, 3, 4	2	B	SR 3.3.2.4	NA
b. Automatic Actuation Relay Logic	1, 2, 3, 4	2 trains	C	SR 3.3.2.2	NA
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
4. Steam Line Isolation					
a. Automatic Actuation Relay Logic	1, 2[(c)], 3[(c)]	2 trains	F	SR 3.3.2.2	NA
b. High-High Containment Pressure	1, 2[(c)], 3[(c)]	3	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≤ 17 psig

(c) Except when both Main Steam Isolation Valves (MSIVs) are closed.

Table 3.3.2-1 (page 3 of 4)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Steam Line Isolation (continued)					
c. Low-Low T_{avg}	1, 2(c), 3(c)(d)	4	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≥ 542°F
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
d. High High Steam Flow	1, 2(c), 3(c)	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≤ 4.5E6 lb/hr at 735 psig
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
5. Feedwater Isolation					
a. Automatic Actuation Relay Logic	1,2(e), 3(e)	2 trains	F	SR 3.3.2.2	NA
b. High-High Steam Generator (SG) Water Level	1, 2(e)	3 per SG	G	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≤ 90%

(c) Except when both MSIVs are closed.
(d) Reactor Coolant System (RCS) T_{avg} ≥ 520°F.
(e) Except when all Main Feedwater Regulation Valves (MFRVs), and MFRVs bypass valves are closed and in manual or isolated by a closed non-automatic valve.

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Feedwater Isolation (continued)					
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
6. Auxiliary Feedwater					
a. Automatic Actuation Relay Logic	1, 2, 3	2 trains	I	SR 3.3.2.2	NA
b. Low-Low SG Water Level	1, 2, 3	3 per SG	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.6	≥ 5%
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
d. Undervoltage on Buses 11 and 12 (21 and 22)(f)	1, 2	2 per bus	H	SR 3.3.2.4 SR 3.3.2.6	≥ 76% bus voltage
e. Trip of both Main Feedwater Pumps	1, 2(g)	2 per pump	I	SR 3.3.2.4	NA

(f) Start of Turbine Driven Pump only.
(g) This function may be bypassed during alignment and operation of the AFW System for SG level control.

3.3 INSTRUMENTATION

3.3.3 Event Monitoring (EM) Instrumentation

LCO 3.3.3 The EM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

--NOTES--

1. LCO 3.0.4 is not applicable.

2. Separate Condition entry is allowed for each Function.

3. Required Core Exit Thermocouple (CET) Channels shall be OPERABLE prior to MODE 2 following each refueling outage.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. -----------NOTE----------- Not applicable to Core Exit Thermocouples (CETs). ------------------------------ One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One or more required CETs channel(s) inoperable. AND At least 4 CETs OPERABLE in the center region of the core. AND At least one CET OPERABLE in each quadrant of the outside core region.	B.1	Restore required CET channel(s) to OPERABLE status.	30 days
C. Required Action and associated Completion Time of Condition A or B not met.	C.1	Submit a report to the NRC.	14 days
D. ----------NOTE------------ Not applicable to hydrogen monitor or CET channels. ------------------------------ One or more Functions with two required channels inoperable.	D.1	Restore one channel to OPERABLE status.	7 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two hydrogen monitor channels inoperable.	E.1 Restore one hydrogen monitor channel to OPERABLE status.	72 hours
F. Three or more required CET channels inoperable in one or more quadrants. AND Less than four CETs OPERABLE in the center region of the core.	F.1 Restore required inoperable channels to OPERABLE status.	7 days
G. Three or more required CET channels inoperable in one or more quadrants. AND Less than one CET OPERABLE in each quadrant of the outside core region.	G.1 Restore required inoperable channels to OPERABLE status.	7 days
H. Required Action and associated Completion Time of Condition D, E, F or G not met.	H.1 Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
I. As required by Required Action H.1 and referenced in Table 3.3.3-1.	I.1	Be in MODE 3.	6 hours
J. As required by Required Action H.1 and referenced in Table 3.3.3-1.	J.1	Submit a report to the NRC.	14 days

SURVEILLANCE REQUIREMENTS

---NOTE---
SR 3.3.3.1 and SR 3.3.3.2 apply to each EM instrumentation Function in Table 3.3.3-1, except Item 9. SR 3.3.3.3 applies only to Item 9.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.3.2	---------------------------NOTE--------------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. --- Perform CHANNEL CALIBRATION.	24 months
SR 3.3.3.3	---------------------------NOTE--------------------------- Verification of setpoint is not required. --- Perform TADOT.	24 months

Table 3.3.3-1 (page 1 of 1)
Event Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION H.1
1.	Power Range Neutron Flux (Logarithmic Scale)	2	I
2.	Source Range Neutron Flux (Logarithmic Scale)	2	I
3.	Reactor Coolant System (RCS) Hot Leg Temperature	2	I
4.	RCS Cold Leg Temperature	2	I
5.	RCS Pressure (Wide Range)	2	I
6.	Reactor Vessel Water Level	2	J
7.	Containment Sump Water Level (Wide Range)	2	I
8.	Containment Pressure (Wide Range)	2	I
9.	Penetration Flow Path Automatic Containment Isolation Valve Position	2 per penetration flow path[(a)(b)]	I
10.	Containment Area Radiation (High Range)	2	J
11.	Hydrogen Monitors	2	I
12.	Pressurizer Level	2	I
13.	Steam Generator Water Level (Wide Range)	2 per steam generator	I
14.	Condensate Storage Tank Level	2	I
15.	Core Exit Temperature	4 per quadrant[(c)]	I
16.	Refueling Water Storage Tank Level	2	I

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

(c) A channel consists of one core exit thermocouple (CET).

3.3 INSTRUMENTATION

3.3.4 4 kV Safeguards Bus Voltage Instrumentation

LCO 3.3.4 The following 4 kV safeguards bus voltage instrumentation Functions shall be OPERABLE:

a. Two channels per bus of the undervoltage Function;

b. Two channels per bus of the degraded voltage Function; and

c. Two trains of automatic load sequencers.

APPLICABILITY: MODES 1, 2, 3, and 4,
When associated Diesel Generator (DG) is required to be OPERABLE by LCO 3.8.2, "AC Sources-Shutdown."

ACTIONS

--NOTE--
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Function a or b or both with one channel per bus inoperable.	A.1 Place channel in bypass.	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ------------NOTE----------- Only applicable in MODE 1, 2, 3, or 4. ------------------------------- Required Action and associated Completion Time of Condition A not met. <u>OR</u> Function a or b or both with two channels per bus inoperable. <u>OR</u> One required automatic load sequencer inoperable.	B.1 Perform SR 3.3.4.1 for OPERABLE automatic load sequencer.	6 hours <u>AND</u> Once per 24 hours thereafter
	<u>AND</u> B.2 Establish offsite paths block loading capability for associated 4 kV safeguards bus.	8 hours
	<u>AND</u> B.3 Verify operability of offsite paths for associated 4kV safeguards bus.	8 hours <u>AND</u> Once per 8 hours thereafter.
	<u>AND</u> B.4 Restore automatic load sequencer to OPERABLE status.	7 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours
D. -----------NOTE----------- Only applicable in MODES 5 or 6. ----------------------------- Required Action and associated Completion Time of Condition A not met. OR Function a or b or both with two channels per bus inoperable. OR One required automatic load sequencer inoperable.	D.1 Enter applicable LCO 3.8.2 Condition(s) and Required Action(s) for the associated DG.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.4.1	Perform COT.	31 days
SR 3.3.4.2	Perform CHANNEL CALIBRATION with Allowable Value as follows: a. Undervoltage Allowable Value ≥ 3016 V and ≤ 3224 V with an undervoltage time delay of 4 ± 1.5 seconds. b. Degraded voltage Allowable Value ≥ 3944 V and ≤ 4002 V with a degraded voltage time delay of 8 ± 0.5 seconds and degraded voltage DG start time delay of 60 ± 3 seconds.	24 months

3.3 INSTRUMENTATION

3.3.5 Containment Ventilation Isolation Instrumentation

LCO 3.3.5 The Containment Ventilation Isolation instrumentation for each Function in Table 3.3.5-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5-1.

ACTIONS

--NOTE--
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One radiation monitoring train inoperable.	A.1 Place and maintain containment inservice (low flow) purge valves in closed position.	4 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. -----------NOTE----------- Only applicable in MODE 1, 2, 3, or 4. ------------------------------ One or more Functions (except radiation monitors) with one or more manual or automatic actuation trains inoperable. <u>OR</u> Two radiation monitoring trains inoperable. <u>OR</u> Required Action and associated Completion Time of Condition A not met.	B.1	Place and maintain containment inservice (low flow) purge valves in closed position.	Immediately
	<u>OR</u>		
	B.2	Enter applicable Conditions and Required Actions of LCO 3.6.3, "Containment Isolation Valves," for containment inservice (low flow) purge valves made inoperable by isolation instrumentation.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. -----------NOTE----------- Only applicable during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment. -----------------------------	C.1 Place and maintain containment inservice (low flow) purge valves in closed position.	Immediately
One or more Functions (except radiation monitors) with one or more manual or automatic actuation trains inoperable.	<u>OR</u>	
<u>OR</u>	C.2 Enter applicable Conditions and Required Actions of LCO 3.9.4, "Containment Penetrations," for containment inservice (low flow) purge valves made inoperable by isolation instrumentation.	Immediately
Two radiation monitoring trains inoperable.		
<u>OR</u>		
Required Action and associated Completion Time for Condition A not met.		

SURVEILLANCE REQUIREMENTS

-----NOTE-----
Refer to Table 3.3.5-1 to determine which SRs apply for each Containment Ventilation Isolation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.5.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.5.2	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.5.3	Perform COT.	31 days
SR 3.3.5.4	-----NOTE----- Verification of setpoint is not required. ----- Perform TADOT.	24 months
SR 3.3.5.5	Perform CHANNEL CALIBRATION.	24 months

Table 3.3.5-1 (page 1 of 1)
Containment Ventilation Isolation Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1.	Manual Initiation	1[(a)], 2[(a)], 3[(a)], 4[(a)], (b)	2	SR 3.3.5.4	NA
2.	Automatic Actuation Relay Logic	1[(a)], 2[(a)], 3[(a)], 4[(a)], (b)	2 trains	SR 3.3.5.2	NA
3.	High Radiation in Exhaust Air	1[(a)], 2[(a)], 3[(a)], 4[(a)], (b)	2 trains	SR 3.3.5.1 SR 3.3.5.3 SR 3.3.5.5	(c)
4.	Manual Containment Isolation	1[(a)], 2[(a)], 3[(a)], 4[(a)]	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 3.a., for initiation functions and requirements.		
5.	Safety Injection	1[(a)], 2[(a)], 3[(a)], 4[(a)]	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for initiation functions and requirements.		
6.	Manual Containment Spray	1[(a)], 2[(a)], 3[(a)], 4[(a)]	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 2, for initiation functions and requirements.		

(a) When the Containment Inservice Purge System is not isolated.

(b) During CORE ALTERATIONS and movement of irradiated fuel assemblies within containment when the Containment Inservice Purge System is not isolated.

(c) ≤ count rate corresponding to 500 mrem/year whole body and 3000 mrem/year skin due to noble gases at the site boundary.

B 3.3 INSTRUMENTATION

B 3.3.1 Reactor Trip System (RTS) Instrumentation

BASES

BACKGROUND

AEC GDC Criterion 14, "Core Protection Systems" (Ref. 1), requires that core protection systems, together with associated equipment, shall be designed to prevent or suppress conditions that could result in exceeding acceptable fuel damage limits. The RTS initiates a unit shutdown, based on the values of selected unit parameters, to protect against violating the core fuel design limits and Reactor Coolant System (RCS) pressure boundary during anticipated operational occurrences (AOOs) and to assist the Engineered Safety Features (ESF) Systems in mitigating accidents.

The protection and monitoring systems have been designed to assure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RTS, as well as specifying LCOs on other reactor system parameters and equipment performance.

Technical specifications are required by 10CFR50.36 to contain LSSS defined by the regulation as "... settings for automatic protective devices ... so chosen that automatic protective action will correct the abnormal situation before a safety limit (SL) is exceeded." The analytical limit is the limit of the process variable at which a safety action is initiated, as established by the safety analysis, to ensure that a SL is not exceeded. Any automatic protection action that occurs on reaching the analytical limit therefore ensures that the SL is not exceeded. However, in practice, the actual settings for automatic protective devices must be chosen to be more conservative than the analytical limit to account for instrument loop uncertainties related to the setting at which the automatic protective action would actually occur.

The trip setpoint is a predetermined setting for a protective device chosen to ensure automatic actuation prior to the process variable

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BACKGROUND (continued)

reaching the analytical limit and thus ensuring that the SL would not be exceeded. As such, the trip setpoint accounts for uncertainties in setting the device (e.g., calibration), uncertainties in how the device might actually perform (e.g., repeatability), changes in the point of action of the device over time (e.g., drift during surveillance intervals), and any other factors which may influence its actual performance (e.g., harsh accident environments). In this manner, the trip setpoint plays an important role in ensuring that SLs are not exceeded. As such, the trip setpoint meets the definition of on LSSS (Ref. 2) and could be used to meet the requirement that they be contained in the technical specifications.

Technical specifications contain values related to the OPERABILITY of equipment required for safe operation of the facility. OPERABLE is defined in technical specifications as "... being capable of performing its safety function(s)." For automatic protective devices, the required safety function is to ensure that a SL is not exceeded and therefore the LSSS as defined by 10CFR50.36 is the same as the OPERABILITY limit for these devices. However, use of the trip setpoint to define OPERABILITY in technical specifications and its corresponding designation as the LSSS required by 10CFR50.36 would be an overly restrictive requirement if it were applied as an OPERABILITY limit for the "as-found" value of a protective device setting during a surveillance. This would result in technical specification compliance problems, as well as reports and corrective actions required by the rule which are necessary to ensure safety. For example, an automatic protective device with a setting that has been found to be different from the trip setpoint due to some drift of the setting may still be OPERABLE since drift is to be expected. This expected drift would have been specifically accounted for in the setpoint methodology for calculating the trip setpoint and thus the automatic protective action would still have ensured that the SL would not be exceeded with the "as-found" setting of the protective device. Therefore, the device would still be OPERABLE since it would have performed its safety

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BACKGROUND (continued)

function and the only corrective action required would be to reset the device to the trip setpoint to account for further drift during the next surveillance interval.

Use of the trip setpoint to define "as-found" OPERABILITY and its designation as the LSSS under the expected circumstances described above would result in actions required by both the rule and technical specifications that are clearly not warranted. However, there is also some point beyond which the device would have not been able to perform its function due, for example, to greater than expected drift. This value needs to be specified in the technical specifications in order to define OPERABILITY of the devices and is designated as the Allowable Value which, as stated above, is the same as the LSSS.

The Allowable Value specified in Table 3.3.1-1 serves as the LSSS such that a channel is OPERABLE if the actual setting is found not to exceed the Allowable Value during the CHANNEL OPERATIONAL TEST (COT). As such, the Allowable Value differs from the trip setpoint by an amount primarily equal to the expected instrument loop uncertainties, such as drift, during the surveillance interval. In this manner, the actual setting of the device will still meet the LSSS definition and ensure that a safety limit is not exceeded at any given point of time as long as the device has not drifted beyond that expected during the surveillance interval. If the actual setting of the device is found to have exceeded the Allowable Value the device would be considered inoperable from a technical specification perspective. This requires corrective action including those actions required by 10CFR50.36 when automatic protective devices do not function as required. Note that, although the channel is "OPERABLE" under these circumstances, the trip setpoint should be left adjusted to a value within the established trip setpoint calibration tolerance band, in accordance with uncertainty assumptions stated in the referenced setpoint methodology (as-left criteria), and confirmed to be operating within the statistical allowances of the uncertainty terms assigned.

BASES

BACKGROUND (continued)

During AOOs, which are those events expected to occur one or more times during the unit life, the acceptable limits (Ref. 3) are:

1. The departure from nucleate boiling ratio (DNBR) shall be maintained to prevent departure from nucleate boiling (DNB);

2. Fuel centerline melt shall not occur; and

3. The RCS pressure SL of 2735 psig shall not be exceeded.

Operation within the SLs of Specification 2.0, "Safety Limits (SLs)," also maintains the above values and assures that offsite dose will be within the 10 CFR 100 criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the unit life. One acceptable limit during accidents is that offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 limits. Different accident categories are allowed a different fraction of these limits, based on probability of occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The RTS instrumentation is segmented into interconnected portions as described in the USAR (Ref. 4), and as identified below:

1. Field transmitters or process sensors: provide a measurable electronic signal based upon the physical characteristics of the parameter being measured;

2. Reactor Protection Analog System and Nuclear Instrumentation System (NIS), arranged in protection channel sets: provides signal conditioning, bistable setpoint comparison, bistable electrical signal output to protection system relay logic, and control board/control room/miscellaneous indications;

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BACKGROUND (continued)

3. Reactor Protection Relay Logic System, including channelized input and logic: initiates proper unit shutdown and/or ESF actuation in accordance with the defined logic, which is based on the bistable outputs from the analog protection system and NIS; and

4. Reactor trip switchgear, including reactor trip breakers (RTBs) and bypass breakers: provides the means to interrupt power to the control rod drive mechanisms (CRDMs) and allows the rod cluster control assemblies (RCCAs), or "rods," to fall into the core and shut down the reactor. The bypass breakers allow testing of the RTBs at power.

Field Transmitters or Sensors

To meet the design demands for redundancy and reliability, more than one, and often as many as four, field transmitters or sensors are used to measure unit parameters. To account for the calibration tolerances and instrument drift, which are assumed to occur between calibrations, statistical allowances are provided in the trip setpoint and Allowable Values. The OPERABILITY of each transmitter or sensor is determined by either "as-found" calibration data evaluated during the CHANNEL CALIBRATION or by qualitative assessment of field transmitter or sensor as related to the channel behavior observed during performance of the CHANNEL CHECK.

Reactor Protection Analog and NI Systems

Generally, two to four channels of instrumentation are used for the signal processing of unit parameters measured by the field instruments. The instrument channels provide signal conditioning, comparable output signals for instruments located on the main control board, and comparison of measured input signals with setpoints that are based on safety analyses (Ref. 3). If the measured value of a unit parameter exceeds the predetermined setpoint, an

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BACKGROUND

Reactor Protection Analog and NI Systems (continued)

output from a bistable actuates logic input relays. Channel separation is described in Reference 4. However, not all unit parameters require four channels of sensor measurement and signal processing. Some unit parameters provide input only to the protection logic, main control board indication, and the plant computer. In addition, some provide input to one or more control systems.

Generally, if a parameter is used only for input to the protection circuits, three channels with a two-out-of-three logic are sufficient to provide the required reliability and redundancy. If one channel fails in a direction that would not result in a partial Function trip, the Function will still operate with a two-out-of-two logic. If one channel fails, such that a partial Function trip occurs, a trip will not occur and the Function will still operate with a one-out-of-two logic.

If a parameter is used for input to the protection logic and a control function, the circuit must be able to withstand both an input failure to the control system, which may then require the protection function actuation, and a single failure in the other channels providing the protection function actuation. These requirements are described in IEEE-279-1971. Where necessary to provide the required reliability and redundancy, four channels with a two-out-of-four logic, or median signal selection and signal validation are provided. The actual number of channels required for each unit parameter is specified in Reference 4. Again, a single failure will neither cause nor prevent the protection function actuation.

Allowable Values and RTS Setpoints

The trip setpoints used in the bistables are based on the analytical limits from Reference 3. The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration

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BACKGROUND

Allowable Values and RTS Setpoints (continued)

tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those RTS channels that must function in harsh environments as defined by 10 CFR 50.49, the Allowable Values specified in Table 3.3.1-1 in the accompanying LCO are conservative with respect to the analytical limits. A detailed description of the methodology used to calculate the Allowable Values and trip setpoints, including their explicit uncertainties, is provided in the plant specific setpoint methodology study (Ref. 5) which incorporates all of the known uncertainties applicable to each channel. The magnitudes of these uncertainties are factored into the determination of each trip setpoint and corresponding Allowable Value. The trip setpoint entered into the bistable is more conservative than that specified by the Allowable Value (LSSS) to account for measurement errors detectable by the COT. One example of such a change in measurement error is drift during the surveillance interval. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

The trip setpoint is the value at which the bistable is set and is the expected value to be achieved during calibration. The trip setpoint value ensures the LSSS and the safety analysis limits are met for the surveillance interval selected when a channel is adjusted based on stated channel uncertainties. Any bistable is considered to be properly adjusted when the "as-left" setpoint value is within the band for CHANNEL CALIBRATION uncertainty allowance (i.e., ± rack calibration + bistable setting uncertainties).

Trip setpoints consistent with the requirements of the Allowable Value ensure that SLs and DNBR limits are not violated during AOOs (and that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the AOO or DBA and the equipment functions as designed).

Each required instrument channel can be tested on line to verify that the signal or setpoint accuracy is within the specified allowance

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BACKGROUND

Allowable Values and RTS Setpoints (continued)

requirements of Reference 5. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The instrumentation for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SRs section.

Reactor Protection Relay Logic System

The relay logic equipment uses outputs from the analog and NI bistables. To meet the redundancy requirements, two trains of relay logic, each performing the same functions, are provided. If one train is taken out of service for maintenance or test purposes, the second train will provide reactor trip for the unit. If both trains are taken out of service or placed in test, a reactor trip will result. Each train is packaged in its own set of cabinets for physical and electrical separation to satisfy separation and independence requirements. The system has been designed to provide a reactor trip in the event of a loss of power, directing the unit to a safe shutdown condition.

The bistable outputs are combined into logic matrices that represent combinations indicative of various unit upset and accident transients. If a required logic matrix combination is completed, the system will initiate a reactor trip. Examples are given in the Applicable Safety Analyses, LCO, and Applicability sections of this Bases.

Reactor Trip Switchgear

The RTBs are in the electrical power supply line from the control rod drive motor generator set power supply to the CRDMs. Opening of the RTBs interrupts power to the CRDMs, which allows the shutdown rods and control rods to fall into the core by gravity. Each RTB is equipped with a bypass breaker to allow testing of the RTB while the unit is at power. During normal operation the output from

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BACKGROUND

Reactor Trip Switchgear (continued)

the relay logic is a contact signal that energizes the undervoltage coils in the RTBs, and bypass breakers if in use. When the required logic matrix combination is completed, the relay logic output contacts open , the undervoltage coils are de-energized, the breaker trip lever is actuated by the de-energized undervoltage coil, and the RTBs and bypass breakers are tripped open. This allows the shutdown rods and control rods to fall into the core. In addition to the de-energization of the undervoltage coils, each breaker is also equipped with a shunt trip device that is energized to trip the breaker open upon receipt of a reactor trip signal from the relay logic. Either the undervoltage coil or the shunt trip mechanism is sufficient by itself to open the RTBs, thus providing a diverse trip mechanism.

The logic matrix Functions are described in Reference 4. In addition to the reactor trip or ESF, Reference 4 also identifies the various "permissive interlocks" that are associated with unit conditions. Each train has built in test features that allow testing of the logic matrix Functions 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.

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

The RTS functions to maintain the SLs and DNBR limits during AOOs as identified in Reference 3 and mitigates the consequences of DBAs in all MODES in which the Rod Control System is capable of rod withdrawal or one or more rods not fully inserted.

Each of the analyzed accidents and transients can be detected by one or more RTS Functions. The analysis described in Reference 3 takes credit for most RTS trip Functions. RTS trip Functions not specifically credited in the safety 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

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

conditions that do not require dynamic transient analysis. 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. A channel is OPERABLE with an actual setpoint value outside its calibration tolerance provided the actual setpoint "as-found" value does not exceed its associated Allowable Value and provided the setpoint "as left" value is adjusted to a value within the "as-left" calibration tolerance band. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.

The LCO generally requires OPERABILITY of two, three, or four channels in each instrumentation Function, two channels of Manual Reactor Trip and two trains in each Automatic Trip Logic Function. Four OPERABLE instrumentation channels in a two-out-of-four configuration are required when RTS channels are also used as control system inputs and there is a possibility of the shared channel failing in such a manner that it creates a transient that requires RTS action. In this case, the RTS will still provide protection, even with random failure of one of the other three protection channels. Three OPERABLE instrumentation channels in a two-out-of-three configuration are generally required when there is no potential for control system and protection system interaction that could simultaneously create a need for RTS trip and disable one RTS channel. The two-out-of-three and two-out-of-four configurations allow one channel to be tripped during maintenance or testing without causing a reactor trip. Specific exceptions to the above general philosophy exist and are discussed below.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

Reactor Trip System Functions

The safety analyses and OPERABILITY requirements applicable to each RTS Function are discussed below:

1. Manual Reactor Trip

The Manual Reactor Trip ensures that the control room operator can initiate a reactor trip at any time by using either of two reactor trip switches in the control room. A Manual Reactor Trip accomplishes the same results as any one of the automatic trip Functions. It is used by the reactor operator to shut down the reactor whenever any parameter is rapidly trending toward its trip setpoint.

The LCO requires two Manual Reactor Trip channels to be OPERABLE. Each channel is controlled by a manual reactor trip switch. Each channel activates the reactor trip breakers in both trains. Two independent channels are required to be OPERABLE so that no single random failure will disable the Manual Reactor Trip Function.

In MODE 1 or 2, Manual Reactor Trip must be OPERABLE. These are the MODES in which the shutdown rods and/or control rods are partially or fully withdrawn from the core. In MODE 3, 4, or 5, the Manual Reactor Trip Function must also be OPERABLE if one or more shutdown rods or control rods are withdrawn or the Rod Control System is capable of withdrawing the shutdown rods or control rods. In this condition, inadvertent control rod withdrawal is possible. In MODE 3, 4, or 5, Manual Reactor Trip does not have to be OPERABLE if the Rod Control System is not capable of withdrawing the shutdown rods or control rods and if all rods are fully inserted. If the rods cannot be withdrawn from the core, or all of the rods are inserted there is no need to be able to trip the reactor. In MODE 6, the CRDMs are disconnected from the control rods and shutdown rods. Therefore, the Manual Reactor Trip Function is not required.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

Reactor Trip System Functions (continued)

2. Power Range Neutron Flux

The NIS power range detectors are located external to the reactor vessel and measure neutrons leaking from the core. The NIS power range detectors provide input to the reactor control system. Therefore, 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 other channels providing the protection function actuation. Note that this Function also provides a signal to prevent automatic and manual rod withdrawal prior to initiating a reactor trip. Limiting further rod withdrawal may terminate the transient and eliminate the need to trip the reactor.

a. Power Range Neutron Flux-High

The Power Range Neutron Flux — High trip Function ensures that protection is provided, from all power levels, against a positive reactivity excursion leading to DNB during power operations. These can be caused by rod withdrawal or reductions in RCS temperature.

The LCO requires all four of the Power Range Neutron Flux-High channels to be OPERABLE.

In MODE 1 or 2, when a positive reactivity excursion could occur, the Power Range Neutron Flux-High trip must be OPERABLE. This Function will terminate the reactivity excursion and shut down the reactor prior to reaching a power level that could damage the fuel. In MODE 3, 4, 5, or 6, the NIS power range channels cannot indicate neutron levels in this range. In these MODES, the Power Range Neutron Flux-High does not have to be OPERABLE because the reactor is shut down

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

a. Power Range Neutron Flux-High (continued)

and reactivity excursions into the power range are extremely unlikely. Other RTS Functions and administrative controls provide protection against reactivity additions when in MODE 3, 4, 5, or 6.

b. Power Range Neutron Flux-Low

The LCO requirement for the Power Range Neutron Flux-Low trip Function ensures that protection is provided against a positive reactivity excursion from low power or subcritical conditions.

The LCO requires all four of the Power Range Neutron Flux-Low channels to be OPERABLE.

In MODE 1, below the Power Range Neutron Flux P-10 setpoint, and in MODE 2, the Power Range Neutron Flux-Low trip must be OPERABLE. This Function may be manually blocked by the operator when two-out-of-four power range channels are greater than the P-10 setpoint. This Function is automatically unblocked when three-out-of-four power range channels are below the P-10 setpoint. Above the P-10 setpoint, positive reactivity additions are mitigated by the Power Range Neutron Flux-High trip Function.

In MODE 3, 4, 5, or 6, the Power Range Neutron Flux-Low trip Function does not have to be OPERABLE because the reactor is shut down and the NIS power range channels cannot indicate neutron levels in this range. Other RTS trip Functions and administrative controls provide protection against positive reactivity additions or power excursions in MODE 3, 4, 5, or 6.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

3. Power Range Neutron Flux Rate

The Power Range Neutron Flux Rate trips use the same channels as discussed for Function 2 above.

a. Power Range Neutron Flux-High Positive Rate

The Power Range Neutron Flux-High Positive Rate trip Function ensures that protection is provided against rapid increases in neutron flux that are characteristic of an RCCA rod drive housing rupture and the accompanying ejection of the RCCA and uncontrolled RCCA withdrawal at power. This Function compliments the Power Range Neutron Flux-High and Low Setpoint trip Functions to ensure that the criteria are met for a rod ejection from the power range.

The LCO requires all four of the Power Range Neutron Flux-High Positive Rate channels to be OPERABLE.

In MODE 1 or 2, when there is a potential to add a large amount of positive reactivity from a rod ejection accident or uncontrolled RCCA withdrawal at power, the Power Range Neutron Flux-High Positive Rate trip must be OPERABLE. In MODE 3, 4, 5, or 6, the Power Range Neutron Flux-High Positive Rate trip Function does not have to be OPERABLE because other RTS trip Functions and administrative controls will provide protection against positive reactivity additions. In MODE 6, no rods are withdrawn and the SDM is increased during refueling operations. The reactor vessel head is also removed or the closure bolts are detensioned preventing any pressure buildup. In addition, the NIS power range channels cannot indicate neutron levels present in this mode.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

3. Power Range Neutron Flux Rate (continued)

b. Power Range Neutron Flux-High Negative Rate

The Power Range Neutron Flux-High Negative Rate trip Function ensures that protection is provided for rod drop events. At high power levels, a rod drop event could cause local flux peaking that would result in an unconservative DNBR. Operation of this Function is not required for certain single rod drop events. Safety analysis results show that DNBR will be greater than the limit for those dropped rods that do not actuate this function.

The LCO requires all four Power Range Neutron Flux-High Negative Rate channels to be OPERABLE.

In MODE 1 or 2, when there is potential for a rod drop event to occur, the Power Range Neutron Flux-High Negative Rate trip must be OPERABLE. In MODE 3, 4, 5, or 6, the Power Range Neutron Flux-High Negative Rate trip Function does not have to be OPERABLE because the core is not critical and DNB is not a concern. In MODE 6, no rods are withdrawn and the required SDM is increased during refueling operations. In addition, the NIS power range channels cannot indicate neutron levels present in this MODE.

4. Intermediate Range Neutron Flux

The Intermediate Range Neutron Flux trip Function provides redundant protection to the Power Range Neutron Flux-Low Setpoint trip Function. The NIS intermediate range detectors are located external to the reactor vessel and measure neutrons leaking from the core. The NIS intermediate range detectors

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

4. Intermediate Range Neutron Flux (continued)

do not provide any input to control systems. Note that this Function also provides a signal to prevent automatic and manual rod withdrawal prior to initiating a reactor trip. Limiting further rod withdrawal may terminate the transient and eliminate the need to trip the reactor.

The LCO requires two channels of Intermediate Range Neutron Flux to be OPERABLE. Two OPERABLE channels are sufficient to ensure no single random failure will disable this trip Function.

Because this trip Function is important only during startup, there is generally no need to disable channels for testing while the Function is required to be OPERABLE. Therefore, a third channel is unnecessary.

In MODE 1 below the P-10 setpoint, and in MODE 2 above the P-6 setpoint, when there is a potential for an uncontrolled RCCA bank rod withdrawal event during reactor startup, the Intermediate Range Neutron Flux trip must be OPERABLE. Above the P-10 setpoint, the Power Range Neutron Flux-High Setpoint trip and the Power Range Neutron Flux-High Positive Rate trip provide core protection for a rod withdrawal event. In MODE 2 below the P-6 setpoint, and in MODE 3, 4, or 5, the Source Range Neutron Flux Trip provides the core protection for reactivity events. The core also has the required SDM to mitigate the consequences of a positive reactivity addition event. In MODE 6, all rods are fully inserted and the core has a required increased SDM. Also, the NIS intermediate range channels cannot indicate neutron levels present in this MODE.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

5. Source Range Neutron Flux

The LCO requirement for the Source Range Neutron Flux trip Function ensures that protection is provided against a positive reactivity excursion from a subcritical condition. This trip Function provides redundant protection to the Power Range Neutron Flux-Low trip Function. The NIS source range detectors are located external to the reactor vessel and measure neutrons leaking from the core. The NIS source range detectors do not provide any inputs to control systems. The source range trip is the only RTS automatic protection function required in MODES 3, 4, and 5 when rods are capable of withdrawal or one or more rods are not fully inserted. Therefore, the functional capability at the specified trip setpoint is assumed to be available.

The Source Range Neutron Flux Function provides protection for control rod withdrawal from subcritical, boron dilution and control rod ejection events.

In MODE 2 when below the P-6 setpoint and in MODES 3, 4, and 5 when there is a potential for an uncontrolled RCCA bank rod withdrawal event the Source Range Neutron Flux trip must be OPERABLE. Two OPERABLE channels are sufficient to ensure no single random failure will disable this trip Function. Above the P-6 setpoint, the Intermediate Range Neutron Flux trip and the Power Range Neutron Flux-Low trip will provide core protection for reactivity events. Above the P-6 setpoint, the NIS source range detectors are de-energized .

In MODEs 3, 4, and 5 with all rods fully inserted and the Rod Control System not capable of rod withdrawal, and in MODE 6, the outputs from the Function to RTS logic are not required to be OPERABLE.

The requirements for the NIS source range detectors to monitor core neutron levels and provide indication of reactivity changes

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

5. Source Range Neutron Flux (continued)

that may occur as a result of events like a boron dilution are addressed in LCO 3.9.3, "Nuclear Instrumentation," for MODE 6.

6. Overtemperature ΔT

The Overtemperature ΔT trip Function is provided to ensure that the design limit DNBR is met. The inputs to the Overtemperature ΔT trip include pressurizer pressure, coolant temperature, axial power distribution, and reactor power as indicated by loop ΔT assuming full reactor coolant flow. Protection from violating the DNBR limit is assured for those transients that are slow with respect to delays from the core to the measurement system. The Overtemperature ΔT trip Function uses each loop's ΔT as a measure of reactor power and is compared 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;
- pressurizer pressure — the trip setpoint is varied to correct for changes in system pressure; and
- axial power distribution — f(ΔI), the trip setpoint is varied to account for imbalances in the axial power distribution as detected by the NIS upper and lower power range channels. If axial peaks are greater than the design limit, as indicated by the difference between the upper and lower NIS power range channels, the trip setpoint is reduced in accordance with Note 1 of Table 3.3.1-1.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

6. Overtemperature ΔT (continued)

Dynamic compensation is included for system piping delays from the core to the temperature measurement system.

The Overtemperature ΔT trip Function is calculated for each channel as described in Note 1 of Table 3.3.1-1. A trip occurs if Overtemperature ΔT is indicated in two channels. Since the pressure and 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 other channels providing the protection function actuation. 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 ΔT condition and may prevent a reactor trip.

The LCO requires all four channels of the Overtemperature ΔT trip Function to be OPERABLE. Note that the Overtemperature ΔT 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 ΔT 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.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

7. Overpower ΔT

The Overpower ΔT trip Function 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 provides a backup to the Power Range Neutron Flux-High Setpoint trip. The Overpower ΔT trip Function ensures that the allowable heat generation rate (kW/ft) of the fuel is not exceeded. It uses the ΔT 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;
- rate of change of reactor coolant average temperature — including dynamic compensation for the delays between the core and the temperature measurement system; and
- axial power distribution — f(ΔI), the trip setpoint is varied to account for imbalances in the axial power distribution as detected by the NIS upper and lower power range detectors. If axial peaks are greater than the design limit, as indicated by the difference between the upper and lower NIS power range detectors, the trip setpoint is reduced in accordance with Note 2 of Table 3.3.1-1.

The Overpower ΔT trip Function is calculated for each channel as per Note 2 of Table 3.3.1-1. A trip occurs if Overpower ΔT is indicated in two channels. Since the temperature signals are used for other control functions, the actuation logic must be

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

7. Overpower ΔT (continued)

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. 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 ΔT condition and may prevent a reactor trip.

The LCO requires four channels of the Overpower ΔT trip Function to be OPERABLE. Note that the Overpower ΔT 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 ΔT 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 provide input to the Pressurizer Pressure-High and-Low trips and the Overtemperature ΔT trip.

a. Pressurizer Pressure-Low

The Pressurizer Pressure-Low trip Function ensures that protection is provided against violating the DNBR limit due to low pressure.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

a. Pressurizer Pressure-Low (continued)

The LCO requires four channels of Pressurizer Pressure -Low to be OPERABLE. 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 the control system, which may then require the protection function actuation, and a single failure in the other channels providing the protection function actuation.

In MODE 1, when DNB is a major concern, the Pressurizer Pressure-Low trip must be OPERABLE. This trip Function is automatically enabled on increasing power by the P-7 interlock (NIS power range or turbine impulse pressure). On decreasing power, this trip Function is automatically blocked below P-7. Below the P-7 setpoint, the AOO's meet their DNB criteria without requiring this trip function.

b. Pressurizer Pressure-High

The Pressurizer Pressure-High trip Function ensures that protection is provided against overpressurizing the RCS. This trip Function operates in conjunction with the pressurizer relief and safety valves to prevent RCS overpressure conditions.

The LCO requires three channels of the Pressurizer Pressure-High to be OPERABLE. Although the pressurizer pressure channels are also input to pressure control, an input failure to the control system can not cause a transient that would require actuation of this protection function. Three OPERABLE channels are sufficient to ensure no single random failure will disable this trip Function.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

b. Pressurizer Pressure-High (continued)

The Pressurizer Pressure-High Allowable Value is selected to be below the pressurizer safety valve actuation pressure and above the power operated relief valve (PORV) setting. This setting minimizes challenges to safety valves while avoiding unnecessary reactor trip for those pressure increases that can be controlled by the PORVs.

In MODE 1 or 2, the Pressurizer Pressure-High trip must be OPERABLE to help prevent RCS overpressurization and minimize challenges to the relief and safety valves. In MODE 3, 4, 5, or 6, the Pressurizer Pressure-High trip Function does not have to be OPERABLE because transients that could cause an overpressure condition will be slow to occur. Therefore, the operator will have sufficient time to evaluate unit conditions and take corrective actions. Additionally, low temperature overpressure protection systems provide overpressure protection when below MODE 4.

9. Pressurizer Water Level-High

The Pressurizer Water Level-High trip Function provides a backup signal for the Pressurizer Pressure-High trip and also provides protection against water relief through the pressurizer safety valves. These valves are designed to pass steam in order to achieve their design energy removal rate. A reactor trip is actuated prior to the pressurizer becoming water solid. The LCO requires three channels of Pressurizer Water Level-High to be OPERABLE. The pressurizer level channels are used as input to the Pressurizer Level Control System. The level channels do not actuate the safety valves, and the high pressure reactor trip is set below the safety valve setting. Therefore, with the slow rate of charging available, pressure overshoot due to

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

9. Pressurizer Water Level-High (continued)

level channel failure cannot cause the safety valve to lift before the reactor high pressure trip.

In MODE 1, when there is a potential for transients such as a load rejection causing overfill of the pressurizer, the Pressurizer Water Level-High trip must be OPERABLE. This trip Function is automatically enabled on increasing power by the P-7 interlock. On decreasing power, this trip Function is automatically blocked below P-7. Below the P-7 setpoint, transients that could raise the pressurizer water level will be slow and the operator will have sufficient time to evaluate unit conditions and take corrective actions.

10. Reactor Coolant Flow-Low

The Reactor Coolant Flow-Low trip Function ensures that protection is provided against violating the DNBR limit due to low flow in one or more RCS loops, while avoiding reactor trips due to normal variations in loop flow. Above the P-8 setpoint, a loss of flow in either RCS loop will actuate a reactor trip. Above the P-7 setpoint, a loss of flow in both RCS loops will actuate a reactor trip. Each RCS loop has three flow detectors to monitor flow. The flow signals are not used for any control system input.

The LCO requires three Reactor Coolant Flow-Low channels per loop to be OPERABLE in MODE 1 above P-7 or P-8.

In MODE 1 above the P-7 or P-8 setpoints, a loss of flow in an RCS loop could result in DNB conditions in the core. Below the P-7 and P-8 setpoints, all reactor trips on low flow are automatically blocked since there is insufficient heat production to generate DNB conditions.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

11. Loss of Reactor Coolant Pump (RCP)

Loss of RCP trip Function operates on two sets of auxiliary contacts, with one set on each RCP breaker. This Function anticipates the Reactor Coolant Flow-Low trips to avoid RCS heatup that would occur before the low flow trip actuates.

a. Reactor Coolant Pump Breaker Open

The RCP Breaker Open trip Function provides protection against violating the DNBR limit due to a loss of flow in one or both RCS loop(s). The position of each RCP breaker is monitored. If one RCP breaker is open above the P-8 setpoint, a reactor trip is initiated. If both RCP breakers are open above the P-7 setpoint, a reactor trip is initiated. This trip Function will generate a reactor trip before the Reactor Coolant Flow-Low trip setpoint is reached.

The LCO requires one RCP Breaker Open channel per RCP to be OPERABLE. One OPERABLE channel is sufficient for this trip Function because the RCS Flow- Low trip alone provides sufficient protection of the DNBR limit for loss of flow events. The RCP Breaker Open trip serves only to anticipate the low flow trip, minimizing the thermal transient associated with loss of a pump.

This Function measures only the discrete position (open or closed) of the RCP breaker, using position switches. Therefore, the Function has no adjustable trip setpoint with which to associate an Allowable Value.

Below the P-7 and P-8 setpoints, RCP Breaker Open reactor trips are automatically blocked since the AOOs meet their DNB criteria without requiring this trip

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

a. Reactor Coolant Pump Breaker Open (continued)

function at this low power level. Above the P-7 or P-8 setpoints, the RCP Breaker Open reactor trips are automatically enabled.

b. Underfrequency Buses 11 and 12 (21 and 22)

The Underfrequency Buses 11 and 12 (21 and 22) breaker trip Function provides protection against violating the DNBR limit due to a loss of flow in both RCS loops from a major network frequency disturbance. An underfrequency condition will slow down the pumps, thereby reducing their coastdown time following a pump trip. The proper coastdown time is required so that reactor heat can be removed immediately after reactor trip. The frequency of each RCP bus is monitored. A loss of frequency detected on both RCP buses will initiate a trip of both RCP breakers. This trip will generate a reactor trip before the Reactor Coolant Flow-Low trip setpoint is reached. Time delays are incorporated into the Underfrequency Buses 11 and 12 (21 and 22) channels to prevent RCP breaker trips due to momentary electrical power transients.

The LCO requires two underfrequency channels per bus to be OPERABLE.

In MODE 1 above the P-7 or P-8 setpoints, the Underfrequency Buses 11 and 12 (21 and 22) trip Function must be OPERABLE. Below the P-7 and P-8 setpoints, reactor trips on RCP breaker open are automatically blocked since the AOO's meet their DNB criteria without requiring this trip function at this low power level. Above the P-7 or P-8 setpoints, the reactor trips on RCP breaker open are automatically enabled.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

12. Undervoltage on Buses 11 and 12 (21 and 22)

The Undervoltage on Buses 11 and 12 (21 and 22)Function provides protection against violating the DNBR limit due to a loss of flow in both RCS loops. The voltage to each RCP is monitored. Above the P-7 setpoint, a loss of voltage detected on both RCP buses will initiate a reactor trip. This trip Function will generate a reactor trip before the Reactor Coolant Flow-Low trip setpoint is reached. Time delays are incorporated into the undervoltage channels to prevent reactor trips due to momentary electrical power transients.

The LCO requires two undervoltage channels per bus to be OPERABLE.

In MODE 1 above the P-7 setpoint, the undervoltage trip must be OPERABLE. Below the P-7 setpoint, reactor trips on undervoltage are automatically blocked since the AOOs meet their DNB criteria without requiring this trip function at this low power level. Above the P-7 setpoint, the reactor trip on undervoltage in both RCS loops is automatically enabled. This Function uses the same relays as the ESFAS Function 6.d, "Undervoltage on Buses 11 and 12 (21 and 22)" start of the turbine driven auxiliary feedwater pump.

13. Steam Generator (SG) Water Level-Low Low

The SG Water Level-Low Low trip Function ensures that protection is provided against a loss of heat sink and actuates the Auxiliary Feedwater (AFW) System prior to uncovering the SG tubes. The SGs are the heat sink for the reactor. In order to act as a heat sink, the SGs must contain a minimum amount of water. A narrow range low low level in either SG indicates a potential loss of heat sink for the reactor. This Function also performs the ESFAS function of starting the AFW pumps on low low SG level.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

13. Steam Generator (SG) Water Level-Low Low (continued)

The LCO requires three channels of SG Water Level-Low Low per SG to be OPERABLE. The level channels provide input to the SG level control system. However, median signal selection ensures that the failure of a single channel will not result in a low level which may require the protection function actuation. Therefore, only three channels per SG are required to be OPERABLE.

In MODE 1 or 2, when the reactor requires a heat sink, the SG Water Level-Low Low trip must be OPERABLE. The normal source of water for the SGs is the Main Feedwater (MFW) System (not safety related). Generally the MFW System is only in operation in MODE 1 or 2. The AFW System is the safety related backup source of water to ensure that the SGs remain the heat sink for the reactor. During normal startups and shutdowns, the AFW System provides feedwater to maintain SG level. In MODE 3, 4, 5, or 6, the SG Water Level-Low Low Function does not have to be OPERABLE because the reactor is not operating or even critical. Decay heat removal is accomplished by the AFW System or by the Residual Heat Removal (RHR) System in MODE 3, 4, 5, or 6.

14. Turbine Trip

a. Turbine Trip-Low Autostop Oil Pressure

The Turbine Trip-Low Autostop Oil Pressure trip Function anticipates the loss of heat removal capabilities of the secondary system following a turbine trip. This trip Function acts to minimize the pressure/temperature transient on the reactor. Any turbine trip from a power level below the P-9 setpoint will not actuate a reactor trip. Three pressure switches monitor the autostop oil pressure in the turbine electrohydraulic control system. A low pressure

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

a. Turbine Trip-Low Autostop Oil Pressure (continued)

condition sensed by two-out-of-three pressure switches will actuate a reactor trip. These pressure switches do not provide any input to the control system. The unit is designed to withstand a complete loss of load and not sustain core damage or challenge the RCS pressure limitations. Core protection is provided by the Pressurizer Pressure-High trip Function and RCS integrity is ensured by the pressurizer safety valves.

The LCO requires three channels of Turbine Trip-Low Autostop Oil Pressure to be OPERABLE in MODE 1 above P-9.

Below the P-9 setpoint, heat removal can be accommodated by the steam dump system. In MODE 2, 3, 4, 5, or 6, there is no potential for a turbine trip, and the Turbine Trip - Low Autostop Oil Pressure trip Function does not need to be OPERABLE.

b. Turbine Trip - Turbine Stop Valve Closure

The Turbine Trip-Turbine Stop Valve Closure trip Function anticipates the loss of heat removal capabilities of the secondary system following a turbine trip from a power level above the P-9 setpoint. The trip Function anticipates the loss of secondary heat removal capability that occurs when the stop valves close. Tripping the reactor in anticipation of loss of secondary heat removal acts to minimize the pressure and temperature transient on the reactor. This trip Function will not and is not required to operate in the presence of a single channel failure. The unit is designed to withstand a complete loss of load and not sustain core damage or challenge the RCS pressure limitations. Core protection is provided by the Pressurizer Pressure-High trip Function, and RCS integrity is ensured

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

b. Turbine Trip - Turbine Stop Valve Closure (continued)

by the pressurizer safety valves. This trip Function is diverse to the Turbine Trip-Low Autostop Oil Pressure trip Function. Each turbine stop valve is equipped with one limit switch channel that inputs to the RTS relay logic. If the limit switches indicate that both stop valves are closed, a reactor trip is initiated.

The LCO requires two Turbine Trip-Turbine Stop Valve Closure channels, one per valve, to be OPERABLE in MODE 1 above P-9. Both channels to a train of relay logic must trip to cause reactor trip.

Below the P-9 setpoint, heat removal can be accommodated by the steam dump system. In MODE 2, 3, 4, 5, or 6, there is no potential for a load rejection, and the Turbine Trip-Stop Valve Closure trip Function does not need to be OPERABLE.

15. Safety Injection (SI) Input from Engineered Safety Feature Actuation System

The SI Input from ESFAS ensures that if a reactor trip has not already been generated by the RTS, the ESFAS automatic actuation relay logic will initiate a reactor trip upon any signal that initiates SI. This is not a condition of acceptability for the LOCA. However, other transients and accidents take credit for varying levels of ESF performance and rely upon rod insertion, except for the most reactive rod that is assumed to be fully withdrawn, to ensure reactor shutdown. Therefore, a reactor trip is initiated every time an SI signal is present. Allowable Values are not applicable to this Function. The SI Input is provided by relays in the ESFAS. Therefore, there is no measurement signal with which to associate an Allowable Value.

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APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

15. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (continued)

The LCO requires two trains of SI Input from ESFAS to be OPERABLE in MODE 1 or 2.

A reactor trip is initiated every time an SI signal is present. Therefore, this trip Function must be OPERABLE in MODE 1 or 2, when the reactor is critical, and must be shut down in the event of an accident. In MODE 3, 4, 5, or 6, the reactor is not critical, and this trip Function does not need to be OPERABLE.

16. Reactor Trip System Interlocks

Reactor protection interlocks are provided to ensure reactor trips are in the correct configuration for the current unit status. They back up operator actions to ensure protection system Functions are not bypassed during unit conditions under which the safety analysis assumes the Functions are not bypassed.

Each interlock Function consists of the following circuitry:

- The bistables that provide the applicable process parameter input;
- Logic input relays and contact matrix; and
- Permissive (P) relays that provide the interlock to the appropriate trip logic.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

16. Reactor Trip System Interlocks (continued)

The interlock Functions are:

a. Intermediate Range Neutron Flux, P-6

The Intermediate Range Neutron Flux, P-6 interlock is actuated when any NIS intermediate range channel goes approximately one decade above the minimum channel reading. If both channels drop below the setpoint, the permissive will automatically be defeated. The LCO requirement for the P-6 interlock ensures that the following Functions are performed:

- on increasing power, the P-6 interlock allows the manual block of the NIS Source Range, Neutron Flux reactor trip. This prevents a premature block of the source range trip and allows the operator to ensure that the intermediate range is OPERABLE prior to leaving the source range. When the source range trip is blocked, the high voltage to the detectors is also removed; and

- on decreasing power, the P-6 interlock automatically energizes the NIS source range detectors and enables the NIS Source Range Neutron Flux reactor trip.

The LCO requires two channels of Intermediate Range Neutron Flux, P-6 interlock to be OPERABLE in MODE 2 when below the P-6 interlock setpoint.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

a. Intermediate Range Neutron Flux, P-6 (continued)

Above the P-6 interlock setpoint, the NIS Source Range Neutron Flux reactor trip will be blocked, and this Function will no longer be necessary. In MODE 3, 4, 5, or 6, the P-6 interlock does not have to be OPERABLE because the NIS Source Range is providing core protection.

b. Low Power Reactor Trips Block, P-7

The Low Power Reactor Trips Block, P-7 interlock is actuated by input from either Power Range Neutron Flux or Turbine Impulse Pressure. The LCO requirement for the P-7 interlock ensures that the following Functions are performed:

(1) on increasing power, the P-7 interlock automatically enables reactor trips on the following Functions:

- Pressurizer Pressure-Low;
- Pressurizer Water Level-High;
- Reactor Coolant Flow-Low (both loops);
- RCPs Breaker Open (both loops); and
- Undervoltage Buses 11 and 12 (21 and 22).

These reactor trips are only required when operating above the P-7 setpoint. The reactor trips provide protection against violating the DNBR limit. Below the P-7 setpoint, the RCS is capable of providing sufficient natural circulation without any RCP running.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

b. Low Power Reactor Trips Block, P-7 (continued)

(2) on decreasing power, the P-7 interlock automatically blocks reactor trips on the following Functions:

- Pressurizer Pressure- Low;
- Pressurizer Water Level-High;
- Reactor Coolant Flow-Low (both loops);
- RCP Breaker Position (both loops); and
- Undervoltage Buses 11 and 12 (21 and 22).

The associated trips are blocked below the P-7 setpoint and unblocked above the P-7 setpoint. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the interlock performs its Function when power level drops below the P-7 setpoint, which is in MODE 1.

1. Power Range Neutron Flux, P-7

Power Range Neutron Flux, P-7 is actuated by two-out-of-four NIS power range channels. The LCO requirement for this Function ensures that this input to the P-7 interlock is available.

The LCO requires four channels of Power Range Neutron Flux, P-7 to be OPERABLE in MODE 1.

OPERABILITY in MODE 1 ensures the Function is available to perform its increasing power Functions.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

2. Turbine Impulse Pressure, P-7

The Turbine Impulse Pressure, P-7 is actuated by one-out-of-two pressure channels. The LCO requirement for this Function ensures that this input to the P-7 interlock is available.

The LCO requires two channels of Turbine Impulse Pressure, P-7 to be OPERABLE in MODE 1. The interlock Function is not required OPERABLE in MODE 2, 3, 4, 5, or 6 because the turbine generator is not operating.

c. Power Range Neutron Flux, P-8

The Power Range Neutron Flux, P-8 interlock is actuated by two-out-of-four NIS power range channels. The P-8 interlock automatically enables the Reactor Coolant Flow-Low (single loop) and RCP Breaker open (single loop) reactor trips on low flow in one or more RCS loops on increasing power. The LCO requirement for this trip Function ensures that protection is provided against a loss of flow in any RCS loop that could result in DNB conditions in the core when greater than the P-8 setpoint. On decreasing power, the reactor trip on low flow in any loop is automatically blocked.

The LCO requires four channels of Power Range Neutron Flux, P-8 interlock to be OPERABLE in MODE 1.

In MODE 1, a loss of flow in one RCS loop could result in DNB conditions, so the Power Range Neutron Flux, P-8 interlock must be OPERABLE. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the core is not producing sufficient power to be concerned about DNB conditions.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

d. Power Range Neutron Flux, P-9

The Power Range Neutron Flux, P-9 interlock is actuated by two-out-of-four NIS power range channels. The LCO requirement for this Function ensures that the Turbine Trip-Low Autostop Oil Pressure and Turbine Trip-Turbine Stop Valve Closure reactor trips are enabled above the P-9 setpoint. Above the P-9 setpoint, a turbine trip could cause a load rejection beyond the capacity of the steam dump and Rod Control Systems. A reactor trip is automatically initiated on a turbine trip when it is above the P-9 setpoint, to minimize the transient on the reactor.

The LCO requires four channels of Power Range Neutron Flux, P-9 interlock to be OPERABLE in MODE 1.

In MODE 1, a turbine trip could cause a load rejection beyond the capacity of the steam dump and Rod Control Systems, so the Power Range Neutron Flux interlock must be OPERABLE. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the reactor is not at a power level sufficient to have a load rejection beyond the capacity of the steam dump system.

e. Power Range Neutron Flux, P-10

The Power Range Neutron Flux, P-10 interlock is actuated by two-out-of-four NIS power range channels. If power level falls below the setpoint on 3 of 4 channels, the nuclear instrument trips will be automatically unblocked. The LCO requirement for the P-10 interlock ensures that the following Functions are performed:

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

e. Power Range Neutron Flux, P-10 (continued)

- on increasing power, the P-10 interlock allows the operator to manually block the Intermediate Range Neutron Flux reactor trip. Note that blocking the reactor trip also blocks the signal to prevent automatic and manual rod withdrawal;

- on increasing power, the P-10 interlock allows the operator to manually block the Power Range Neutron Flux-Low reactor trip;

- on increasing power, the P-10 interlock automatically provides a backup signal to block the Source Range Neutron Flux reactor trip, and also to de-energize the NIS source range detectors; and

- on decreasing power, the P-10 interlock automatically enables the Power Range Neutron Flux-Low reactor trip and the Intermediate Range Neutron Flux reactor trip (and rod stop).

The LCO requires four channels of Power Range Neutron Flux, P-10 interlock to be OPERABLE in MODE 1 or 2. OPERABILITY in MODE 1 ensures the Function is available to perform its decreasing power Functions in the event of a reactor shutdown. This Function must be OPERABLE in MODE 2 to ensure that core protection is provided during a startup or shutdown by the Power Range Neutron Flux-Low and Intermediate Range Neutron Flux reactor trips. In MODE 3, 4, 5, or 6, this Function does not have to be OPERABLE because the reactor is not at power and the Source Range Neutron Flux reactor trip provides core protection.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

17. Reactor Trip Breakers

The LCO requires two OPERABLE trains of trip breakers. A trip breaker train consists of all trip breakers associated with a single RTS logic train that are racked in, closed, and capable of supplying power to the Rod Control System. Thus, the train may consist of the main breaker, bypass breaker, or main breaker and bypass breaker, depending upon the system configuration. Two OPERABLE trains ensure no single random failure can disable the RTS trip capability. The OPERABILITY requirement for the individual trip mechanisms is provided in the Function 18 below.

This trip Function must be OPERABLE in MODE 1 or 2. This ensures it is available when the reactor is critical. In MODE 3, 4, or 5, this RTS trip Function must be OPERABLE when the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

18. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms

The LCO requires both the Undervoltage and Shunt Trip Mechanisms to be OPERABLE for each RTB that is in service. The trip mechanisms are not required to be OPERABLE for trip breakers that are open, racked out, incapable of supplying power to the Rod Control System, or declared inoperable under Function 17 above. OPERABILITY of both trip mechanisms on each breaker ensures that no single trip mechanism failure will prevent opening any breaker on a valid signal.

These trip Functions must be OPERABLE in MODE 1 or 2. This ensures they are available when the reactor is critical. In MODE 3, 4, or 5, these RTS trip Functions must be OPERABLE when the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

19. Automatic Trip Logic

The LCO requirement for the RTBs (Functions 17 and 18) and Automatic Trip Logic (Function 19) ensures that means are provided to interrupt the power to allow the rods to fall into the reactor core. Each RTB is equipped with an undervoltage coil and a shunt trip coil to trip the breaker open when needed. Each RTB is equipped with a bypass breaker to allow testing of the trip breaker while the unit is at power. The reactor trip signals generated by the RTS Automatic Trip Logic cause the RTBs and associated bypass breakers to open and shut down the reactor.

The LCO requires two trains of RTS Automatic Trip Logic to be OPERABLE. Having two OPERABLE trains ensures that random failure of a single logic train will not prevent reactor trip.

This trip Function must be OPERABLE in MODE 1 or 2. This ensures it is available when the reactor is critical. In MODE 3, 4, or 5, this RTS trip Function must be OPERABLE when the Rod Control System is capable of rod withdrawal or one or more rods not fully inserted.

The RTS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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A Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.1-1.

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument loop, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO

BASES

ACTIONS (continued)

Condition(s) entered for the protection Function(s) affected. When the Required Channels in Table 3.3.1-1 are specified (e.g., on a per steamline, per loop, per SG, etc., basis), then the Condition may be entered separately for each steamline, loop, SG, etc., as applicable.

When the number of inoperable channels in a trip Function exceed those specified in one or other related Conditions associated with a trip Function, then the unit may be outside the safety analysis. Therefore, LCO 3.0.3 must be immediately entered if applicable in the current MODE of operation.

A.1

Condition A applies to all RTS protection Functions. Condition A addresses the situation where one or more required channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.1-1 and to take the Required Actions for the protection functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

B.1 and B.2.

Condition B applies to the Manual Reactor Trip in MODE 1 or 2. This action addresses the train orientation of the Reactor Protection Relay Logic for this Function. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 48 hours. In this Condition, the remaining OPERABLE channel is adequate to perform the safety function.

The Completion Time of 48 hours is reasonable considering that there are two automatic actuation trains and another manual initiation channel OPERABLE, and the low probability of an event occurring during this interval.

BASES

ACTIONS

B.1 and B.2. (continued)

If the channel cannot be restored to OPERABLE status within the allowed 48 hour Completion Time, the unit must be brought to a MODE in which the requirement does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 additional hours (54 hours total time). The 6 additional hours to reach MODE 3 is reasonable, based on operating experience, to reach MODE 3 from full power operation in an orderly manner and without challenging unit systems. With the unit in MODE 3, Action C would apply to any inoperable Manual Reactor Trip Function if the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

C.1 , C.2.1 and C.2.2

Condition C applies to the following reactor trip Functions in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted:

- Manual Reactor Trip;
- RTBs;
- RTB Undervoltage and Shunt Trip Mechanisms; and
- Automatic Trip Logic.

This action addresses the train orientation of the RTS for these Functions. With one channel or train inoperable, the inoperable channel or train must be restored to OPERABLE status within 48 hours. If the affected Function(s) cannot be restored to OPERABLE status within the allowed 48 hour Completion Time, the unit must be placed in a MODE in which the requirement does not apply. To achieve this status, action must be initiated within the

BASES

ACTIONS

C.1 , C.2.1 and C.2.2 (continued)

same 48 hours to ensure that all rods are fully inserted and the Rod Control System must be placed in a condition incapable of rod withdrawal within the next hour. The additional hour provides sufficient time to accomplish the action in an orderly manner. With rods fully inserted and the Rod Control System incapable of rod withdrawal, these Functions are no longer required.

The Completion Time is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function, and given the low probability of an event occurring during this interval.

D.1.1, D.1.2, and D.2

Condition D applies to the Power Range Neutron Flux -High Function.

The NIS power range detectors provide input to the reactor control system and, therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 6 hours allowed to place the inoperable channel in the tripped condition is justified in WCAP-10271-P-A (Ref. 6).

In addition to placing the inoperable channel in the tripped condition, monitor the QPTR once every 12 hours as per SR 3.2.4.2, QPTR verification. Calculating QPTR every 12 hours compensates for the lost monitoring capability due to the inoperable NIS power range channel and allows continued unit operation at power levels > 85% RTP. The 12 hour Frequency is consistent with LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)."

BASES

ACTIONS

D.1.1, D.1.2, and D.2 (continued)

As an alternative to the above Actions, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Twelve hours are allowed to place the plant in MODE 3. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.

The Required Actions have been modified by two Notes. Note 1 allows placing the inoperable channel in the bypass condition for up to 4 hours while performing routine surveillance testing of other channels. This Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 4 hour time limit is justified in Reference 6. Note 2 allows an additional power range instrument channel to be made inoperable only during low power PHYSICS TESTS.

Required Action D.1.2 has been modified by a Note which only requires SR 3.2.4.2 to be performed if THERMAL POWER is > 85% RTP and the Power Range Neutron Flux input to QPTR becomes inoperable. Failure of a component in the Power Range Neutron Flux Channel which renders the High Flux Trip Function inoperable may not affect the capability to monitor QPTR. As such, determining QPTR using the movable incore detectors once per 12 hours may not be necessary.

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux-Low;

BASES

ACTIONS

E.1 and E.2 (continued)

- Power Range Neutron Flux-High Positive Rate;
- Power Range Neutron Flux-High Negative Rate;
- Overtemperature ΔT;
- Overpower ΔT;
- Pressurizer Pressure-High; and
- SG Water Level-Low Low.

A known inoperable channel must be placed in the tripped condition within 6 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 6 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 6.

If the operable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.

The Required Actions have been modified by two Notes. Note 1 allows placing the inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The 4 hour time limit is justified in Reference 6. Note 2 allows an additional power range instrument channel to be made inoperable only for low power PHYSICS TESTS.

BASES

ACTIONS (continued)

F.1 and F.2

Condition F applies to the Intermediate Range Neutron Flux trip when one channel is inoperable. Above the P-6 setpoint and below the P-10 setpoint, the NIS intermediate range channel performs the monitoring Functions. If THERMAL POWER is greater than the P-6 setpoint but less than the P-10 setpoint, 24 hours is allowed to reduce THERMAL POWER below the P-6 setpoint or increase THERMAL POWER above the P-10 setpoint. The provisions of LCO 3.0.4 allows entry into a MODE or other specified condition in the Applicability as directed by the Required Actions. Therefore, a MODE change is permitted with one channel inoperable whenever Required Action F.2 is used. The NIS Intermediate Range Neutron Flux channels must be OPERABLE when the power level is above the capability of the source range, P-6, and below the capability of the power range, P-10. If THERMAL POWER is greater than the P-10 setpoint, the NIS power range channels perform the monitoring and protection functions and the intermediate range is not required. The Completion Times allow for a slow and controlled power adjustment above P-10 or below P-6 and take into account the redundant capability afforded by the redundant OPERABLE channel, and the low probability of its failure during this period. This action does not require the inoperable channel to be tripped because the Function uses one-out-of-two logic. Tripping one channel would trip the reactor. Thus, the Required Actions specified in this Condition are only applicable when channel failure does not result in reactor trip.

G.1 and G.2

Condition G applies to two inoperable Intermediate Range Neutron Flux trip channels. Required Actions specified in this Condition are only applicable when channel failures do not result in reactor trip. Above the P-6 setpoint and below the P-10 setpoint, the NIS intermediate range channel performs the monitoring Functions.

BASES

ACTIONS

G.1 and G.2 (continued)

With no intermediate range channels OPERABLE, the Required Actions are to suspend operations involving positive reactivity additions immediately. This will preclude any power level increase since there are no OPERABLE Intermediate Range Neutron Flux channels. The operator must also reduce THERMAL POWER below the P-6 setpoint within two hours. Below P-6, the Source Range Neutron Flux channels will be able to monitor the core power level. The Completion Time of 2 hours will allow a controlled power reduction to less than the P-6 setpoint and takes into account the low probability of occurrence of an event during this period that may require the protection afforded by the NIS Intermediate Range Neutron Flux trip.

Required Action G.1 is modified by a Note to indicate that normal plant control operations that individually add limited reactivity (e. g., temperature or boron fluctuations associated with RCS inventory management or temperature control) are not precluded by this Action, provided they are accounted for in the calculated SDM.

H.1

Condition H applies to one inoperable Source Range Neutron Flux trip channel when in MODE 2, below the P-6 setpoint, and performing a reactor startup. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the two channels inoperable, operations involving positive reactivity additions shall be suspended immediately.

This will preclude any power escalation. With only one source range channel OPERABLE, core protection is reduced and any actions that add positive reactivity to the core must be suspended immediately.

BASES

ACTIONS

H.1 (continued)

Required Action H.1 is modified by a Note to indicate that normal plant control operations that individually add limited reactivity (e. g., temperature or boron fluctuations associated with RCS inventory management or temperature control) are not precluded by this Action, provided they are accounted for in the calculated SDM.

I.1

Condition I applies to two inoperable Source Range Neutron Flux trip channels when in MODE 2, below the P-6 setpoint, or in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With both source range channels inoperable, the RTBs must be opened immediately. With the RTBs open, the core is in a more stable condition.

J.1 and J.2

Condition J applies to one inoperable source range channel in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the source range channels inoperable, 48 hours is allowed to restore it to an OPERABLE status. If the channel cannot be returned to an OPERABLE status, action must be initiated within the same 48 hours to ensure that all rods are fully inserted, and the Rod Control System must be placed in a condition incapable of rod withdrawal within the next hour. The allowance of 48 hours to restore the channel to OPERABLE status, and the additional hour are justified in Reference 6.

BASES

ACTIONS (continued)

K.1 and K.2

Condition K applies to the following reactor trip Functions:

- Pressurizer Pressure-Low;
- Pressurizer Water Level-High;
- Reactor Coolant Flow-Low (single loop); and
- Reactor Coolant Flow-Low (both loops).

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 6 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 or P-8 setpoints. These Functions do not have to be OPERABLE below the P-7 and P-8 setpoints because there are no loss of flow trips below these setpoints. There is insufficient heat production to generate DNB conditions below these setpoints. The 6 hours allowed to place the channel in the tripped condition is justified in Reference 6. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 and P-8 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time.

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channels, and the low probability of occurrence of an event during this period that may require the protection afforded by the Functions associated with Condition K.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The 4 hour time limit is justified in Reference 6.

BASES

ACTIONS (continued)

L.1 and L.2

Condition L applies to the Loss of Reactor Coolant Pump Underfrequency Buses 11 and 12 (21 and 22) and Undervoltage on Buses 11 and 12 (21 and 22). With one or both channels inoperable on one bus, the inoperable channel(s) must be placed in trip within 6 hours. If the channel(s) cannot be restored to OPERABLE status or the channel(s) placed in trip within the 6 hours, then THERMAL POWER must be reduced below the P-7 and P-8 setpoints within the next 6 hours. This places the unit in a MODE where the LCO is no longer applicable. These trip Functions do not have to be OPERABLE below the P-7 and P-8 setpoints because the AOOs meet their DNB criteria without requiring these trip functions at this low power level. The 6 hours allowed to restore the channel(s) to OPERABLE status or place in trip and the 6 additional hours allowed to reduce THERMAL POWER to below the P-7 and P-8 setpoints are justified in Reference 6.

The Required Actions have been modified by a Note that allows placing one inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The 4 hour time limit is justified in Reference 6.

M.1 and M.2

Condition M applies to the RCP Breaker Position reactor trip Function. There is one breaker position device per RCP breaker. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 48 hours. The Completion Time of 48 hours is reasonable considering that there are two automatic actuation trains, other breaker position channels, other flow related trip Functions and the low probability of an event occurring during this interval.

If the channel cannot be restored to OPERABLE status within the 48 hours, then THERMAL POWER must be reduced below the P-7 and

BASES

ACTIONS

M.1 and M.2 (continued)

P-8 setpoints within the next 6 hours. This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-7 and P-8 setpoints because the AOO's meet their DNB criteria without requiring this trip function at this low power level.

N.1 and N.2

Condition N applies to Turbine Trip on Low Autostop Oil Pressure or on Turbine Stop Valve Closure. With one channel inoperable, the inoperable channel must be placed in the trip condition within 6 hours. If placed in the tripped condition, this results in a partial trip condition requiring only one additional channel to initiate a reactor trip. If the channel cannot be restored to OPERABLE status or placed in the trip condition, then power must be reduced below the P-9 setpoint within the next 6 hours. The 6 hours allowed to place the inoperable channel in the tripped condition and the 6 hours allowed for reducing power are justified in Reference 6.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channel(s). The 4 hour time limit is justified in Reference 6.

O.1 and O.2

Condition O applies to the SI Input from ESFAS reactor trip and the RTS Automatic Trip Logic in MODES 1 and 2. These actions address the train orientation of the RTS for these Functions. With one train inoperable, 6 hours are allowed to restore the train to OPERABLE status (Required Action O.1) or the unit must be placed

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ACTIONS

O.1 and O.2 (continued)

in MODE 3 within the next 6 hours. The Completion Time of 6 hours (Required Action O.1) is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function and given the low probability of an event during this interval. The Completion Time of an additional 6 hours (Required Action O.2) is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging unit systems.

The Required Actions have been modified by a Note that allows bypassing one train up to 8 hours for surveillance testing, provided the other train is OPERABLE. A train is normally bypassed by placing the bypass breaker in service and opening the associated RTB. The RTB remains OPERABLE under these conditions so that entry into Condition P is not required while performing testing allowed by this Note.

P.1 and P.2

Condition P applies to the RTBs in MODES 1 and 2. These actions address the train orientation of the RTS for the RTBs. With one RTB train inoperable, 1 hour is allowed to restore the RTB to OPERABLE status or the unit must be placed in MODE 3 within the next 6 hours. The Completion Time of an additional 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging unit systems. The 1 hour and 7 hour Completion Times are equal to the time allowed by LCO 3.0.3 for shutdown actions in the event of a complete loss of RTS Function. Placing the unit in MODE 3 results in Action C entry while RTB(s) are inoperable.

BASES

ACTIONS

P.1 and P.2 (continued)

The Required Actions have been modified by two Notes. Note 1 allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. Note 2 allows one RTB to be bypassed for up to 4 hours for maintenance on undervoltage or shunt trip mechanisms if the other train is OPERABLE.

Q.1 and Q.2

Condition Q applies to the P-6 and P-10 interlocks. With one or more channel(s) inoperable for one-out-of-two or two-out-of-four coincidence logic, the associated interlock must be verified to be in its required state for the existing unit condition within 1 hour or the unit must be placed in MODE 3 within the next 6 hours. Verifying the interlock status ensures the interlock's Function. The Completion Time of 1 hour is based on operating experience and the minimum amount of time allowed for manual operator actions. The Completion Time of an additional 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging unit systems. The 1 hour and 7 hour Completion Times are equal to the time allowed by LCO 3.0.3 for shutdown actions in the event of a complete loss of RTS Function.

R.1 and R.2

Condition R applies to the P-7, P-8, and P-9 interlocks. With one or more channel(s) inoperable for one-out-of-two or two-out-of-four coincidence logic, the associated interlock must be verified to be in its required state for the existing unit condition within 1 hour or the unit must be placed in MODE 2 within the next 6 hours. These actions are conservative for the case where power level is being

BASES

ACTIONS

R.1 and R.2 (continued)

raised. Verifying the interlock status ensures the interlock's Function. The Completion Time of 1 hour is based on operating experience and the minimum amount of time allowed for manual operator actions. The Completion Time of an additional 6 hours is reasonable, based on operating experience, to reach MODE 2 from full power in an orderly manner and without challenging unit systems.

S.1 and S.2

Condition S applies to the RTB Undervoltage and Shunt Trip Mechanisms, or diverse trip features, in MODES 1 and 2. With one of the diverse trip features inoperable, it must be restored to an OPERABLE status within 48 hours or the unit must be placed in a MODE where the requirement does not apply. This is accomplished by placing the unit in MODE 3 within the next 6 hours (54 hours total time). The Completion Time of an additional 6 hours is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging unit systems.

With the unit in MODE 3, Action C would apply to any inoperable RTB Trip mechanism. The affected RTB shall not be bypassed while one of the diverse features is inoperable except for the time required to perform maintenance to one of the diverse features. The allowable time for performing maintenance of the diverse features is 4 hours, per Condition P.

The Completion Time of 48 hours for Required Action S.1 is reasonable considering that in this Condition there is one remaining diverse feature for the affected RTB, and one OPERABLE RTB capable of performing the safety function and given the low probability of an event occurring during this interval.

BASES (continued)

SURVEILLANCE REQUIREMENTS

The SRs for each RTS Function are identified by the SRs column of Table 3.3.1-1 for that Function.

A Note has been added to the SR Table stating that Table 3.3.1-1 determines which SRs apply to which RTS Functions.

Note that each channel of reactor protection analog system supplies both trains of the RTS. When testing Channel I, Train A and Train B must be examined. Similarly, Train A and Train B must be examined when testing Channel II, Channel III, and Channel IV (if applicable). The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

SR 3.3.1.1

Performance of the CHANNEL CHECK once every 12 hours ensures that gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1 (continued)

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.1.2

SR 3.3.1.2 compares the calorimetric heat balance calculation to the NIS channel output every 24 hours. If the calorimetric exceeds the NIS channel output by > 2% RTP, the NIS is not declared inoperable, but must be adjusted. If the NIS channel output cannot be properly adjusted, the channel is declared inoperable.

Two Notes modify SR 3.3.1.2. The first Note indicates that the NIS channel output shall be adjusted consistent with the calorimetric results if the absolute difference between the NIS channel output and the calorimetric is > 2% RTP. The second Note clarifies that this Surveillance is required only if reactor power is ≥ 15% RTP and that 12 hours is allowed for performing the first Surveillance after reaching 15% RTP. At lower power levels, calorimetric data are inaccurate.

The Frequency of every 24 hours is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate the change in the absolute difference between NIS and heat balance calculated powers rarely exceeds 2% in any 24 hour period.

In addition, control room operators periodically monitor redundant indications and alarms to detect deviations in channel outputs.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.3

SR 3.3.1.3 compares the incore system to the NIS channel output prior to exceeding 75% RTP after each refueling and every 31 Effective Full Power Days (EFPD). If the absolute difference is ≥ 3%, the NIS channel is still OPERABLE, but must be readjusted.

If the NIS channel cannot be properly readjusted, the channel is declared inoperable. This Surveillance is performed to verify the f(ΔI) input to the overtemperature and overpower ΔT Functions.

Two Notes modify SR 3.3.1.3. Note 1 indicates that the excore NIS channel shall be adjusted if the absolute difference between the incore and excore AFD is ≥ 3%.

Note 2 clarifies that the Surveillance is required only if reactor power is ≥ 15% RTP.

The Frequency of once prior to exceeding 75% RTP following each refueling outage considers that the core, and therefore the neutron leakage characteristics, has been changed during a refueling outage such that the previous comparison is no longer valid. The Frequency also recognizes the importance of obtaining accurate excore NIS detector initial response data at high power level prior to NIS channel adjustment. An initial performance at ≤ 75% RTP provides a verification prior to attaining full power. The Frequency of every 31 EFPD is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Also, the slow changes in neutron flux during the fuel cycle can be detected during this interval.

SR 3.3.1.4

SR 3.3.1.4 is the performance of a TADOT every 31 days on a STAGGERED TEST BASIS. This test shall verify OPERABILITY

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.4 (continued)

by actuation of the end devices. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specification tests at least once per refueling interval with applicable extensions.

The RTB test shall include separate verification of the undervoltage and shunt trip mechanisms. Verification of the shunt trip Function is not required for the bypass breakers. No capability is provided for performing such a test. When performing this SR, manually trip the UV trip attachment remotely (i.e., from the protection system racks). Note 1 has been added to indicate that this test must be performed on the bypass breaker when placing it in service.

The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

Note 2 excludes verification of setpoints from the TADOT. The Functions affected have no setpoints associated with them.

SR 3.3.1.5

SR 3.3.1.5 is the performance of an ACTUATION LOGIC TEST. The RTS relay logic is tested every 31 days on a STAGGERED TEST BASIS. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. All logic combinations, with applicable permissives, are tested for each protection function required for the current plant MODE. The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.6

SR 3.3.1.6 is a calibration of the excore channels to the incore channels. If the measurements do not agree, the excore channels are not declared inoperable but must be calibrated to agree with the incore detector measurements. If the excore channels cannot be adjusted, the channels are declared inoperable. This Surveillance is performed to verify the f(ΔI) input to the overtemperature and overpower ΔT Functions.

A Note modifies SR 3.3.1.6. The Note states that this Surveillance is required only if reactor power is > 75% RTP and that 24 hours is allowed for performing the first surveillance after reaching 75% RTP.

The Frequency of 92 EFPD is adequate. It is based on industry operating experience, considering instrument reliability and operating history data for instrument drift.

SR 3.3.1.7

SR 3.3.1.7 is the performance of a COT every 92 days. A COT is performed on each required channel to ensure the entire channel will perform the intended Function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specification tests at least once per refueling interval with applicable extensions. Setpoints must be within the Allowable Values specified in Table 3.3.1-1.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.7 (continued)

allowance used in the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint methodology.

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of Reference 5.

The Frequency of 92 days is justified in Reference 6.

SR 3.3.1.8

SR 3.3.1.8 is the performance of a COT as described in SR 3.3.1.7, except it is modified by a Note that this test shall include verification that the P-6 and P-10 interlocks are in their required state for the existing unit condition. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. Verification that P-6 and P-10 are in their required state for existing plant conditions can also be accomplished by observation of the permissive annunciator window. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specification tests at least once per refueling interval with applicable extensions. The Frequency is modified by a Note that allows this surveillance to be satisfied if it has been performed within 92 days of the Frequencies prior to reactor startup. The Frequency of "prior to reactor startup" ensures this surveillance is performed prior to critical operations and applies to the source, intermediate and power range low instrument channels. The Frequency of every 92 days applies if the plant remains in the MODE of Applicability after the initial performances of prior to reactor startup. Once the unit is in MODE 3, this surveillance is no longer required for the power range low and

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.8 (continued)

intermediate range channels. This test ensures that the NIS source, intermediate, and power range low channels are OPERABLE prior to taking the reactor critical and after reducing power into the applicable MODE.

SR 3.3.1.9

SR 3.3.1.9 is the performance of a TADOT and is performed every 92 days, as justified in Reference 6. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specification tests at least once per refueling interval with applicable extensions.

The SR is modified by a Note that excludes verification of setpoints from the TADOT. Since this SR applies to undervoltage and underfrequency relays, setpoint verification is accomplished during the CHANNEL CALIBRATION.

SR 3.3.1.10

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor where applicable (e.g., the undervoltage and underfrequency relays do not have separate sensors). The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.10 (continued)

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology. The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology.

The Frequency of 24 months is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

SR 3.3.1.10 is modified by a Note stating that this test shall include verification that the time constants are adjusted to the prescribed values where applicable.

SR 3.3.1.11

SR 3.3.1.11 is the performance of a CHANNEL CALIBRATION, as described in SR 3.3.1.10, every 24 months. This SR is modified by two Notes. Note 1 states that neutron detectors are excluded from the CHANNEL CALIBRATION. Note 2 requires the Surveillance to include verification that the time constants, where applicable, are adjusted to the prescribed values. The 24 month Frequency is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

SR 3.3.1.12

SR 3.3.1.12 is the performance of a CHANNEL CALIBRATION, as described in SR 3.3.1.10, every 24 months. This SR is modified by two Notes. Note 1 states that this test shall include verification of

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.12 (continued)

the RCS resistance temperature detector (RTD) bypass loop flow rate. Note 2 requires the Surveillance to include verification that the time constants, where applicable, are adjusted to the prescribed values.

The Frequency is justified by the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.1.13

SR 3.3.1.13 is the performance of a COT of RTS interlocks every 24 months. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specification tests at least once per refueling interval with applicable extensions.

The Frequency is based on the known reliability of the interlocks and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

SR 3.3.1.14

SR 3.3.1.14 is the performance of a TADOT of the Manual Reactor Trip, RCP Breaker Position, and the SI Input from ESFAS. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.14 (continued)

a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specification tests at least once per refueling interval with applicable extensions. This TADOT is performed every 24 months. The test shall independently verify the OPERABILITY of the undervoltage and shunt trip mechanisms for the Manual Reactor Trip Function for the Reactor Trip Breakers. The Reactor Trip Bypass Breaker test shall include testing of the undervoltage trip.

The Frequency is based on the known reliability of the Functions and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

The SR is modified by a Note that excludes verification of setpoints from the TADOT. The Functions affected have no setpoints associated with them.

SR 3.3.1.15

SR 3.3.1.15 is the performance of a TADOT of Turbine Trip Functions. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specification tests at least once per refueling interval with applicable extensions. This test is performed prior to exceeding P-9 interlock whenever the unit has been shutdown in excess of 2 days. This Surveillance is required if not performed within the previous 31 days. A Note states that verification of the Trip Setpoint does not have to be performed for this Surveillance. Performance of this test will ensure that the turbine trip Function is OPERABLE prior to exceeding the P-9 interlock.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.16

SR 3.3.1.16 verifies that the individual channel/train actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response time testing acceptance criteria are included in appropriate plant procedures. Individual component response times are typically not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the equipment reaches the required functional state.

Response time test is performed with the time constants set to their nominal value, provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured. As appropriate, each channel's response must be verified every 24 months on a STAGGERED TEST BASIS. Testing of the final actuation devices is included in the testing. Response times cannot be determined during unit operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. AEC "General Design Criteria for Nuclear Power Plant Construction Permits," Criterion 14, issued for comment July 10, 1967, as referenced in USAR Section 1.2.
2. Regulatory Guide 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation."
3. USAR, Section 14.
4. USAR, Section 7.

BASES

REFERENCES (continued)

5. "Engineering Manual Section 3.3.4.1,Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations".

6. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

B 3.3 INSTRUMENTATION

B 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

BASES

BACKGROUND

AEC GDC Criterion 15, "Engineered Safety Features Protection Systems" (Ref. 1), requires that protection systems shall be provided for sensing accident situations and initiating the operation of necessary engineered safety features.

Accidents are events that are analyzed even though they are not expected to occur during the unit life. One acceptable limit during accidents is that offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 limits. Different accident categories are allowed a different fraction of these limits, based on probability of occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The ESFAS instrumentation is segmented into interconnected portions as described in the USAR (Ref. 2), and as identified below:

1. Field transmitters or process sensors and instrumentation: provide a measurable electronic signal based on the physical characteristics of the parameter being measured;

2. Signal processing equipment including Reactor Protection Analog System, arranged in protection channel sets: provide signal conditioning, bistable setpoint comparison, bistable electrical signal output to engineered safety features (ESF) relay logic, and control board/control room/miscellaneous indications; and

3. ESF relay logic system including channelized input and logic: initiates the proper ESF actuation in accordance with the defined logic and based on the bistable outputs from the analog protection system.

BASES

BACKGROUND (continued)

The Allowable Value in conjunction with the trip setpoint and LCO establishes the threshold for ESFAS action to prevent exceeding acceptable limits such that the consequences of Design Basis Accidents (DBA's) will be acceptable. The Allowable Value is considered a limiting value such that a channel is OPERABLE if the setpoint is found not to exceed the Allowable Value during the CHANNEL OPERATIONAL TEST (COT). Note that, although a channel is "OPERABLE" under these circumstances, the ESFAS setpoint must be left adjusted to within the established calibration tolerance band of the ESFAS setpoint in accordance with the uncertainty assumptions stated in the referenced setpoint methodology (as-left criteria) and confirmed to be operating within the statistical allowances of the uncertainty terms assigned.

Field Transmitters or Sensors

To meet the design demands for redundancy and reliability for the ESFAS Functions, generally two or three field transmitters or sensors are used to measure unit parameters. In many cases, field transmitters or sensors that input to the ESFAS are shared with the Reactor Trip System (RTS). To account for calibration tolerances and instrument drift, which are assumed to occur between calibrations, statistical allowances are provided in the Allowable Values. The OPERABILITY of each transmitter or sensor is determined by either "as-found" calibration data evaluated during the CHANNEL CALIBRATION or by qualitative assessment of field transmitter or sensor, as related to channel behavior observed during performance of the CHANNEL CHECK.

Reactor Protection Analog System

Generally, for ESFAS Functions, two or three channels of instrumentation are used for the signal processing of unit parameters measured by the field instruments. The instrument channels provide

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BACKGROUND

Reactor Protection Analog System (continued)

signal conditioning, comparable output signals for instruments located on the main control board, and comparison of measured input signals with setpoints that are based on safety analyses (Ref. 3). If the measured value of a unit parameter exceeds the predetermined setpoint, an output from a bistable actuates logic input relays. Channel separation is described in Reference 2.

Generally, three channels with a two-out-of-three logic are sufficient to provide the required reliability and redundancy. If one channel fails in a direction that would not result in a partial Function trip, the Function will still operate with a two-out-of-two logic. If one channel fails such that a partial Function trip occurs, a trip will not occur and the Function will still operate with a one-out-of- two logic. Therefore, a single failure will neither cause nor prevent the protection function actuation. The actual number of channels required for each unit parameter is specified in Reference 2.

Allowable Values and ESFAS Setpoints

The trip setpoints used in the bistables are based on the analytical limits from Reference 3. The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those ESFAS channels that must function in harsh environments as defined by 10 CFR 50.49, the Allowable Values specified in Table 3.3.2-1 in the accompanying LCO are conservative with respect to the analytical limits. A detailed description of the methodology used to calculate the Allowable Value and ESFAS setpoints, including their explicit uncertainties, is provided in the plant specific setpoint methodology study (Ref. 4) which incorporates all the known uncertainties applicable to each channel. The magnitudes of these uncertainties are factored into the

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BACKGROUND

Allowable Values and ESFAS Setpoints (continued)

determination of each ESFAS setpoint and corresponding Allowable Value. The nominal ESFAS setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for measurement errors detectable by a COT. One example of such a change in measurement error is drift during the surveillance interval. If the measured setpoint does not exceed the Allowable Value, the ESFAS Function is considered OPERABLE.

The ESFAS setpoints are the values at which the bistables are set and is the expected value to be achieved during calibration. The ESFAS setpoint value ensures the safety analysis limits are met for the surveillance interval selected when a channel is adjusted based on stated channel uncertainties. Any bistable is considered to be properly adjusted when the "as-left" setpoint value is within the band for CHANNEL CALIBRATION uncertainty allowance (i.e. calibration tolerance uncertainties).

Setpoints adjusted consistent with the requirements of the Allowable Value ensure that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA and the equipment functions as designed.

Each channel can be tested on line to verify that the signal processing equipment and setpoint accuracy is within the specified allowance requirements of Reference 4. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SR section.

ESF Relay Logic System

The relay logic equipment uses outputs from the analog bistables. To meet the redundancy requirements, two trains of relay logic, each

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BACKGROUND

ESF Relay Logic System (continued)

performing the same functions, are provided. If one train is taken out of service for maintenance or test purposes, the second train will provide ESF actuation for the unit. Each train is packaged in its own set of cabinets for physical and electrical separation to satisfy separation and independence requirements.

The ESF relay logic system performs the decision logic for most ESF equipment actuation; generates the electrical output signals that initiate the required actuation; and provides the status, permissive, and annunciator output signals to the main control room of the unit. The relay logic consists of input, master and slave relays. The bistable outputs are combined via the input relays into logic matrices that represent combinations indicative of various transients. If a required logic matrix combination is completed, the appropriate master and slave relays are energized. The master and slave relays cause actuation of those components whose aggregate Function best serves to alleviate the condition and restore the unit to a safe condition. Examples are given in the Applicable Safety Analyses, LCO, and Applicability sections of this Bases.

Each relay logic train has built in test features that allow testing the decision logic matrix and master relay functions 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.

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

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APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

Low Pressure is a primary actuation signal for loss of coolant accidents (LOCAs) and a backup actuation signal for steam line breaks (SLBs) inside containment. Functions such as manual initiation, not specifically credited in the 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. A channel is OPERABLE with a trip setpoint outside its calibration tolerance band provided the trip setpoint "as-found" value does not exceed its associated Allowable Value and provided the trip setpoint "as-left" value is adjusted to within the calibration tolerance band. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.

The LCO generally requires OPERABILITY of two or three channels in each instrumentation function and two channels in each logic and manual initiation function. The two-out-of-three configuration allows one channel to be tripped during maintenance or testing without causing an ESFAS initiation. Two logic or manual initiation channels are required to ensure no single random failure disables the ESFAS.

The required channels of ESFAS instrumentation provide unit protection in the event of any of the analyzed accidents. ESFAS protection functions are as follows:

1. Safety Injection

   Safety Injection (SI) provides two primary functions:

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APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

1. Safety Injection (continued)

   1. Primary side water addition to ensure maintenance or recovery of reactor vessel water level (coverage of the active fuel for heat removal, clad integrity, and for limiting peak clad temperature to < 2200°F); and

   2. Boration to ensure recovery and maintenance of SDM.

   These functions are necessary to mitigate the effects of a LOCA or SLB, both inside and outside of containment. The SI signal is also used to initiate other functions such as:

   - Containment Isolation;
   - Containment Ventilation Isolation;
   - Reactor Trip;
   - Feedwater Isolation;
   - Auxiliary Feedwater (AFW); and
   - Control room ventilation isolation.

   These other functions ensure:

   - Isolation of nonessential systems through containment penetrations;
   - Trip of the reactor to limit power generation;
   - Isolation of main feedwater to limit containment pressurization;
   - Start of AFW to ensure secondary side cooling capability;

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

1. Safety Injection (continued)

- Isolation of the control room to ensure habitability.

a. Safety Injection-Manual Initiation

The LCO requires two channels to be OPERABLE. The operator can initiate SI at any time by using either of two switches in the control room. This action will cause actuation of all components in the same manner as any of the automatic actuation signals.

The LCO for the Manual Initiation Function ensures the proper amount of redundancy is maintained in the manual ESFAS actuation circuitry to ensure the operator has manual ESFAS initiation capability.

Each channel consists of one switch and the interconnecting wiring to the actuation logic cabinet. Each switch actuates both trains. This configuration does not allow testing at power. The Applicability of the SI Manual Initiation Function is discussed with the Automatic Actuation Relay Logic Function below.

b. Safety Injection-Automatic Actuation Relay Logic

This LCO requires two trains to be OPERABLE. The SI actuation logic consists of all circuitry housed within the ESF relay logic cabinets for the SI actuation subsystem, including the initiating relay contacts responsible for actuating the ESF equipment.

Manual and automatic initiation of SI must be OPERABLE in MODES 1, 2, and 3. In these MODES, there is sufficient energy in the primary and secondary systems to warrant automatic initiation of ESF systems.

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APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

b. Safety Injection-Automatic Actuation Relay Logic (continued)

Manual Initiation is also required in MODE 4 even though automatic actuation is not required. In this MODE, adequate time is available to manually actuate required components in the event of a DBA, but because of the large number of components actuated on a SI, actuation is simplified by the use of the manual actuation switches. Automatic actuation relay logic must be OPERABLE in MODE 4 to support system level manual initiation.

These Functions are not required to be OPERABLE in MODES 5 and 6 because there is adequate time for the operator to evaluate unit conditions and respond by manually starting individual systems, pumps, and other equipment to mitigate the consequences of an abnormal condition or accident. Unit pressure and temperature are very low and many ESF components are administratively locked out or otherwise prevented from actuating to prevent inadvertent overpressurization of unit systems.

c. Safety Injection-High Containment Pressure

This signal provides protection against the following accidents:

- SLB inside containment; and
- LOCA.

Three OPERABLE channels are sufficient to satisfy protective requirements with a two-out-of-three logic. The transmitters and electronics are located outside of

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

c. Safety Injection-High Containment Pressure (continued)

containment with the sensing line located inside containment. Thus, the high pressure Function will not experience any adverse environmental conditions and the Allowable Value reflects only steady state instrument uncertainties.

High Containment Pressure must be OPERABLE in MODES 1, 2, and 3 when there is sufficient energy in the primary and secondary systems to warrant automatic initiation of ESF systems. In MODES 4, 5, and 6, plant conditions are such that the probability of an event requiring Emergency Core Cooling System (ECCS) injection is extremely low. In MODE 4, adequate time is available to manually actuate required components in the event of a DBA.

d. Safety Injection-Pressurizer Low Pressure

This signal provides protection against the following accidents:

- Inadvertent opening of a steam generator (SG) relief or safety valve;
- SLB;
- Rupture of a control rod drive mechanism housing (rod ejection);
- Inadvertent opening of a pressurizer relief or safety valve;

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APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

d. Safety Injection-Pressurizer Low Pressure (continued)

- LOCAs; and
- SG Tube Rupture.

Pressurizer pressure provides both control and protection functions: input to the pressurizer pressure control system, reactor trip, and SI. However, two independent Power Operated Relief Valve (PORV) open signals must be present before a PORV can open. Therefore, a single pressure channel failing high will not fail a PORV open and trigger a depressurization event, which may then require SI actuation. Thus, three OPERABLE channels are sufficient to satisfy the protective requirements with a two-out-of-three logic.

The transmitters are located inside containment, with the taps in the vapor space region of the pressurizer, and thus possibly experiencing adverse environmental conditions (LOCA, SLB inside containment, rod ejection). Therefore, the Allowable Value reflects the inclusion of both steady state and adverse environmental instrument uncertainties.

This Function must be OPERABLE in MODES 1, 2, and 3 with pressurizer pressure ≥ 2000 psig. This signal may be manually blocked by the operator when pressurizer pressure is < 2000 psig. Automatic SI actuation below this pressure setpoint is then performed by the High Containment Pressure signal.

This Function is not required to be OPERABLE in MODE 3 when pressurizer pressure is < 2000 psig. Other ESF

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

d. Safety Injection-Pressurizer Low Pressure (continued)

functions are used to detect accident conditions and actuate the ESF systems in this MODE. In MODES 4, 5, and 6, this Function is not needed for accident detection and mitigation.

e. Safety Injection-Steam Line Low Pressure

Steam Line Low Pressure provides protection against the following accidents:

- SLB;
- Feed line break; and
- Inadvertent opening of an SG safety valve.

Steam line pressure transmitters provide input to control functions, but the control function cannot initiate events that the Function acts to mitigate. Thus, three OPERABLE channels on each steam line are sufficient to satisfy the protective requirements with a two-out-of-three logic on each steam line.

With the transmitters typically located in the vicinity of the main steam lines, it is possible for them to experience adverse environmental conditions during a secondary side break. Therefore, the Allowable Value reflects both steady state and adverse environmental instrument uncertainties.

This Function is anticipatory in nature and has a typical lead/lag ratio of 12/2.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

e. Safety Injection-Steam Line Low Pressure (continued)

Steam Line Low Pressure must be OPERABLE in MODES 1, 2, and 3 with pressurizer pressure ≥ 2000 psig, when a secondary side break or stuck open safety valve could result in the rapid depressurization of the steam lines. This signal may be manually blocked by the operator when pressurizer pressure is < 2000 psig. When pressurizer pressure is < 2000 psig, feed line break is not a concern. This Function is not required to be OPERABLE in MODE 4, 5, or 6 because there is insufficient energy in the secondary side of the unit to cause an accident.

2. Containment Spray

Containment Spray (CS) provides three primary functions:

1. Lowers containment pressure and temperature after a LOCA or SLB in containment;

2. Reduces the amount of radioactive iodine in the containment atmosphere; and

3. Adjusts the pH of the water in the containment sump after a large break LOCA.

These functions are necessary to:

- Ensure the pressure boundary integrity of the containment structure;

- Limit the release of radioactive iodine to the environment in the event of a failure of the containment structure; and

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

2. Containment Spray (continued)

- Minimize corrosion of the components and systems inside containment following a LOCA.

The CS actuation signal starts the CS pumps and aligns the discharge of the pumps to the CS nozzle headers in the upper levels of containment. Water is initially drawn from the RWST by the CS pumps and mixed with a sodium hydroxide solution from the spray additive tank. Containment spray is actuated manually or by High High Containment Pressure.

a. Containment Spray-Manual Initiation

The LCO requires two channels to be OPERABLE. The operator can initiate CS at any time from the control room by simultaneously turning two CS actuation switches. Because an inadvertent actuation of CS could have such serious consequences, two switches must be turned simultaneously to initiate both trains of CS. The inoperability of either switch may fail both trains of manual initiation.

Each channel consists of one switch and the interconnecting wiring to the actuation logic cabinets. The Applicability of the CS Manual Initiation Function is discussed with the Automatic Actuation Relay Logic Function below. Note that manual initiation of CS also actuates containment ventilation isolation.

b. Containment Spray-Automatic Actuation Relay Logic

The CS actuation logic consists of all circuitry housed within the ESF relay logic cabinets for the CS actuation subsystem, in the same manner as described for ESFAS Function 1.b.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

b. Containment Spray-Automatic Actuation Relay Logic (continued)

Manual and automatic initiation of CS must be OPERABLE in MODES 1, 2, and 3 when there is a potential for an accident to occur, and sufficient energy in the primary or secondary systems to pose a threat to containment integrity due to overpressure conditions. Manual initiation is also required in MODE 4, even though automatic actuation is not required. In this MODE, adequate time is available to manually actuate required components in the event of a DBA by the use of the manual actuation switches. Automatic actuation relay logic must be OPERABLE in MODE 4 to support system level manual initiation. In MODES 5 and 6, there is insufficient energy in the primary and secondary systems to result in containment overpressure. In MODES 5 and 6, there is also adequate time for the operators to evaluate unit conditions and respond, to mitigate the consequences of abnormal conditions by manually starting individual components.

c. Containment Spray-High High Containment Pressure

This signal provides protection against a LOCA or an SLB inside containment. The transmitters and electronics are located outside of containment with the sensing lines located inside containment. Thus, they will not experience any adverse environmental conditions and the Allowable Value reflects only steady state instrument uncertainties.

This is one of the only Functions that requires the bistable output to energize to perform its required action. It is not desirable to have a loss of power actuate CS, since the consequences of an inadvertent actuation of CS could be serious.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

c. Containment Spray-High High Containment Pressure (continued)

High High Containment Pressure uses three sets of two channels, each set combined in a one-out-of-two configuration, with these outputs combined so that three sets tripped initiates CS. This arrangement exceeds the minimum redundancy requirements. High High Containment Pressure must be OPERABLE in MODES 1, 2, and 3 when there is sufficient energy in the primary and secondary sides to pressurize the containment following a pipe break. In MODES 4, 5, and 6, there is insufficient energy in the primary and secondary sides to overpressurize containment.

3. Containment Isolation

Containment Isolation (CI) provides isolation of the containment atmosphere, and process systems that penetrate containment, from the environment. This Function is necessary to prevent or limit the release of radioactivity to the environment in the event of a LOCA.

The CI signal isolates all automatically isolable process lines except instrument air and main steam lines, which require a steam line isolation signal.

a. Containment Isolation-Manual Initiation

Manual CI is actuated by either of two switches in the control room. Either switch actuates both trains. Note that manual initiation of CI also actuates Containment Ventilation Isolation.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

a. Containment Isolation-Manual Initiation (continued)

The LCO requires two channels to be OPERABLE. Each channel consists of one switch and the interconnecting wiring to the actuation logic cabinets. The Applicability of the CI Manual Initiation Function is discussed with the Automatic Actuation Relay Logic Function below.

b. Containment Isolation-Automatic Actuation Relay Logic

The CI actuation logic consists of all circuitry housed within the ESF relay logic cabinets for the CI actuation subsystem in the same manner as described for ESFAS Function 1.b.

Manual and automatic initiation of CI must be OPERABLE in MODES 1, 2, and 3, when there is a potential for an accident to occur. Manual initiation is also required in MODE 4 even though automatic actuation is not required. In this MODE, adequate time is available to manually actuate required components in the event of a DBA, but because of the large number of components actuated on a CI, actuation is simplified by the use of the manual actuation switches.

Automatic actuation relay logic must be OPERABLE in MODE 4 to support system level manual initiation. In MODES 5 and 6, there is insufficient energy in the primary or secondary systems, in the event of a line break, to pressurize the containment to require CI. There is adequate time for the operator to evaluate unit conditions and manually actuate individual isolation valves in response to abnormal or accident conditions.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

c. Containment Isolation Safety Injection

Containment Isolation is initiated by all Functions that initiate SI via the SI signal. The CI requirements for these Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating Functions and requirements.

4. Steam Line Isolation

Isolation of the main steam lines provides protection in the event of an SLB inside or outside containment. Rapid isolation of the steam lines will limit the steam break accident to the blowdown from one SG, at most. For an SLB upstream of the main steam isolation valves (MSIVs), inside or outside of containment, closure of the non-return check valves or the MSIVs limits the accident to the blowdown from only the affected SG. For an SLB downstream of the MSIVs, closure of the MSIVs terminates the accident.

a. Steam Line Isolation-Automatic Actuation Relay Logic

The steam line isolation actuation logic consists of all circuitry housed within the ESF relay logic cabinets for the steam line isolation subsystem in the same manner as described for ESFAS Function 1.b.

Manual and automatic initiation of steam line isolation must be OPERABLE in MODES 1, 2, and 3 when there is sufficient energy in the RCS and SGs to have an SLB. This could result in the release of significant quantities of energy and cause a cooldown of the primary system. The Steam Line Isolation Function is required in MODES 2 and 3 unless both MSIVs are closed. In MODES 4, 5, and 6, there is insufficient energy in the RCS and SGs to experience an SLB releasing significant quantities of energy.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

4. ~~Steam Line Isolation (continued)~~

b. Steam Line Isolation-High High Containment Pressure

This Function actuates closure of the MSIVs in the event of a LOCA or an SLB inside containment to maintain at least one unfaulted SG as a heat sink for the reactor. Three OPERABLE channels are sufficient to satisfy protective requirements with two-out-of-three logic. The transmitters and electronics are located outside containment with the sensing line located inside containment. Thus, they will not experience any adverse environmental conditions, and the Allowable Value reflects only steady state instrument uncertainties.

High High Containment Pressure must be OPERABLE in MODES 1, 2, and 3, when there is sufficient energy in the primary and secondary side to pressurize the containment following a pipe break. This would cause a significant increase in the containment pressure, thus allowing detection and closure of the MSIVs. The Steam Line Isolation Function remains OPERABLE in MODES 2 and 3 unless both MSIVs are closed. In MODES 4, 5, and 6, there is not enough energy in the primary and secondary sides to overpressurize containment.

c. Steam Line Isolation-Low Low T_{avg} Coincident With Safety Injection

This Function provides closure of the MSIVs during an SLB or inadvertent opening of an SG safety valve to maintain at least one unfaulted SG as a heat sink for the reactor.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

c. Steam Line Isolation-Low Low T_{avg} Coincident With Safety Injection (continued)

The main steam line isolates if an SI signal is present with a low low RCS average temperature. The Main Steam Line Isolation Function requirements for the SI Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating functions and requirements.

Two channels of T_{avg} per loop are required to be OPERABLE. The T_{avg} channels are combined in a logic such that two channels tripped cause a trip for the parameter. The accidents that this Function protects against cause reduction of T_{avg} in the entire primary system. Therefore, the provision of two OPERABLE channels per loop in a two-out-of-four configuration ensures no single random failure disables the Low Low T_{avg} Function. The T_{avg} channels provide control inputs, but the control function cannot initiate events that the Function acts to mitigate. Therefore, additional channels are not required to address control protection interaction issues.

With the T_{avg} resistance temperature detectors (RTDs) located inside the containment, it is possible for them to experience adverse environmental conditions during an SLB event. Therefore, the Allowable Value reflects both steady state and adverse environmental instrumental uncertainties.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

c. Steam Line Isolation-Low Low T_{avg} Coincident With Safety Injection (continued)

This Function must be OPERABLE in MODES 1 and 2, and in MODE 3, when T_{avg} is above 520 °F, when a secondary side break or stuck open valve could result in rapid depressurization of the steam lines. The Steam Line Isolation Function is required to be OPERABLE in MODES 2 and 3 unless both MSIVs are closed. This Function is not required to be OPERABLE in MODES 4, 5, and 6 because there is insufficient energy in the secondary side of the unit to have an accident.

d. Steam Line Isolation-High High Steam Flow Coincident With Safety Injection

This Function provides closure of the MSIVs during a SLB to maintain at least one unfaulted SG as a heat sink for the reactor.

Two steam line flow channels per steam line are required to be OPERABLE for this Function. These are combined in a one-out-of-two logic to indicate high steam flow in one steam line. The steam flow transmitters provide control inputs, but the control function cannot cause the events that the Function must protect against. Therefore, two channels are sufficient to satisfy redundancy requirements.

The Allowable Value for High High Steam Flow is a ΔP corresponding to ≤ 4.5E6 lb/hr at 735 psig.

With the transmitters located inside containment, it is possible for them to experience adverse environmental

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

d. Steam Line Isolation-High High Steam Flow Coincident With Safety Injection (continued)

conditions during an SLB event. Therefore, the Allowable Value reflects both steady state and adverse environmental instrument uncertainties.

The main steam lines isolate if the High High Steam Flow signal occurs coincident with an SI signal. The Main Steam Line Isolation Function requirements for the SI Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating functions and requirements.

This Function must be OPERABLE in MODES 1, 2, and 3 when a secondary side break could result in rapid depressurization of the steam lines unless both MSIVs are closed. This Function is not required to be OPERABLE in MODES 4, 5, and 6 because there is insufficient energy in the secondary side of the unit to have an accident.

5. Feedwater Isolation

The primary function of the Feedwater Isolation signal is to limit containment pressurization during an SLB. This Function also mitigates the effects of a high water level in the SGs, which could result in carryover of water into the steam lines and excessive cooldown of the primary system. The SG high water level is due to excessive feedwater flows.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

5. Feedwater Isolation (continued)

The Function performs the following:

- Trips the main turbine;
- Trips the main feedwater (MFW) pumps; and
- Shuts the MFW regulating valves (MFRVs) and the MFRV bypass valves.

This Function is actuated by High High SG Water Level, or by an SI signal. In the event of SI, the unit is taken off line. The MFW System is also taken out of operation and the AFW System is automatically started. The SI signal was discussed previously.

a. Feedwater Isolation-Automatic Actuation Relay Logic

The feedwater isolation actuation logic consists of all circuitry housed within the ESF relay logic cabinets for the feedwater isolation subsystem, in the same manner as described for ESFAS Function 1.b.

This Function must be OPERABLE in MODES 1, 2, and 3, except when all MFRV's and associated bypass valves are closed and in manual or isolated by a closed non-automatic valve, when a secondary side break could result in significant containment pressurization. This Function is not required to be OPERABLE in MODES 4, 5, and 6 because there is insufficient energy in the secondary side of the unit to cause an accident.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

b. Feedwater Isolation-High High Steam Generator Water Level

This signal provides protection against excessive feedwater flow. The SG water level instruments provide input to the Feedwater Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system (which may then require the protection function actuation) and a single failure in the other channels providing the protection function actuation. Median signal selection is used in the Feedwater Control System. Thus, three OPERABLE channels are sufficient to satisfy the requirements with a two-out-of-three logic. The transmitters (d/p cells) are located inside containment. However, the events that this Function protects against cannot cause a severe environment in containment. Therefore, the Allowable Value reflects only steady state instrument uncertainties.

This Function must be OPERABLE in MODES 1 and 2, except when all MFRV's and associated bypass valves are closed and in manual or isolated by a closed non-automatic valve. In MODES 3, 4, 5, and 6, the MFW System and the turbine generator are normally not in service and this Function is not required to be OPERABLE.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

c. Feedwater Isolation-Safety Injection

Feedwater Isolation is also initiated by all Functions that initiate SI via the SI signal. The Feedwater Isolation Function requirements for these Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements.

6. Auxiliary Feedwater

The AFW System is designed to provide a secondary side heat sink for the reactor in the event that the MFW System is not available. The system has a motor driven pump and a turbine driven pump, making it available during normal unit operation, during a loss of AC power, a loss of MFW, and during a Feedwater System pipe break. The normal source of water for the AFW System is the condensate storage tank (CST) (not safety related). Upon low level in the CST, the operators can manually realign the pump suctions to the Cooling Water (CL) System (safety related). The AFW System is aligned so that upon a pump start, flow is initiated to the SGs immediately.

a. Auxiliary Feedwater-Automatic Actuation Relay Logic

The auxiliary feedwater actuation logic consists of all circuitry housed within the reactor protection relay logic cabinets for the auxiliary feedwater actuation subsystem.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

b. Auxiliary Feedwater-Low Low Steam Generator Water Level

Low Low SG Water Level provides protection against a loss of heat sink. A feed line break, inside or outside of containment, or a loss of MFW, would result in a loss of SG water level. The SG water level instruments provide input to the Feedwater Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system which may then require a protection function actuation and a single failure in the other channels providing the protection function actuation. Median signal selection is used in the Feedwater Control System. Thus, three OPERABLE channels per SG are sufficient to satisfy the requirements with a two-out-of-three logic.

With the transmitters (d/p cells) located inside containment and thus possibly experiencing adverse environmental conditions (feed line break), the Allowable Value reflects the inclusion of both steady state and adverse environmental instrument uncertainties.

c. Auxiliary Feedwater-Safety Injection

An SI signal starts the motor driven and turbine driven AFW pumps. The AFW initiation functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating functions and requirements.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

c. Auxiliary Feedwater-Safety Injection (continued)

Functions 6.a through 6.c must be OPERABLE in MODES 1, 2, and 3 to ensure that the SGs remain the heat sink for the reactor. Low Low SG Water Level in any operating SG will cause the AFW pumps to start. The system is aligned so that upon a start of the pump, water immediately begins to flow to the SGs. These Functions do not have to be OPERABLE in MODES 5 and 6 because there is not enough heat being generated in the reactor to require the SGs as a heat sink. In MODE 4, AFW actuation does not need to be OPERABLE because either AFW or residual heat removal (RHR) will already be in operation to remove decay heat or sufficient time is available to manually place either system in operation.

d. Auxiliary Feedwater-Undervoltage on Buses 11 and 12 (21 and 22)

A loss of power on the buses that provide power to the MFW pumps provides indication of a pending loss of MFW flow. The undervoltage Function senses the voltage upstream of each MFW pump breaker. A loss of power for both MFW pumps will start the turbine driven AFW pump to ensure that at least one SG contains enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip.

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

e. Auxiliary Feedwater-Trip of Both Main Feedwater Pumps

A trip of both MFW pumps is an indication of a loss of MFW and the subsequent need for some method of decay heat and sensible heat removal to bring the reactor back to no load temperature and pressure. Motor driven MFW pumps are equipped with a breaker position sensing device. A trip of both MFW pumps starts the motor driven and turbine driven AFW pumps to ensure that at least one SG is available with water to act as the heat sink for the reactor.

Functions 6.d and 6.e must be OPERABLE in MODES 1 and 2. This ensures that at least one SG is provided with water to serve as the heat sink to remove reactor decay heat and sensible heat in the event of an accident. In MODES 3, 4, and 5, the MFW pumps may be normally shut down, and thus neither the pump trip or bus undervoltage are indicative of a condition requiring automatic AFW initiation. Also, in MODE 2 the AFW system may be used for SG level control. The MFW trip is bypassed by placing the AFW pump CS in shutdown auto when AFW is aligned for this purpose. Low low SG level provides protection during this operation.

The ESFAS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES (continued)

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.2-1.

In the event a channel's setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument loop, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the protection Function(s) affected. When the Required Channels in Table 3.3.2-1 are specified (e.g., on a per steam line, per loop, per SG, etc., basis), then the Condition may be entered separately for each steam line, loop, SG, etc., as appropriate.

When the number of inoperable channels in a trip function exceed those specified in one or other related Conditions associated with a trip function, then the unit may be outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered if applicable in the current MODE of operation.

A.1

Condition A applies to all ESFAS protection functions.

Condition A addresses the situation where one or more channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.2-1 and to take the Required Actions for the protection functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

BASES

ACTIONS (continued)

B.1, B.2.1 and B.2.2

Condition B applies to manual initiation of:

- SI;
- Containment Spray (CS); and
- Containment Isolation (CI).

This action addresses the train orientation of the ESF relay logic for the functions listed above. If a channel or train is inoperable, 48 hours is allowed to return it to an OPERABLE status. The specified Completion Time is reasonable considering that there are two automatic actuation trains and another manual initiation channel OPERABLE for each Function (except for CS), and the low probability of an event occurring during this interval. If the channel cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (54 hours total time) and in MODE 5 within an additional 30 hours (84 hours total time). The allowable Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

C.1, C.2.1 and C.2.2

Condition C applies to the automatic actuation relay logic for the following functions:

- SI;
- CS; and
- CI.

BASES

ACTIONS

C.1, C.2.1 and C.2.2 (continued)

This action addresses the train orientation of the ESF relay logic. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (12 hours total time) and in MODE 5 within an additional 30 hours (42 hours total time). The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 8 hours for surveillance testing, provided the other train is OPERABLE. This allowance is based on the reliability analysis assumption of WCAP-10271-P-A (Ref. 5) that 8 hours is the average time required to perform relay logic train surveillance.

D.1, D.2.1, and D.2.2

Condition D applies to:

- High Containment Pressure;
- Pressurizer Low Pressure;
- Steam Line Low Pressure;
- CS High High Containment Pressure;
- Steam Line Isolation High High Containment Pressure;

BASES

ACTIONS

D.1, D.2.1, and D.2.2 (continued)

- Low Low T_{avg} Coincident With Safety Injection;
- High High Steam Flow Coincident With Safety Injection; and
- Low Low SG Water level.

If one channel is inoperable, 6 hours are allowed to restore the channel to OPERABLE status or to place it in the tripped condition. Generally this Condition applies to functions that operate on two-out-of-three logic. Therefore, failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-three configuration that satisfies redundancy requirements.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to restore the channel to OPERABLE status or to place the inoperable channel in the tripped condition, and the 4 hours allowed for testing, are justified in Reference 5.

BASES

ACTIONS (continued)

E.1.1, E.1.2, E.2.1, and E.2.2

Condition E applies to CS High High Containment Pressure. Condition E addresses the situation where two of the six containment pressure channels are inoperable at the same time. With one channel tripped per Condition D, one of the three sets is actuated. Tripping the second channel could actuate the second set. This is undesirable because a single failure would then cause spurious containment spray initiation. Spurious spray actuation is undesirable because of the cleanup problems presented. With one channel bypassed, one OPERABLE channel remains available to actuate the second set and two OPERABLE channels are available to provide the one of two logic for the third set to actuate CS. Furthermore, with one channel bypassed, a single instrumentation channel failure will not spuriously initiate containment spray.

To avoid the inadvertent actuation of containment spray, both inoperable channels should not be placed in the tripped condition. Instead one is bypassed. Restoring the channel(s) to OPERABLE status, or placing the other inoperable channel in the bypass condition within 6 hours, is sufficient to assure that the Function remains OPERABLE and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed high). The Completion Time is further justified based on the low probability of an event occurring during this interval. Failure to restore the inoperable channel(s) to OPERABLE status, or place one in the bypassed condition within 6 hours, requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, this Function is a no longer required OPERABLE.

BASES

ACTIONS

E.1.1, E.1.2, E.2.1, and E.2.2 (continued)

The Required Actions are modified by a Note that allows the tripped channel to be bypassed for up to 4 hours for surveillance testing. Placing a second channel in the bypass condition for up to 4 hours for testing purposes is acceptable based on the results of Reference 5.

F.1, F.2.1, and F.2.2

Condition F applies to the automatic actuation relay logic for the Steam Line Isolation and Feedwater Isolation Functions.

The action addresses the train orientation of the ESF relay logic for these functions. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of the actuation function. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the Functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 8 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 5) assumption that 8 hours is the average time required to perform relay logic train surveillance.

BASES

ACTIONS (continued)

G.1 and G.2

Condition G applies to High High SG Water Level.

If one channel is inoperable, 6 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition where one-out-of-two logic will result in actuation.

The 6 hour Completion Time is justified in Reference 5. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, this Function is no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to place the inoperable channel in the tripped condition, and the 4 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 5.

H.1 and H.2

Condition H applies to Undervoltage on Buses 11 and 12 (21 and 22).

If one or both channel(s) on one bus is inoperable, 6 hours are allowed to restore the channel(s) to OPERABLE status or to place it

BASES

ACTIONS

H.1 and H.2 (continued)

in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition where one-out-of-two channels on the other bus will result in actuation. The 6 hour Completion Time is justified in Reference 5. Failure to restore the inoperable channel(s) to OPERABLE status or place it in the tripped condition within 6 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, this Function is no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to place the inoperable channel in the tripped condition, and the 4 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 5.

I.1 and I.2

Condition I applies to the AFW pump start on trip of both MFW pumps and to the AFW automatic actuation relay logic functions.

The OPERABILITY of the AFW System must be assured by allowing automatic start of the AFW System pumps. If a channel or logic train is inoperable, the applicable Condition(s) and Required Action(s) of LCO 3.7.5, “Auxiliary Feedwater (AFW) System,” are entered for the associated AFW Train.

BASES (continued)

SURVEILLANCE REQUIREMENTS

The SRs for each ESFAS Function are identified by the SRs column of Table 3.3.2-1.

A Note has been added to the SR Table to clarify that Table 3.3.2-1 determines which SRs apply to which ESFAS Functions.

Note that each channel of reactor protection analog system supplies both trains of the ESFAS. When testing Channel I, Train A and Train B must be examined. Similarly, Train A and Train B must be examined when testing Channel II, Channel III, and Channel IV (if applicable). The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

SR 3.3.2.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including indication and reliability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.1 (continued)

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.2.2

SR 3.3.2.2 is the performance of an ACTUATION LOGIC TEST. The ESF relay logic is tested every 31 days on a STAGGERED TEST BASIS. The train being tested is placed in the test condition, thus preventing inadvertent actuation. All possible logic combinations are tested for each ESFAS function. The test includes actuation of master and slave relays whose contact outputs remain within the relay logic. The test condition inhibits actuation of the master and slave relays whose contact outputs provide direct ESF equipment actuation. Where the relays are not actuated, the test circuitry provides a continuity check of the relay coil. This verifies that the logic is OPERABLE and that there is a signal path to the output relay coils. The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.3

SR 3.3.2.3 is the performance of a COT.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.3 (continued)

found within the Allowable Values specified in Table 3.3.2-1. A successful test of the required contact(s) of a channel (logic input) relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint methodology.

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis (Ref. 5) when applicable.

The Frequency of 92 days is justified in Reference 5.

SR 3.3.2.4

SR 3.3.2.4 is the performance of a TADOT. This SR is a check of the following ESFAS Instrumentation Functions:

1. CS Manual Initiation;
2. CI Manual Initiation;
3. AFW pump start on Undervoltage on Buses 11 and 12 (21 and 22); and
4. AFW pump start on trip of both MFW pumps.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.4 (continued)

This SR is performed every 24 months. A successful test of the required contact(s) of a channel (logic input) relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. The Frequency is adequate, based on industry operating experience and is consistent with the typical refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Functions, except the undervoltage start of the AFW pumps, have no associated setpoints. For the undervoltage start of the AFW pumps, setpoint verification is covered by other SRs.

SR 3.3.2.5

This SR is the performance of a TADOT to check the Safety Injection Manual Initiation Function. It is performed every 24 months on a STAGGERED TEST BASIS. The Frequency is adequate, based on industry operating experience and is consistent with a typical refueling cycle.

The SR is modified by a Note that excludes verification of setpoints during the TADOT. The manual initiation Function has no associated setpoints.

SR 3.3.2.6

SR 3.3.2.6 is the performance of a CHANNEL CALIBRATION.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.6 (continued)

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology. The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology.

The Frequency of 24 months is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

This SR is modified by a Note stating that this test should include verification that the time constants are adjusted to the prescribed values where applicable.

REFERENCES

1. AEC "General Design Criteria for Nuclear Power Plant Construction Permits," Criterion 15, issued for comment July 10, 1967, as referenced in USAR Section 1.2.

2. USAR, Section 7.

3. USAR, Section 14.

4. "Engineering Manual Section 3.3.4.1,Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations".

5. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

B 3.3 INSTRUMENTATION

B 3.3.3 Event Monitoring (EM) Instrumentation

BASES

BACKGROUND

The primary purpose of the EM instrumentation is to display unit variables that provide information required by the control room operators during accident situations.

The OPERABILITY of the accident monitoring instrumentation ensures that there is sufficient information available on selected unit parameters to monitor and to assess unit status and behavior following an accident.

The availability of accident monitoring instrumentation is important so that responses to corrective actions can be observed and the need for, and magnitude of, further actions can be determined. These essential instruments are identified by the USAR (Ref. 1) addressing the recommendations of Regulatory Guide 1.97 (Ref. 2) as required by Supplement 1 to NUREG-0737.

The instrument channels required to be OPERABLE by this LCO include two classes of parameters identified during unit specific implementation of Regulatory Guide 1.97 as Type A and Category I variables.

Type A variables are included in this LCO because they provide the primary information required for the control room operator to take specific manually controlled actions for which no automatic control is provided, and that are required for safety systems to accomplish their safety functions for DBAs.

Category I variables are the key variables deemed risk significant because they are needed to:

- Determine whether other systems important to safety are performing their intended functions;

BASES

BACKGROUND (continued)

- Provide information to the operators that will enable them to determine the likelihood of a gross breach of the barriers to radioactivity release; and
- Provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public, and to estimate the magnitude of any impending threat.

These key variables are identified by the unit specific Regulatory Guide 1.97 analyses (Ref. 1). These analyses identify the unit specific Type A and Category I variables and provide justification for deviating from Reference 2.

The specific instrument Functions listed in Table 3.3.3-1 are discussed in the LCO section.

APPLICABLE SAFETY ANALYSES

The EM instrumentation ensures the operability of Regulatory Guide 1.97 Type A and Category I variables so that the control room operating staff can:

- Perform the diagnosis specified in the emergency operating procedures (these variables are restricted to preplanned actions for the primary success path of DBAs), e.g., loss of coolant accident (LOCA);
- Take the specified, preplanned, manually controlled actions, for which no automatic control is provided, and that are required for safety systems to accomplish their safety function;
- Determine whether systems important to safety are performing their intended functions;
- Determine the likelihood of a gross breach of the barriers to radioactivity release;

BASES

APPLICABLE SAFETY ANALYSES (continued)

- Determine if a gross breach of a barrier has occurred; and
- Initiate action necessary to protect the public and to estimate the magnitude of any impending threat.

EM instrumentation that meets the definition of Type A in Regulatory Guide 1.97 satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). Category I, non-Type A, instrumentation is included in TS because it is intended to assist operators in minimizing the consequences of accidents. Therefore, Category I, non-Type A, variables are important for reducing public risk and satisfy Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

The EM instrumentation LCO provides OPERABILITY requirements for Regulatory Guide 1.97 Type A instrument variables, which provide information required by the control room operators to perform certain manual actions specified in the Emergency Operating Procedures. These manual actions ensure that a system can accomplish its safety function, and are credited in the safety analyses. Additionally, this LCO addresses Regulatory Guide 1.97 instruments that have been designated Category I, non-Type A.

The OPERABILITY of the EM instrumentation ensures there is sufficient information available on selected unit parameters to monitor and assess unit status following an accident. This capability is consistent with Reference 1.

LCO 3.3.3 requires two OPERABLE channels for most Functions. Two OPERABLE channels ensure no single failure prevents operators from getting the information necessary for them to determine the safety status of the unit, and to bring the unit to and maintain it in a safe condition following an accident.

BASES

LCO (continued)

Furthermore, OPERABILITY of two channels allows a CHANNEL CHECK during the post accident phase to confirm the validity of displayed information.

An exception to the two channel requirement is Containment Isolation Valve (CIV) Position. In this case, the important information is the status of the containment penetrations. The LCO requires one position indicator for each active CIV. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve and prior knowledge of a passive valve, or via system boundary status. If a normally active CIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

Table 3.3.3-1 lists all Type A and Category I variables identified by the unit specific Regulatory Guide 1.97 analyses, as amended by the NRC's SER, as identified in Reference 3.

Type A and Category I variables are required to meet Regulatory Guide 1.97 Category I (Ref. 2) design and qualification requirements for seismic and environmental qualification, single failure criterion, utilization of emergency standby power, immediately accessible display, continuous readout, and recording of display.

Listed below are discussions of the specified instrument Functions listed in Table 3.3.3-1.

1, 2. Power Range and Source Range Neutron Flux (Logarithmic Scale)

Power Range and Source Range Neutron Flux (Logarithmic Scale) indication is provided to verify reactor shutdown. The two ranges are necessary to cover the full range of flux that may occur post accident.

Neutron flux is used for accident diagnosis, verification of subcriticality, and diagnosis of positive reactivity insertion.

BASES

LCO (continued)

3, 4. Reactor Coolant System (RCS) Hot and Cold Leg Temperatures

RCS Hot and Cold Leg Temperatures are Category I variables provided for verification of core cooling and long term surveillance.

In addition, RCS cold leg temperature is used in conjunction with RCS hot leg temperature to verify the unit conditions necessary to establish natural circulation in the RCS. RCS hot and cold leg temperature is also used for unit stabilization and cooldown control.

The channels provide indication over a range of 50°F to 700°F.

5. Reactor Coolant System (RCS) Pressure (Wide Range)

RCS wide range pressure is a Category I variable provided for verification of core cooling and RCS integrity long term surveillance.

RCS pressure is used to verify when there should be SI flow to RCS from at least one train, when the RCS pressure is below the pump shutoff head.

In addition to these verifications, RCS pressure is used for determining RCS subcooling margin. RCS subcooling margin will allow termination of SI, if still in progress, or reinitiation of SI if it has been stopped. RCS pressure can also be used:

- to determine whether to terminate actuated SI or to reinitiate stopped SI;

BASES

LCO

5. Reactor Coolant System Pressure (RCS) (Wide Range) (continued)

- to determine when to reset SI and shut off RHR;
- to determine when to manually restart Emergency Core Cooling System (ECCS) Pumps;
- as reactor coolant pump (RCP) trip criteria; and
- to make a determination on the nature of the accident in progress and where to go next in the procedure.

RCS subcooling margin is also used for unit stabilization and cooldown control.

RCS pressure is also related to three decisions about depressurization. They are:

- to determine whether to proceed with primary system depressurization;
- to verify termination of depressurization; and
- to determine whether to close accumulator isolation valves during a controlled cooldown/depressurization.

RCS pressure is a Category I, Type A variable because the operator uses this indication to monitor the cooldown of the RCS following a steam generator tube rupture (SGTR) or small break LOCA. Operator actions to maintain a controlled cooldown, such as adjusting steam generator (SG) pressure or level, would use this indication. Furthermore, RCS pressure is one factor that may be used in decisions to terminate RCP operation.

BASES

LCO (continued)

6. Reactor Vessel Water Level

Reactor Vessel Water Level is provided for verification and long term surveillance of core cooling. It is also used for accident diagnosis and to determine reactor coolant inventory adequacy.

The Reactor Vessel Water Level Monitoring System provides a direct measurement of the collapsed liquid level above the bottom of the vessel. The collapsed level represents the amount of liquid mass that is in the reactor vessel. Measurement of the collapsed water level is selected because it is a direct indication of the water inventory.

7. Containment Sump Water Level (Wide Range)

Containment Sump Water Level is provided for verification and long term surveillance of RCS integrity.

Containment Sump Water Level is used for accident diagnosis and to determine when to begin the recirculation procedure.

8. Containment Pressure (Wide Range)

Containment Pressure (Wide Range) is provided for verification of RCS and containment OPERABILITY.

9. Penetration Flow Path Automatic Containment Isolation Valve (CIV) Position

CIV Position is provided for verification of Containment OPERABILITY and containment isolation.

When used to verify containment isolation, the important information is the isolation status of the containment

BASES

LCO

9. Penetration Flow Path Automatic Containment Isolation Valve (CIV) Position (continued)

penetrations. The LCO requires one channel of valve position indication in the control room to be OPERABLE for each active CIV in a containment penetration flow path, i.e., two total channels of CIV position indication for a penetration flow path with two active valves. The position indication in the control room requirement is satisfied by the individual valve position indication lights (red or green) or the Containment Isolation panel 44104 (44515) white status lights. For containment penetrations with only one active CIV having control room indication, Note (b) requires a single channel of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve, as applicable, and prior knowledge of a passive valve, or via system boundary status. If a normally active CIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE. Note (a) to the Required Channels states that the Function is not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. Each penetration is treated separately and each penetration flow path is considered a separate Function. Therefore, separate Condition entry is allowed for each penetration flow path.

10. Containment Area Radiation (High Range)

Containment Area Radiation is provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to

BASES

LCO

10. Containment Area Radiation (High Range) (continued)

invoke site emergency plans. Containment radiation level is used to determine if a LOCA with core damage has occurred.

11. Hydrogen Monitors

Hydrogen Monitors are provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. This variable is also important in verifying the adequacy of mitigating actions.

12. Pressurizer Level

Pressurizer Level is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify the unit conditions necessary to establish natural circulation in the RCS and to verify that the unit is maintained in a safe shutdown condition.

13. Steam Generator Water Level (Wide Range)

SG Water Level is provided to monitor operation of decay heat removal via the SGs. The Category I indication of SG level is the wide range level instrumentation. The wide range level covers a span of 0% to 100% between the lower tubesheet and the separator.

SG Water Level (Wide Range) is used to:

BASES

LCO

13. Steam Generator Water Level (Wide Range) (continued)

- verify that the intact SGs are an adequate heat sink for the reactor;
- determine the nature of the accident in progress (e.g., verify an SGTR); and
- verify unit conditions for termination of SI.

Operator action is based on the control room indication of SG level. Wide range level is a Type A variable because the operator must manually raise and control SG level to ensure decay heat removal.

14. Condensate Storage Tank (CST) Level

CST Level is provided to ensure water supply for auxiliary feedwater (AFW). The CSTs provide a nonsafety grade water supply for the AFW System. The CSTs consist of three 150,000 gallon tanks connected to both units by a common outlet header. Inventory is monitored by a 0% to 100% level indication. CST Level is displayed on a control room indicator and unit computer. In addition, a control room annunciator alarms on low level.

CST Level is considered a Type D variable.

The DBAs that require AFW are the steam line break (SLB) and LOCA.

Reference Technical Specification Bases 3.7.6, "Condensate Storage Tanks" for additional information.

BASES

LCO (continued)

15. Core Exit Temperature

Core Exit Temperature is provided for verification and long term surveillance of core cooling.

An evaluation was made of the minimum number of valid core exit thermocouples (CET) necessary for measuring core cooling. The evaluation determined the reduced complement of CETs necessary to detect initial core recovery and trend the ensuing core heatup. Adequate core cooling monitoring is ensured with four valid CETs per quadrant (Ref. 3). Core Exit Temperature is used to determine RCS subcooling margin. RCS subcooling margin will allow termination of safety injection (SI), if still in progress, or reinitiation of SI if it has been stopped. RCS subcooling margin is also used for unit stabilization and cooldown control.

In accordance with Reference 3, due to the size of the reactor core, four thermocouples OPERABLE in the center region of the core and at least one thermocouple in each quadrant of the outside core region are needed to provide radial temperature gradient monitoring. The center core region is defined by the following CETs and their locations.

BASES

LCO

15. Core Exit Temperature (continued)

CET Number	CET Location
9	D-5
10	D-7
12	E-4
13	E-6
14	E-10
16	F-7
18	G-4
19	G-6
22	H-5
23	H-9
28	I-4
29	I-8
30	I-10
32	J-6
33	J-8
34	J-9

These required thermocouples ensure a single failure will not disable the ability to determine the radial temperature gradient.

16. Refueling Water Storage Tank (RWST) Level

The RWST Level is a Category I, Type A variable provided for verifying a water source to the ECCS and Containment Spray, determining the time for initiation of recirculation following a LOCA, and event diagnosis.

BASES (continued)

APPLICABILITY

The EM instrumentation LCO is applicable in MODES 1 and 2. These variables are related to the diagnosis and preplanned actions required to mitigate DBAs. In MODES 3, 4, 5, and 6, unit conditions are such that the likelihood of an event that would require EM instrumentation is low; therefore, the EM instrumentation is not required to be OPERABLE in these MODES.

ACTIONS

Note 1 has been added in the ACTIONS to exclude the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE while relying on the ACTIONS even though the ACTIONS may eventually require unit shutdown. This exception is acceptable due to the passive function of the instruments, the operator's ability to respond to an accident using alternate instruments and methods, and the low probability of an event requiring these instruments.

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.3-1. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

Note 3 has been added in the ACTIONS to clarify that the required CET channels shall be OPERABLE prior to entering MODE 2 following each refueling outage.

A.1

Condition A applies when one or more Functions have one required channel that is inoperable. Required Action A.1 requires restoring the inoperable channel to OPERABLE status within 30 days. The 30 day Completion Time is based on operating experience and takes

BASES

ACTIONS

A.1 (continued)

into account the remaining OPERABLE channel, the passive nature of the instrument (no critical automatic action is assumed to occur from these instruments), and the low probability of an event requiring EM instrumentation during this interval.

A Note has been added stating that Condition A is not applicable to the CETs. The CETs are controlled under Conditions B, F, and G.

B.1

Condition B applies when there is one or more required CET channel(s) inoperable and with at least 4 CETs OPERABLE in the center region of the core, and at least one CET OPERABLE in each quadrant of the outside core region. Required Action B.1 requires restoring the required CET channel(s) to OPERABLE status within 30 days. The 30 day Completion Time is acceptable based on operating experience and takes into account the remaining OPERABLE CETs, and the low probability of an event requiring EM Instrumentation during this interval.

C.1

Condition C applies when the Required Action and associated Completion Time for Condition A or B are not met. This Required Action specifies a written report to be submitted to the NRC within 14 days. This report discusses the results of the evaluation of the inoperability and identifies proposed restorative actions. This action is appropriate in lieu of a shutdown requirement since alternative actions are identified before loss of functional capability, and given the likelihood of unit conditions that would require information provided by this instrumentation.

BASES

ACTIONS (continued)

D.1

Condition D applies when one or more Functions have two inoperable required channels (i.e., two channels inoperable in the same Function). Required Action D.1 requires restoring one channel in the Function(s) to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring EM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the EM instrumentation. Therefore, requiring restoration of one inoperable channel of the Function limits the risk that the EM Function will be in a degraded condition should an accident occur. Condition D is modified by a Note that excludes hydrogen monitor channels and CET channel(s).

E.1

Condition E applies when two hydrogen monitor channels are inoperable. Required Action E.1 requires restoring one hydrogen monitor channel to OPERABLE status within 72 hours. The 72 hour Completion Time is reasonable based on the backup capability of the Post Accident Sampling System to monitor the hydrogen concentration for evaluation of core damage and to provide information for operator decisions. Also, it is unlikely that a LOCA (which would cause core damage) would occur during this time.

BASES

ACTIONS (continued)

F.1

Condition F applies when three or more required CET channels are inoperable in one or more quadrants and less than four CET channels are OPERABLE in the center region of the core. Required Action F.1 requires restoring the required inoperable channels to OPERABLE status within 7 days. The 7 day Completion Time is acceptable based on operating experience and taking into account the remaining CETs and the low probability of an event occurring that would require the CETs to assess the reactor core.

G.1

Condition G applies when three or more required CET channels are inoperable in one or more quadrants and less than one CET channel OPERABLE in each quadrant of the outside core region. Required Action G.1 requires restoring the required inoperable channels to OPERABLE status within 7 days. The 7 day Completion Time is acceptable based on operating experience taking into account the remaining CETs and the low probability of an event occurring that would require the CETs to assess the reactor core.

H.1

Condition H applies when the Required Action and associated Completion Time of Condition D, E, F, or G are not met. Required Action H.1 requires entering the appropriate Condition referenced in Table 3.3.3-1 for the channel immediately. The applicable Condition referenced in the Table is Function dependent. Each time an inoperable channel has not met any Required Action of Condition D, E, F, or G and the associated Completion Time has expired, Condition H is entered for that channel and provides for transfer to the appropriate subsequent Condition.

BASES

ACTIONS (continued)

I.1

If the Required Action and associated Completion Time of Condition H is not met and Table 3.3.3-1 directs entry into Condition I, the unit must be brought to a MODE where the requirements of this LCO do not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours.

The allowed Completion Time is reasonable, based on operating experience, to reach the required unit condition from full power condition from full power conditions in an orderly manner and without challenging unit systems.

J.1

Alternate means (e.g., CETs) of monitoring Reactor Vessel Water Level and Containment Area Radiation have been developed and tested. These alternate means may be temporarily installed if the normal EM channel cannot be restored to OPERABLE status within the allotted time. If these alternate means are used, the Required Action is not to shut down the unit but rather to submit a report to the NRC. The report provided to the NRC should discuss the alternate means used, describe the degree to which the alternate means are equivalent to the installed EM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal EM channels.

BASES (continued)

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that SR 3.3.3.1 and SR 3.3.3.2 apply to each EM instrumentation Function in Table 3.3.3-1, except Item 9. SR 3.3.3.3 only applies to Item 9.

SR 3.3.3.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION. The high radiation instrumentation should be compared to similar unit instruments located throughout the unit.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

As specified in the SR, a CHANNEL CHECK is only required for those channels that are normally energized.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.3.1 (continued)

The Frequency of 31 days is based on operating experience that demonstrates that channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.3.2

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to the measured parameter with the necessary range and accuracy. This SR is modified by a Note that excludes neutron detectors.

The Frequency is based on operating experience and consistency with the typical PI refueling cycle.

SR 3.3.3.3

This SR is the performance of a TADOT for the Penetration Flow Path Automatic Containment Isolation Valve Position every 24 months.

The Frequency of every 24 months is adequate based on operating experience, reliability, and consistency with the typical PI refueling cycle.

The SR is modified by a Note that excludes verification of setpoints from the TADOT. The Functions affected have no setpoints associated with them.

BASES (continued)

REFERENCES

1. USAR Section 7.10.
2. Regulatory Guide 1.97, Revision 2.
3. NRC approved LAR 121 dated November 9, 1995.

B 3.3 INSTRUMENTATION

B 3.3.4 4 kV Safeguards Bus Voltage Instrumentation

BASES

BACKGROUND

The Diesel Generators (DGs) provide a source of emergency power when offsite power is either unavailable or is insufficiently stable to allow safe unit operation. Redundant offsite power sources ensure an available source of offsite power to the Engineered Safety Features when one offsite path becomes unavailable. Undervoltage protection, via load sequencers, will provide voltage and load restoration, including DG start if an undervoltage (UV) or degraded voltage (DV) condition occurs at the 4 kV safeguards buses. There are two trains of load sequencers and UV and DV signals, one train for each 4 kV safeguards bus. These features are described in the USAR (Ref. 1).

Eight voltage relays provide input to the load sequencer for each 4 kV safeguards bus for detecting a sustained DV, approximately 95% of 4160V, or a UV, approximately 75% of 4160V, condition. The relay inputs are paired in the load sequencer into two DV and two UV channels. Either channel initiates the DV or UV function. Time delays are applied within the UV and DV functions to prevent actuation during normal transients. A DG start time delay is also provided in the DV function to allow the condition to be corrected by external actions within a time period that will not cause damage to operating equipment.

The load sequencer provides a DG start signal from the UV function if neither offsite path is available. The DV function provides a DG start signal and transfers the bus from the grid to the DG. Load rejection and load restoration sequencing is actuated by an SI signal input, or when the bus is being automatically transferred. The load sequencer is considered to be a support system to the associated DG. An inoperable load sequencer would not allow the associated DG to

BASES

BACKGROUND (continued)

automatically start, connect to the bus, and provide load reception. However, when a load sequencer is inoperable, the associated DG can still be manually started and loaded, thus providing its intended safety function.

Allowable Values and Trip Setpoints

The trip setpoints used in the relays are based on the plant specific voltage analysis discussed in the USAR (Ref. 1).

The Allowable Value in conjunction with the trip setpoint and LCO establishes the threshold for protective action to ensure that the consequences of Design Basis Accidents (DBA's), in coincidence with offsite power unavailability or instability, will be acceptable. The Allowable Value is considered a limiting value such that a channel is OPERABLE if the measured setpoint is found not to exceed the Allowable Value during the CHANNEL OPERATIONAL TEST (COT). Note that, although a channel is OPERABLE under these circumstances, the setpoint must be left adjusted to within the established calibration tolerance band of the trip setpoint in accordance with the uncertainty assumptions stated in the referenced setpoint methodology (as-left criteria).

Setpoints adjusted consistent with the requirements of the Allowable Values provide a conservative margin with regard to instrument uncertainties to ensure that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the accident and that the equipment functions as designed.

Allowable Values are specified as applicable for each Function in SR 3.3.4.2. Trip setpoints are also specified in the unit specific setpoint calculations. The specified trip setpoints are selected to

BASES

BACKGROUND

Allowable Values and Trip Setpoints (continued)

ensure that the setpoint measured by the surveillance procedure does not exceed the Allowable Value if the relay is performing as required. If the measured setpoint does not exceed the Allowable Value, the relay is considered OPERABLE. Operation with a measured setpoint less conservative than the specified trip setpoint, but within the Allowable Value, is acceptable provided that operation and testing is consistent with the assumptions of the unit specific setpoint calculation. Each Allowable Value specified is conservative with respect to the values assumed in the analyses described in Reference 1 in order to account for instrument uncertainties appropriate to the trip function. These uncertainties are defined in Reference 2.

APPLICABLE SAFETY ANALYSES

The 4 kV safeguards bus voltage instrumentation is required for the Engineered Safety Features (ESF) Systems to function in any accident with a loss of offsite power. Its design basis is that of the ESF Actuation System (ESFAS).

Accident analyses credit the loading of the DG based on the loss of offsite power during a small break loss of coolant accident (LOCA). The actual DG start has historically been associated with the ESFAS actuation. The DG loading has been included in the delay time associated with each safety system component requiring DG supplied power following a loss of offsite power. The analyses assume a non-mechanistic DG loading, which does not explicitly account for each individual component of loss of power detection and subsequent actions.

The required 4 kV safeguards bus voltage instrumentation, in conjunction with the ESF systems powered from the DGs, provide

BASES

APPLICABLE SAFETY ANALYSES (continued)	unit protection in the event of any of the analyzed accidents discussed in Reference 3, in which a loss of offsite power is assumed. The delay times assumed in the safety analysis for the ESF equipment include the 10 second DG start delay, and the appropriate sequencing delay, if applicable. The 4 kV safeguards bus voltage instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).
LCO	The LCO for 4 kV safeguards bus voltage instrumentation requires that two channels per bus of both the UV and DV Functions, and two trains of automatic load sequencers, shall be OPERABLE in MODES 1, 2, 3, and 4. In MODES 5 and 6, the two channels and the associated load sequencer must be OPERABLE whenever the associated DG is required to be OPERABLE to ensure that the automatic start of the DG is available when needed. Loss of the 4 kV Safeguards Bus Voltage Instrumentation Function could result in the delay of safety systems initiation when required. This could lead to unacceptable consequences during accidents. A channel is OPERABLE with a trip setpoint outside its calibration tolerance band provided the trip setpoint "as-found" value does not exceed its associated Allowable Value and provided the trip setpoint "as-left" value is adjusted to within the calibration tolerance band.
APPLICABILITY	The 4 kV Safeguards Bus Voltage Instrumentation Functions are required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 5 or 6 is required whenever the required DG must be OPERABLE so that it can perform its function on an UV or degraded power to the safeguards bus.

BASES (continued)

ACTIONS

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the channel is found inoperable, then the function that channel provides must be declared inoperable and the LCO Condition entered for the particular protection function affected.

Because the required channels are specified on a per bus basis, the Condition may be entered separately for each bus as appropriate.

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in the LCO. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

<u>A.1</u>

Condition A applies to the 4 kV safeguards bus voltage Function with one UV or one DV or both (one UV and one DV) channel(s) per bus inoperable.

If one channel is inoperable, Required Action A.1 requires that channel to be placed in bypass within 6 hours. With a channel in bypass, the remaining 4 kV safeguards bus voltage instrumentation channel provides UV or DV Function initiation.

The specified Completion Time and time allowed for bypassing one channel are reasonable considering the Function will operate on every bus and the low probability of an event occurring during these intervals.

BASES

ACTIONS (continued)

B.1

Condition B applies in MODES 1, 2, 3, or 4 when Required Action and associated Completion Time of Condition A is not met, when Functions a or b or both with two channels per bus are inoperable, or when one required load sequencer is inoperable.

Required Action B.1 requires the performance of SR 3.3.4.1 for the OPERABLE automatic load sequencer. The 6 hour Completion Time provides a reasonable time for performance of the SR. Performance of this SR on a more frequent basis, once per 24 hours thereafter, ensures that the OPERABLE load sequencer remains OPERABLE while in this Condition. If the redundant train load sequencer fails to pass the SR it is inoperable and Condition D must then be entered.

B.2 and B.3

To ensure a highly reliable power source remains with an inoperable load sequencer, the offsite paths for the associated 4 kV safeguards bus must be capable of accepting the block loading that could result from an SI signal and availability must be verified on a more frequent basis. The 8 hour Completion Time is consistent with the Completion Time for an inoperable 4 kV safeguards bus, as required in LCO 3.8.9, "Distribution Systems - Operating." The verification of the operability of the offsite paths for associated 4kV safeguards on a more frequent basis, once per 8 hours thereafter, ensures that the OPERABLE paths remain OPERABLE while in this Condition.

An inoperable load sequencer results in associated DG unavailability for automatic start, connection to the bus and load reception. In Condition B, the remaining OPERABLE DG and offsite paths are adequate to supply electrical power to the onsite Safeguards AC Distribution System.

BASES

ACTIONS

B.2 and B.3 (continued)

Offsite power block loading capability is established by administrative control of selected distribution system loads to reduce potential starting inrush.

B.4

Required Action B.4 requires that the automatic load sequencer be restored to OPERABLE status. The 7 day Completion Time allows a reasonable time to repair the inoperable load sequencer. The Completion Time is consistent with the Completion Time to restore an inoperable DG, as required in LCO 3.8.1, "AC Sources - Operating."

C.1

Condition C applies when the Required Action and associated Completion Time of Condition B are not met. The unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours.

D.1

Required Action D.1 requires that LCO 3.8.2 "AC Sources-Shutdown" Condition(s) and Required Action(s) for the associated DG be entered immediately when Required Action and Completion Time of Condition A is not met, or Functions a and b or both with two channels per bus inoperable, or when one required automatic

BASES

ACTIONS

D.1 (continued)

load sequencer is inoperable in MODE 5 or 6. The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1

SR 3.3.4.1 is the performance of a COT every 31 days.

A COT is performed on each required voltage relay channel and automatic load sequencer to ensure they will perform the intended function. For these tests, the relay trip setpoints are verified and adjusted as necessary. The Frequency is based on the known reliability of the relays and load sequencers and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

SR 3.3.4.2

SR 3.3.4.2 is the performance of a CHANNEL CALIBRATION.

The setpoints, as well as the response to a UV and a DV test, shall include a single point verification that an actuation occurs within the required time delay, as shown in Reference 1.

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.4.2 (continued)

complete check of the voltage relay channel. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency of 24 months is based on operating experience and consistency with the typical PI refueling cycle and is justified by the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. USAR, Section 8.4.
2. "Engineering Manual Section 3.3.4.1,Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations".
3. USAR, Section 14.

B 3.3 INSTRUMENTATION

B 3.3.5 Containment Ventilation Isolation Instrumentation

BASES

BACKGROUND

Containment ventilation isolation (CVI) instrumentation closes the containment isolation valves in the Containment Inservice (low flow) Purge System. This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident. The Containment Inservice (low flow) Purge System may be in use during reactor operation and with the reactor shutdown.

Containment ventilation isolation initiates on a safety injection (SI) signal, by manual actuation of containment isolation, or by manual actuation of containment spray. The Bases for LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," discuss these modes of initiation.

Three radiation monitoring channels are also provided as input to CVI. One channel measures gaseous radiation in containment exhaust air. This channel provides an input to one train of CVI actuation relay logic. The other two channels measure either gaseous or particulate containment exhaust air radiation. These two channels provide inputs to the other train of CVI actuation relay logic where either channel will actuate the train. These three detectors will respond to most events that release radiation to containment. Since the monitors constitute a sampling system, various components such as sample line valves and sample pumps are required to support monitor OPERABILITY.

The Containment Inservice (low flow) Purge System has two containment isolation valves on each supply and exhaust line. A high radiation signal from any one of the three channels initiates one train of CVI logic, which closes one supply and one exhaust containment isolation valve in the Containment Inservice (low flow) Purge System. This system is described in the Bases for LCO 3.6.3, "Containment Isolation Valves."

BASES (continued)

APPLICABLE SAFETY ANALYSES

The safety analyses assume that the containment remains intact with penetrations unnecessary for core cooling isolated early in the event. The isolation of the purge valves has not been analyzed mechanistically in the dose calculations, although its rapid isolation is assumed. The containment exhaust air radiation monitors act as backup to the SI signal to ensure closing of the purge and exhaust valves. They are also the primary means for automatically isolating containment in the event of a fuel handling accident during shutdown. Containment isolation in turn ensures meeting the containment leakage rate assumptions of the safety analyses, and ensures that the calculated accidental offsite radiological doses are below 10 CFR 100 (Ref. 1) limits.

The CVI instrumentation satisfies Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

The LCO requirements ensure that the instrumentation necessary to initiate CVI, listed in Table 3.3.5-1, is OPERABLE.

1. <u>Manual Initiation</u>

The LCO requires two channels OPERABLE. The operator can initiate CVI at any time by using either of two switches in the control room. This action will cause actuation of one train of Containment Inservice (low flow) Purge System containment isolation valves in the same manner as any of the automatic actuation signals.

The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

Each channel consists of one switch and the interconnecting wiring to the valves.

BASES

LCO (continued)

2. Automatic Actuation Relay Logic

The LCO requires two trains of CVI relay logic OPERABLE to ensure that no single random failure can prevent automatic actuation.

The CVI Automatic Actuation Relay Logic consists of the same features and operate in the same manner as described for ESFAS Function 1.b, SI, and ESFAS Function 3.b, Containment Isolation. The applicable MODES and specified conditions for the CVI portion of these Functions are different and less restrictive than those for their containment isolation and SI roles. If one or more of the SI or containment isolation Functions becomes inoperable in such a manner that only the CVI Function is affected, the Conditions applicable to their SI and containment isolation Functions need not be entered. The less restrictive Actions specified for inoperability of the CVI Functions specify sufficient compensatory measures for this case.

3. High Radiation in Exhaust Air

The LCO specifies two required trains of radiation monitors to ensure that the radiation monitoring instrumentation necessary to initiate CVI remains OPERABLE.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of the channel electronics. OPERABILITY may also require correct valve lineups, and sample pump operation as well as detector OPERABILITY, if these supporting features are necessary for trip to occur under the conditions assumed by the safety analyses.

BASES

LCO (continued)

4. Manual Containment Isolation

Refer to LCO 3.3.2, Function 3.a., for all initiating Functions and requirements.

5. Safety Injection

Refer to LCO 3.3.2, Function 1, for all initiating Functions and requirements.

6. Manual Containment Spray

Refer to LCO 3.3.2, Function 2, for all initiating Functions and requirements.

APPLICABILITY

All Functions in Table 3.3.5-1 are required to be OPERABLE in MODES 1, 2, 3, and 4 when the Containment Inservice (low flow) Purge System is not isolated. In addition, the Manual Initiation, Automatic Actuation Relay Logic, and High Radiation in Exhaust Air Functions are required OPERABLE during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, when the Containment Inservice (low flow) Purge System is not isolated. Under these conditions, the potential exists for an accident that could release fission product radioactivity into containment. Therefore, the CVI instrumentation must be OPERABLE in these MODES.

While in MODES 5 and 6 without CORE ALTERATIONS or irradiated fuel handling in progress, the CVI instrumentation need not be OPERABLE since the potential for radioactive releases is minimized and operator action is sufficient to ensure post accident offsite doses are maintained within the limits of Reference 1.

BASES (continued)

ACTIONS

The most common cause of channel inoperability is outright failure or drift of the process module sufficient to exceed the tolerance allowed by unit specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. This determination is generally made during the performance of a COT, when the process instrumentation is set up for adjustment to bring it within specification. If the trip setpoint is less conservative than the Allowable Value, the channel must be declared inoperable immediately and the appropriate Condition entered.

A Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.5-1. The Completion Time(s) of the inoperable channel(s)/train(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to the failure of one CVI radiation monitor train. The 4 hours allowed to restore the affected train is justified by the low likelihood of events occurring during this interval, and recognition that the remaining train will respond to events.

B.1 and B.2

Condition B applies to all CVI Functions and addresses the train orientation for these Functions.

If a train is inoperable, or the Required Action and associated Completion Time of Condition A are not met, operation may continue as long as the Required Action to place and maintain

BASES

ACTIONS

B.1 and B.2 (continued)

containment inservice (low flow) purge valves in the closed position is met, or the Required Action for the applicable Conditions of LCO 3.6.3 is met for each valve made inoperable by failure of isolation instrumentation.

A Note is added stating that Condition B is only applicable in MODE 1, 2, 3, or 4.

C.1 and C.2

Condition C applies to all CVI Functions and addresses the train orientation for these Functions. If a train is inoperable, or the Required Action and associated Completion Time of Condition A are not met, operation may continue as long as the Required Action to place and maintain containment inservice (low flow) purge and exhaust isolation valves in their closed position is met or the applicable Conditions of LCO 3.9.4, “Containment Penetrations,” are met for each valve made inoperable by failure of isolation instrumentation. The Completion Time for these Required Actions is Immediately.

A Note states that Condition C is only applicable during CORE ALTERATIONS and during movement of irradiated fuel assemblies within containment.

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.5-1 determines which SRs apply to which CVI Functions.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.5.2

SR 3.3.5.2 is the performance of an ACTUATION LOGIC TEST. This test is performed every 31 days on a STAGGERED TEST BASIS. The Surveillance interval is acceptable based on instrument reliability and industry operating experience.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.3

A COT is performed every 31 days on each required channel to ensure the entire channel will perform the intended Function. The setpoint shall be left consistent with the current unit specific procedure tolerance.

SR 3.3.5.4

SR 3.3.5.4 is the performance of a TADOT. This test is a check of the Manual Initiation Function and is performed every 24 months.

The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Functions tested have no setpoints associated with them.

The Frequency is based on the known reliability of the Function and the redundancy available, and has been shown to be acceptable through operating experience.

SR 3.3.5.5

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency is based on operating experience and is consistent with the typical PI refueling cycle.

REFERENCES

1. 10 CFR 100.11.

PACKAGE 3.3

INSTRUMENTATION

PART C

MARKUP OF PRAIRIE ISLAND CURRENT TECHNICAL SPECIFICATIONS

List of Pages

PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNITS 1 AND 2

Improved Technical Specifications Conversion Submittal

2.3 LIMITING SAFETY SYSTEM SETTINGS, PROTECTIVE INSTRUMENTATION

~~Applicability~~

~~Applies to trip settings for instruments monitoring reactor power and reactor coolant pressure, temperature, flow, and pressurizer level.~~ A3.3-01

~~Objective~~

~~To provide for automatic protective action in the event that the principal process variables approach a safety limit.~~

Specification

A. Protective instrumentation settings for reactor trip shall be as follows:

1. Startup protection

Tbl 3.3.1-1 Function 4

a. High flux, intermediate range (high set point) - current equivalent to $\leq$40% of RATED THERMAL POWER.

Tbl 3.3.1-1 Function 2b

b. High flux, power range (low set point) - $\leq$40% of RATED THERMAL POWER.

Tbl 3.3.1-1 Function 5

c. High flux, source range - neutron flux $\leq 10^6$ counts/second.

2. Core protection

Tbl 3.3.1-1 Function 2a

a. High flux, power range (high set point) - $\leq$ 110~~108~~% of RATED THERMAL POWER. L3.3-31

Tbl 3.3.1-1 Function 8b

b. High pressurizer pressure - $\leq$2400~~2385~~ psig. L3.3-31

Tbl 3.3.1-1 Function 8a

c. Low pressurizer pressure - $\geq$1760~~1815~~ psig. L3.3-31

Tbl 3.3.1-1 Function 6 and Note 1

d. Overtemperature ΔT

$$\Delta T_t \leq \Delta T_0 \left[K_1 - K_2 (T-T') \left(\frac{1+t_1 s}{1+t_2 s}\right) + K_3(P-P') - f(\Delta I)\right]$$

where

ΔT_0 = Indicated ΔT at RATED THERMAL POWER
T = Average temperature, °F
T' = 567.3°F
P = Pressurizer pressure, psig
P' = psig 2235
K_1 $\leq$ 1.11
K_2 = 0.0090
K_3 = 0.000566
t_1 = 30 sec
t_2 = 4 sec

2.3.A.2.d Cont.

Tbl 3.3.1-1 Function 6 and Note 1

and f (ΔI) is a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chamber, with gains to be selected based on measured instrument response during plant startup tests, such that where q_t and q_b are the percent power in the top and bottom halves of the core, respectively, and $q_t + q_b$ is total core power in percent of rated power:

1. for $q_t - q_b$ within -12% and +9%, f (ΔI) = 0, and

2. for each percent that the magnitude of $q_t - q_b$ exceeds +9% the ΔT trip set point shall be automatically reduced by an equivalent of 2.5 percent of RATED THERMAL POWER.

3. for each percent that the magnitude of $q_t - q_b$ exceeds -12%, the ΔT trip set point shall be automatically reduced by an equivalent of 1.5 percent of RATED THERMAL POWER.

Tbl 3.3.1-1 Function 7 and Note 2

e. Overpower Δ T

$$\Delta T_p \le \Delta T_o \left[K_4 - \frac{K_5 t_3 s T}{1 + t_3 s} - K_6 (T-T') - f(\Delta I)\right]$$

where

ΔT_o = Indicated ΔT at RATED THERMAL POWER
T = Average temperature, °F
T' = 567.3°F
K_4 $\le$ 1.10
K_5 = 0.0275 for increasing T; 0 for decreasing T
K_6 = 0.002 for T > T', 0 for T < T'
t_3 = 10 sec
f(ΔI) = as defined in d. above

Tbl 3.3.1-1 Function 10

f. Low reactor coolant flow per loop - ≥91~~90~~% of normal indicated loop flow as measured at loop elbow tap. L3.3-31

Tbl 3.3.1-1
Function 12
Tbl 3.3.2-1
Function 6d

2.3.A.2.g. Reactor coolant pump bus undervoltage - ≥76~~75~~% of normal voltage [L3.3-31]

Tbl 3.3.1-1
Function 11a

h. Open reactor coolant pump motor breaker.

Tbl 3.3.1-1
Function 11b

Reactor coolant pump bus underfrequency - ≥58.2 Hz

i. Power range neutron flux rate.

Tbl 3.3.1-1
Function 3a

1. Positive rate - ≤6~~15~~% of RATED THERMAL POWER with a time constant ≥2 seconds [L3.3-31]

Tbl 3.3.1-1
Function 3b

2. Negative rate - ≤8~~7~~% of RATED THERMAL POWER with a time constant ≥2 seconds [L3.3-31]

3. Other reactor trips

Tbl 3.3.1-1
Function 9

a. High pressurizer water level - ≤90% of narrow range instrument span.

Tbl 3.3.1-1
Function 13
Tbl 3.3.2-1
Function 6b

b. Low-low steam generator water level - ≥5% of narrow range instrument span.

c. Turbine Generator trip

Tbl 3.3.1-1
Function 14b

1. Turbine stop valve indicators - closed

Tbl 3.3.1-1
Function 14a

2. Low auto stop oil pressure - ≥45 psig

~~d. Safety injection - See Specification 3.5~~ [A3.3-02]

2.3.B. Protective instrumentation settings for reactor trip interlocks shall be as follows:

1. P-6 Interlock:

[Tbl 3.3.1-1 Function 16a] Source range high flux trip shall be ~~un~~blocked whenever intermediate range neutron flux is ≤10^{-10} amperes. [A3.3-28]

2. P-7 Interlock:

"At power" reactor trips that are blocked at low power (low pressurizer pressure, high pressurizer level, and loss of flow for one or two loops) shall be ~~un~~blocked whenever: [A3.3-28]

[Tbl 3.3.1-1 Function 16b.1] a. Power range neutron flux is ≥12% of RATED THERMAL POWER or,

[Tbl 3.3.1-1 Function 16b.2] b. Turbine load is ≥12 ~~10%~~ of full load turbine impulse pressure. [L3.3-31] [A3.3-28]

3. P-8 Interlock:

[Tbl 3.3.1-1 Function 16c] Low power block of single loop loss of flow is permitted whenever power range neutron flux is <11 ~~10%~~ of RATED THERMAL POWER. [L3.3-31]

4. P-9 Interlock:

[Tbl 3.3.1-1 Function 16d] Reactor trip on turbine trip shall be ~~un~~blocked whenever power range neutron flux is ≥12 ~~50%~~ of RATED THERMAL POWER. [L3.3-31] [A3.3-28]

5. P-10 Interlock:

[Tbl 3.3.1-1 Function 16e] Power range high flux low setpoint trip and intermediate range high flux trip shall be ~~un~~blocked whenever power range neutron flux is ≤9% of RATED THERMAL POWER. [A3.3-28]

~~C. Control Rod Withdrawal Stops~~ [LR3.3-03]

~~1. Block automatic rod withdrawal:~~

~~a. P-2 Interlock:~~

~~Turbine load ≤15% of full load turbine impulse pressure.~~

3.5 INSTRUMENTATION SYSTEM

Applicability

Applies to protection system instrumentation. A3.3-01

Objectives

To provide for automatic initiation of the engineered safety features in the event the principal process variable limits are exceeded, and to delineate the conditions of the reactor trip and engineered safety feature instrumentation necessary to ensure reactor safety.

Specification

A. Limiting set points for instrumentation which initiates operation of the engineered safety features shall be as stated in Table TS 3.5-1. A3.3-04

B. For on-line testing or in the event of failure of a sub-system instrumentation channel, plant operation shall be permitted to continue at RATED THERMAL POWER in accordance with Tables TS 3.5-2A and TS 3.5-2B.

TABLE TS.3.5-1

ENGINEERED SAFETY FEATURES INITIATION INSTRUMENT LIMITING SET POINTS

		FUNCTIONAL UNIT	CHANNEL	LIMITING SET POINTS*	
Table 3.3.2-1 Funct 1c	1	High Containment Pressure (Hi)	Safety Injection*	≤4 psig	
Table 3.3.2-1 Funct 2c	2	High Containment Pressure (Hi-Hi)	a. Containment Spray	≤23 psig	
Table 3.3.2-1 Funct 4b			b. Steam Line Isolation of Both Lines	≤17 psig	
Table 3.3.2-1 Funct 1d	3	Pressurizer Low Pressure	Safety Injection*	≥1760~~1815~~ psig	L3.3-31
Table 3.3.2-1 Funct 1e and Note b	4	Low Steam Line Pressure	Safety Injection* Lead Time Constant Lag Time Constant	≥500 psig ≥12 seconds ≤2 seconds	
Table 3.3.2-1 Funct 4c	5	~~High Steam Flow in a Steam Line Coincident with~~ Safety Injection ~~and~~ Low T_{avg}	Steam Line ~~Isolation of Affected Line~~	~~d/p corresponding to ≤0.745 x 10⁶ lb/hr at 1005 psig~~ ≥542~~540~~ F	A3.3-20 L3.3-31

~~TABLE TS.3.5-1A~~ Page 1 of 2

Table 3.3.2-1 Funct 4d	6	High-high Steam Flow in a Steam Line Coincident with Safety Injection	Steam Line Isolation of Affected Line	≤d/p corresponding to 4.5 x 10^6 lb/hr at 735 psig	
	7	High Pressure Difference Between Shield Building and Containment	Containment Vacuum Breakers	≤0.5 psi	Addressed Elsewhere
	~~8~~	~~High Temperature in Ventilation Ducts~~	~~Ventilation System Isolation Dampers~~	~~120°F~~	LR3.3-10
Table 3.3.5-1 Funct 3	9	High Radiation in Containment Exhaust Air	Containment Ventilation Isolation	≤count rate corresponding to 500 mrem/year whole body and 3000 mrem/year skin due to noble gases at the site boundary	

*Initiates also containment isolation, feedwater line isolation and starting of all containment fans.
d/p means differential pressure

TABLE TS.3.5-1A Page 1 of 2 (Overflow)

TABLE TS.3.5-1 (continued)

ENGINEERED SAFETY INITIATION INSTRUMENTATION LIMITING SET POINTS

		FUNCTIONAL UNIT	CHANNEL	LIMITING SET POINTS	
	10.	4KV Safeguards Busses Voltage Restoration	a. Degraded Voltage		
SR3.3.4.2			Voltage (% nominal)	≥94.8% and ≤96.2%	
SR3.3.4.2			Degraded voltage Time Delay ~~1~~	8 ± 0.5 sec	M3.3-09
SR3.3.4.2			Degraded voltage DG Start Time Delay ~~2~~	~~8 ± 0.5 to~~ 60 ± 3 sec	
			b. Undervoltage		
SR3.3.4.2			Voltage (% nominal)	75 ± 2.5%	
SR3.3.4.2			Undervoltage Time Delay	4 ± 1.5 sec	

~~TABLE TS.3.5-1 Page 2 of 2~~
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TABLE TS.3.5-2A (Page 1 of 6)

REACTOR TRIP SYSTEM INSTRUMENTATION

A3.3-05 → REQUIRED

A3.3-06 → ~~CHANNELS TO TRIP~~, ~~MINIMUM CHANNELS OPERABLE~~

		FUNCTIONAL UNIT	REQUIRED ~~TOTAL NO.~~ ~~OF~~ CHANNELS	~~CHANNELS TO TRIP~~	~~MINIMUM CHANNELS OPERABLE~~	APPLICABLE MODES	ACTION	
Table 3.3.1-1 Funct 1	1.	Manual Reactor Trip	2	~~1~~	~~2~~	1, 2	B~~1~~	A3.3-07
			2	~~1~~	~~2~~	3[(a)], 4[(a)], 5[(a)]	C~~8~~	
Table 3.3.1-1 Funct 2	2.	Power Range, Neutron Flux						
		a. High Setpoint	4	~~2~~	~~3~~	1, 2	D~~2~~	
		b. Low Setpoint	4	~~2~~	~~3~~	1[(b)], 2	E~~2~~	
Table 3.3.1-1 Funct 3a	3.	Power Range, Neutron Flux, High Positive Rate	4	~~2~~	~~3~~	1, 2	E~~2~~	
Table 3.3.1-1 Funct 3b	4.	Power Range, Neutron Flux, High Negative Rate	4	~~2~~	~~3~~	1, 2	E~~2~~	
Table 3.3.1-1 Funct 4	5.	Intermediate Range, Neutron Flux	2	~~1~~	~~2~~	1[(b)], 2[(k)]	F, G~~3~~	A3.3-11

~~TABLE TS.3.5-2A~~
~~Page 1 of 6~~
~~Rev 111 8/10/94~~

Table 3.3.1-1 Funct 5	6.	Source Range, Neutron Flux						A3.3-08
		~~a. Startup~~	2	~~1~~	~~2~~	2[c]	H, I ~~4~~	
		~~b. Shutdown~~	2	~~1~~	~~2~~	3[a], 4[a], 5[a]	I, J ~~5~~	
Table 3.3.1-1 Funct 6	7.	Overtemperature ΔT	4	~~2~~	~~3~~	1, 2	E ~~6~~	
Table 3.3.1-1 Funct 7	8.	Overpower ΔT	4	~~2~~	~~3~~	1, 2	E ~~6~~	

Table 3.3.1-1 Note a — (a) When the ~~Reactor Trip Breakers are closed and the~~ Control Rod Drive System is capable of rod withdrawal or one or more rods not fully inserted. M3.3-12

Table 3.3.1-1 Note b — (b) Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

Table 3.3.1-1 Note d — (c) Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

Table 3.3.1-1 Note c — (k) Above the P-6 Setpoint. A3.3-11

TABLE TS 3.5-2A Page 1 of 6 Overflow Rev 11 8/10/94

REACTOR TRIP SYSTEM INSTRUMENTATION

		FUNCTIONAL UNIT	REQUIRED ~~TOTAL NO.~~ ~~OF~~ CHANNELS	~~CHANNELS TO TRIP~~	~~MINIMUM CHANNELS OPERABLE~~	APPLICABLE MODES	ACTION	
Table 3.3.1-1 Funct 8a	9.	Low Pressurizer Pressure	4	~~2~~	~~3~~	1(e)	K~~6~~	L3.3-13
Table 3.3.1-1 Funct 8b	10.	High Pressurizer Pressure	3	~~2~~	~~2~~	1, 2	E~~6~~	
Table 3.3.1-1 Funct 9	11.	Pressurizer High Water Level	3	~~2~~	~~2~~	1(e)	K~~6~~	L3.3-13
Table 3.3.1-1 Funct 10	12.	Reactor Coolant Flow Low	3/Loop	~~2/Loop~~	~~2/Loop~~	1(f)	K~~6~~	L3.3-13
	13.	Turbine Trip						
Table 3.3.1-1 Funct 14		a. Low AST Oil Pressure	3	~~2~~	~~2~~	1(h)	N~~6~~	L3.3-13
		b. Turbine Stop Valve Closure	2	~~2~~	~~1~~	1(h)	N~~6~~	L3.3-13
Table 3.3.1-1 Funct 13	14.	Lo-Lo Steam Generator Water Level	3/SG	~~2/SG in any SG~~	~~2/SG in each SG~~	1, 2	E~~6~~	

~~TABLE TS.3.5-2A~~
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L3.3-13

~~TABLE TS 3.5-2A (Page 2 of 6) (Overflow)~~

Table 3.3.1-1 Funct 12	15.	Undervoltage on 4.16 kV Buses 11 and 12 (Unit 2: 21 and 22)	2/bus	~~1/bus on both buses~~	~~2 on one bus~~	1(e)	~~11~~

Table 3.3.1-1 Note e	(e) Above P-7 interlock.
Table 3.3.1-1 Note f	(f) Above P-8 or P-7 interlock.
Table 3.3.1-1 Note h	(h) Above P-9 interlock.

L3.3-13

~~TABLE TS 3.5-2A~~
~~Page 2 of 6 (Overflow)~~
~~Rev 11 8/10/94~~

TABLE TS.3.5-2A (Page 3 of 6)

REACTOR TRIP SYSTEM INSTRUMENTATION

		FUNCTIONAL UNIT	REQUIRED ~~TOTAL NO.~~ OF CHANNELS	~~CHANNELS TO TRIP~~	~~MINIMUM CHANNELS OPERABLE~~	APPLICABLE MODES	ACTION	
Table 3.3.1-1 Funct 11	16.	Loss of Reactor Coolant Pump						L3.3-13
		a. RCP Breaker Open	1/pump	~~1~~	~~1/pump~~	1[f]	M~~1~~	
		b. Underfrequency 4kV bus[g]	2/bus	~~1/bus on both buses~~	~~2 on one bus~~	1[f]	L~~11~~	
Table 3.3.1-1 Funct 15	17.	Safety Injection Input from ESF	2	~~1~~	~~2~~	1, 2	O~~7~~	
Table 3.3.1-1 Funct 19	18.	Automatic Trip ~~& Interlock~~ Logic	2 2	~~1~~ ~~1~~	~~2~~ ~~2~~	1, 2 3[(a)], 4[(a)], 5[(a)]	O~~7~~ C~~8~~	A3.3-19
Table 3.3.1-1 Funct 17	19.	Reactor Trip Breakers(d)	2 2	~~1~~ ~~1~~	~~2~~ ~~2~~	1, 2 3[(a)], 4[(a)], 5[(a)]	P~~9~~ C~~8~~	A3.3-14
	~~20.~~	~~Reactor Trip Bypass Breakers~~	~~2~~	~~1~~	~~1~~	~~(d)~~	~~10~~	A3.3-14 M3.3-15
Table 3.3.1-1 Funct 16	16.	Reactor Trip System Interlocks						
		a. P-6	2			2[(c)]	Q	

~~TABLE TS.3.5-2A~~
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~~Rev 111 8/10/94~~

~~TABLE TS 3.5-2A (Page 3 of 6) (Overflow)~~

Table 3.3.1-1 Funct 16		b. P-7				
		1. Power Range Neutron Flux	4	1	R	M3.3-15
		2. Turbine Impulse Pressure	2	1	R	
		c. P-8	4	1	R	
		d. P-9	4	1	R	
		e. P-10	4	1, 2	Q	
Table 3.3.1-1 Funct 18	18.	RTB Undervoltage and Shunt Trip Mechanisms.[j]	1 each per RTB	1, 2	S	M3.3-16
			1 each per RTB	3[a], 4[a], 5[a]	Q	

Table 3.3.1-1 Note a — (a) When the ~~Reactor Trip Breakers are closed and the~~ Control Rod Drive System is capable of rod withdrawal or one or more rods not fully inserted. M3.3-12

Table 3.3.1-1 Note i — (d) Including any ~~When the~~ Reactor Trip Bypass Breakers that are racked in and closed for bypassing a Reactor Trip Breaker ~~and the Control Rod System is capable of rod withdrawal~~. A3.3-14 M3.3-17

Table 3.3.1-1 Note g — (g) Not a direct reactor trip, underfrequency will trip the RCP breakers open. A3.3-41

Table 3.3.1-1 Note j — (j) Only applies to breakers OPERABLE and closed. M3.3-16

TABLE TS.3.5-2A Page 3 of 6 Overflow Rev 111 6/10/94

Action Statements

LCO3.3.1 Condition B, M	ACTION 1: With ~~the number of OPERABLE channels~~ one ~~less than the Total Number of~~ Channel~~s~~ inoperable (Manual Reactor Trip channel or RCP Breaker Position channel), restore the inoperable channel to OPERABLE status within 48 hours	A3.3-18
LCO3.3.1 Condition B	or be in at least MODE 3 ~~HOT SHUTDOWN~~ within 54~~the next 6~~ hours.	A3.3-21 A3.3-29
LCO3.3.1 Condition M	or reduce THERMAL POWER to < P-7 and P-8 within 54 hours	L3.3-13
LCO3.3.1 Condition D, E	ACTION 2: With one channel (or Power Range Neutron Flux - High) inoperable ~~the number of OPERABLE channels less than the Total Number of Channels~~, operation ~~HOT STANDBY and/or POWER OPERATION~~ may proceed provided the following conditions are satisfied:	A3.3-18
	a. The inoperable channel is placed in the tripped condition within 6 hours;	
	or be in MODE 3 within 12 hours;	L3.3-22
LCO3.3.1 Condition D,E Note 1	b. ~~The Minimum Channels OPERABLE requirement is met; however, the~~ the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.1; and	A3.3-18

~~TABLE TS.3.5-2A~~
~~Page 4 of 6~~
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LCO3.3.1 Condition D only

c. If THERMAL POWER is above 85% of RATED THERMAL POWER, then determine the core quadrant power balance in accordance with the requirements of Specification 3.10.C.4.

LCO3.3.1 Condition D,E Note 2

d. One additional channel may be taken out of service for low power PHYSICS TESTS.

ACTION 3:

LCO3.3.1 Condition F

With one Intermediate Range Neutron Flux channel inoperable ~~the number of channels OPERABLE one less than the Total Number of Channels~~ and with the THERMAL POWER level: A3.3-18

~~a. Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint.~~ A3.3-23

b. Above the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint but below the P-10 (Power Range Neutron Flux Interlock) Setpoint, within 24 hours, reduce THERMAL POWER < P-6 or increase THERMAL POWER > P-10~~restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-10 Setpoint~~. L3.3-24

~~TABLE TS 3.5-2A Page 4 of 6 Overflow/ Rev 111 8/10/94~~

~~TABLE 3.5-2A (Page 4 of 6) (Overflow continued)~~

LCO3.3.1 Condition G

Condition G: With two intermediate range neutron flux channels inoperable, immediately suspend operations involving positive reactivity additions (Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM) and within 2 hours reduce THERMAL POWER to < P-6.

L3.3-25

ACTION 4: With ~~the number of OPERABLE channels~~ one Source Range Neutron Flux channel inoperable ~~less than the Total Number of Channels~~ suspend ~~all~~ operations involving positive reactivity additions ~~changes~~ (Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM).

LCO3.3.1 Condition H

A3.3-18

L3.3-30

LCO3.3.1 Condition I

Condition I: With two source range neutron flux channels inoperable, immediately open the Reactor Trip Breakers.

M3.3-26

ACTION 5: With ~~the number of OPERABLE channels~~ one Source Range Neutron Flux channel inoperable ~~less than the Total Number of Channels, suspend all operations involving positive reactivity changes, and~~ restore the inoperable channel to OPERABLE status within 48 hours or within 48 hours initiate action to fully insert all rods and within 49 hours make Rod Control System incapable of rod withdrawal ~~open the reactor trip breakers~~.

LCO3.3.1 Condition J

A3.3-18

A3.3-27

TABLE TS 3.5-2A
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TABLE 3.5-2A (Page 5 of 6)

Action Statements

ACTION 6: With one the number of OPERABLE channels inoperable one less than the Total Number of Channels, HOT STANDBY and/or POWER OPERATION operation may proceed provided the following conditions are satisfied:

LCO3.3.1 Condition E,K,N

A3.3-18

a. The inoperable channel is placed in the tripped condition within 6 hours; or

LCO3.3.1 Condition E

be in MODE 3 within 12 hours

L3.3-22

or

LCO3.3.1 Condition K

reduce THERMAL POWER < P-7 and P-8 within 12 hours

L3.3-13

or

LCO3.3.1 Condition N

reduce THERMAL POWER < P-9 within 12 hours, and

L3.3-13

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.1.

LCO3.3.1 Condition E,K,N Note

A3.3-18

TABLE TS.3.5-2A
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~~TABLE 3.5-2A (Page 5 of 6) (Overflow)~~

ACTION 7: With ~~the number of OPERABLE channels~~ one train inoperable ~~less than the Total Number of Channels~~, restore the inoperable channel to OPERABLE status within 6 hours or be in at least MODE 3 ~~HOT SHUTDOWN~~ within 12 ~~the next 6~~ hours; however, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.1 provided the other channel is OPERABLE.

LCO3.3.1 Condition O

A3.3-18

A3.3-21

A3.3-29

ACTION 8: With ~~the number of OPERABLE channels~~ one channel or train inoperable ~~less than the Total Number of Channels~~ restore the inoperable channel or train to OPERABLE status within 48 hours or within 48 hours initiate action to fully insert all rods and make the Rod Control System incapable of rod withdrawal ~~open the reactor trip breakers~~ within 49 ~~the next~~ hours.

LCO3.3.1 Condition C

A3.3-18

A3.3-27

A3.3-29

ACTION 9: a. With one of the diverse trip features (Undervoltage or Shunt Trip Attachment) inoperable, restore it to OPERABLE status within 48 hours or be in MODE 3 within 54 hours ~~declare the breaker inoperable and apply the requirements of b below~~.

LCO3.3.1 Condition S

M3.3-32

The breaker may ~~shall not~~ be bypassed while one of the diverse trip features is inoperable, ~~except~~ for 4 hours ~~the time required~~ for performing maintenance and testing to restore the diverse trip feature to OPERABLE status.

LCO3.3.1 Condition P Note 2

TABLE TS 3.5-2A Page 5 of 6 Overflow Rev 11 8/10/94

~~TABLE 3.5-2A (Page 5 of 6) (Overflow continued)~~

| LCO3.3.1 Condition P |

b. With one of the Reactor Trip Breakers otherwise inoperable, restore to OPERABLE status in one hour or be in at least MODE 3 ~~HOT SHUTDOWN~~ within 7~~6~~ hours; however, one Reactor Trip Breaker may be bypassed for up to 4 hours for surveillance testing per Specification 4.1, provided the other Reactor Trip Breaker is OPERABLE.

| L3.3-33 |
| A3.3-21 |
| A3.3-29 |

| LCO3.3.1 Condition P |

ACTION 10: ~~With the Reactor Trip Bypass Breaker inoperable, restore the Reactor Trip Bypass Breaker to OPERABLE status prior to using the Reactor Trip Bypass Breaker to bypass a Reactor Trip Breaker.~~ If the Reactor Trip Bypass Breaker is racked in and closed for bypassing a Reactor Trip Breaker and it becomes inoperable, restore to OPERABLE status in one hour or be in at least MODE 3 ~~HOT SHUTDOWN~~ within 7~~6~~ hours.

| A3.3-34 |

| L3.3-33 |
| A3.3-21 |
| A3.3-29 |

| LCO3.3.1 Condition C |

Restore the Bypass Breaker to OPERABLE status within the next 48 hours or open the Bypass Breaker within 49~~the following~~ hours.

~~TABLE TS 3.5-2A~~
~~Page 5 of 6~~
~~Overflow continued~~
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TABLE 3.5-2A (Page 6 of 6)

Action Statements

LCO3.3.1 Condition L

ACTION 11: With one or both ~~the number of OPERABLE~~ channels on one bus inoperable ~~less than the Total Number of Channels, POWER OPERATION~~ operation may proceed provided the following conditions are satisfied: A3.3-18

a. The inoperable channel(s) is placed in the tripped condition within 6 hours

or reduce THERMAL POWER to ≤ P-7 and P-8 within 12 hours, and L3.3-13

b. ~~The Minimum Channels OPERABLE requirement is met; however, the~~ one inoperable channel~~(s)~~ may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.1. A3.3-18

New Condition Q M3.3-15

New Condition R

New Condition S

ACTION 12: NOT USED

ACTION 13: NOT USED

ACTION 14: NOT USED

~~TABLE TS.3.5-2A~~
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TABLE 3.5-2A (Page 6 of 6) (Overflow)

ACTION 15: NOT USED

ACTION 16: NOT USED

ACTION 17: NOT USED

ACTION 18: NOT USED

ACTION 19: NOT USED

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TABLE TS.3.5-2B (Page 1 of 9)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

A3.3-05 (→ REQUIRED TOTAL NO. OF CHANNELS)

A3.3-06 (→ CHANNELS TO TRIP; MINIMUM CHANNELS OPERABLE)

	FUNCTIONAL UNIT	REQUIRED ~~TOTAL NO. OF~~ CHANNELS	~~CHANNELS TO TRIP~~	~~MINIMUM CHANNELS OPERABLE~~	APPLICABLE MODES	ACTION	
	1. SAFETY INJECTION						
Table 3.3.2-1 Funct 1a	a. Manual Initiation	2	~~1~~	~~2~~	1, 2, 3, 4	B~~23~~	A3.3-07
Table 3.3.2-1 Funct 1c	c~~b~~. High Containment Pressure	3	~~2~~	~~2~~	1, 2, 3~~, 4~~	D~~24~~	L3.3-36
Table 3.3.2-1 Funct 1e	e~~c~~. Steam Line Low Pressure	3/Loop	~~2 in any Loop~~	~~2/Loop~~	1, 2, 3[(a)]	D~~24~~	
Table 3.3.2-1 Funct 1d	d. Pressurizer Low Pressure	3	~~2~~	~~2~~	1, 2, 3[(a)]	D~~24~~	
Table 3.3.2-1 Funct 1b	b~~e~~. Automatic Actuation Relay Logic ~~and Actuation Relays~~	2	~~1~~	~~2~~	1, 2, 3, 4	C~~20~~	A3.3-35

~~TABLE TS.3.5-2B (Page 1 of 9) REV 111 8/10/94~~

Table 3.3.2-1 Funct 2a	2. CONTAINMENT SPRAY						
	a. Manual Initiation	2	~~2~~	~~2~~	1, 2, 3, 4	B~~23~~	
Table 3.3.2-1 Funct 2c	C~~b~~. Hi-Hi Containment Pressure	3 channels with 2 sensors per channel	~~1 sensor per channel in all 3 channels~~	~~1 sensor per channel in all 3 channels~~	1, 2, 3~~, 4~~	E~~21~~	L3.3-37
Table 3.3.2-1 Funct 2b	b~~c~~. Automatic Actuation Relay Logic ~~and Actuation Relays~~	2	~~1~~	~~2~~	1, 2, 3, 4	C~~20~~	A3.3-35

Table 3.3.2-1 Note a

(a) ~~Trip function may be blocked in this MODE below a Reactor Coolant System~~ Pressurizer Pressure ≥~~of~~ 2000 psig. A3.3-38

~~TABLE TS 3.5-2B Page 1 of 9 (Overflow)~~ Rev 11 8/10/94

TABLE TS.3.5-2B (Page 2 of 9)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

A3.3-05

A3.3-06

	FUNCTIONAL UNIT	REQUIRED ~~TOTAL NO. OF~~ CHANNELS	~~CHANNELS TO TRIP~~	~~MINIMUM CHANNELS OPERABLE~~	APPLICABLE MODES	ACTION
	3. CONTAINMENT ISOLATION					
Table 3.3.2-1 Funct 3c	c~~a~~. Safety Injection	See Functional Unit 1 above for all Safety Injection initiating functions and requirements.				
Table 3.3.2-1 Funct 3a	a~~b~~. Manual	2	~~1~~	~~2~~	1, 2, 3, 4	B~~23~~
Table 3.3.2-1 Funct 3b	b~~c~~. Automatic Actuation Relay Logic ~~and Actuation Relays~~	2	~~1~~	~~2~~	1, 2, 3, 4	C~~20~~

A3.3-35

~~TABLE TS.3.5-2B~~
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TABLE TS 3.5-2B (Page 2 of 9) (Overflow)

4. CONTAINMENT VENTILATION ISOLATION

Table 3.3.5-1 Funct 5	5a. Safety Injection	See Functional Unit 1 above for all Safety Injection initiating functions and requirements.				
Table 3.3.5-1 Funct 1	1b. Manual	2	1	2	(b)	22
Table 3.3.5-1 Funct 6	6c. Manual Containment Spray	See Functional Unit 2a above for Manual Containment Spray requirements.				
Table 3.3.5-1 Funct 4	4d. Manual Containment Isolation	See Functional Unit 3b above for Manual Containment Isolation requirements.				
Table 3.3.5-1 Funct 3	3e. High Radiation in Exhaust Air	2	1	2	(b)	22
Table 3.3.5-1 Funct 2	2f. Automatic Actuation Relay Logic and Actuation Relays (A3.3-35)	2	1	2	(b)	22

Table 3.3.5-1 Notes a,b

(a, b) Whenever in MODES 1, 2, 3, 4 or during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment when CONTAINMENT INTEGRITY is required and either of the containment inservice purge systems is not isolated are in operation. A3.3-39

TABLE TS 3.5-2B Page 2 of 9 Overflow Rev 111 8/10/94

TABLE TS.3.5-2B (Page 3 of 9)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

A3.3-05

A3.3-06

FUNCTIONAL UNIT	REQUIRED ~~TOTAL NO. OF~~ CHANNELS	~~CHANNELS TO TRIP~~	~~MINIMUM CHANNELS OPERABLE~~	APPLICABLE MODES	ACTION
4~~5~~. STEAM LINE ISOLATION					Addressed Elsewhere
a. Manual	1/Loop	1/Loop	1/Loop	1, 2, 3(c)	27
b. Hi-Hi Containment Pressure	3	~~2~~	~~2~~	1, 2(c), 3(c)	D~~24~~
d~~c~~. Hi-Hi Steam Flow with Safety Injection					
1. Hi-Hi Steam Flow	2/Loop	~~1 in any Loop~~	~~1/Loop~~	1, 2(c), 3(c)	D~~29~~
2. Safety Injection	See Functional Unit 1 above for all Safety Injection initiating functions and requirements.				

L3.3-42

Table 3.3.2-1 Funct 4b

Table 3.3.2-1 Funct 4d

L3.3-42

~~TABLE TS.3.5-2B~~
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Table 3.3.2-1 Funct 4c	Cd. ~~Hi Steam Flow and~~ 2 of 4 Lo-Lo T_{avg} with Safety Injection:					
	~~1. Hi Steam Flow~~Deleted	~~2/Loop~~	~~1 in any Loop~~	~~1/Loop~~	~~1, 2, 3(d)~~	~~29~~ A3.3-20
	2. Lo-Lo T_{avg}	4	~~2~~	~~3~~	1, 2(c), 3(c) (d)	D~~24~~ L3.3-42
Table 3.3.2-1 Funct 4c	3. Safety Injection	See Functional Unit 1 above for all Safety Injection initiating functions and requirements.				

Table 3.3.2-1 Note c — (c) Except when both MSIVs are closed~~When either main steam isolation valve is open~~. A3.3-43

Table 3.3.2-1 Notes c,d — (c d) When reactor coolant system average temperature is greater than 520°F and either main steam isolation valve is open.

TABLE TS 3.5-2B Page 3 of 9 Overflow

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

	FUNCTIONAL UNIT	REQUIRED ~~TOTAL NO. OF~~ CHANNELS	~~CHANNELS TO TRIP~~	~~MINIMUM CHANNELS OPERABLE~~	APPLICABLE MODES	ACTION	
Table 3.3.2-1 Funct 4a	4~~5~~. STEAM LINE ISOLATION (continued)						A3.3-35 L3.3-42
	a~~e~~. Automatic Actuation Relay Logic ~~and Actuation Relays~~	2	~~1~~	~~2~~	1, 2(c), 3(c)	F~~25~~	
	5~~6~~. FEEDWATER ISOLATION						L3.3-45
Table 3.3.2-1 Funct 5b	b~~a~~. Hi-Hi Steam Generator Level	3/SG	~~2/SG in any SG~~	~~2/SG in each SG~~	1, 2(x)	G~~24~~	
Table 3.3.2-1 Funct 5c	c~~b~~. Safety Injection	See Functional Unit 1 above for all Safety Injection initiating functions and requirements.					
	~~c. Reactor Trip with 2 of 4 Low T_{avg} (Main Valves only):~~						
	~~1. Reactor Trip~~	~~2~~	~~1~~	~~2~~	~~1, 2~~	~~28~~	LR3.3-44
	~~2. Low T_{avg}~~	~~4~~	~~2~~	~~3~~	~~1, 2~~	~~24~~	A3.3-35
Table 3.3.2-1 Funct 5a	a~~d~~. Automatic Actuation Relay Logic ~~and Actuation Relays~~	2	~~1~~	~~2~~	1, 2(x), 3(x)	F~~28~~	L3.3-45 M3.3-49

Table 3.3.2-1 Note c — (c) Except when both MSIVs are closed~~When either main steam isolation valve is open~~ A3.3-43

Table 3.3.2-1 Note e — (x) Except when all MFRVs and MFRV bypass valves are closed and in manual or isolated by a closed non-automatic valve. L3.3-45

~~TABLE TS.3.5-2B~~
~~Page 4 of 9~~
~~Rev 111 8/10/94~~

ENGINEERED SAFETY FEATURE ACTUATION TABLE INSTRUMENTATION

A3.3-05
A3.3-06

Margin note	FUNCTIONAL UNIT	REQUIRED TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION	Note
	67. AUXILIARY FEEDWATER						
	a. Manual	2	1	2	1, 2, 3	26	LR3.3-46
Table 3.3.2-1 Funct 6b	b. Steam Generator Lo-Lo Water Level	3/SG	2/SG in any SG	2/SG in each SG	1, 2, 3	D24	A3.3-47
Table 3.3.2-1 Funct 6d	dc. Undervoltage on 4.16 kV Buses 11 and 12 (Unit 2: 21 and 22)	2/bus	1/bus on both buses	2 on one bus	1,2	H29	
Table 3.3.2-1 Note f	(Start Turbine Driven Pump only)						
Table 3.3.2-1 Funct 6e	ed. Trip of Both Main Feedwater Pumps						
	1. Turbine Driven	2	2	2	1, 2*	I26	
	2. Motor Driven	2	2	2	1, 2*	26	A3.3-51
Table 3.3.2-1 Funct 6c	ce. Safety Injection	See Functional Unit 1 above for all Safety Injection initiating functions and requirements.					A3.3-35
Table 3.3.2-1 Funct 6a	af. Automatic Actuation Relay Logic and Actuation Relays	2	1	2	1, 2, 3	I30	

TABLE TS.3.5-2B
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TABLE TS.3.5-2B (Page 5 of 9) (Overflow)

A3.3-48

* This function may be by passed during alignment and operation of the AFW system for SG level controlThe Auxiliary Feedwater auto start of the Turbine and Motor Driven AFW pumps caused by the Trip of Both Main Feedwater Pumps maybe bypassed during Startup and Shutdown Operations when the Main Feedwater Pumps are not required to supply feedwater to the Steam Generators.

Table 3.3.2-1 Note g

TABLE TS.3.5-2B Page 5 of 9 (Overflow) Rev 134 11/25/97

TABLE TS.3.5-2B (Page 6 of 9)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

A3.3-05

A3.3-06

	FUNCTIONAL UNIT	REQUIRED TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION	
8.	LOSS OF POWER						
LCO3.3.4	a. Degraded Voltage 4kV Safeguards Bus	4/Bus (2/phase on 2 phases)	~~2/Bus (1/phase on 2 phases)~~	~~3/Bus~~	1, 2, 3, 4 (a)	31, 32, 33	M3.3-52
LCO3.3.4	b. Undervoltage 4kV Safeguards Bus	4/Bus (2/phase on 2 phases)	~~2/Bus (1/phase on 2 phases)~~	~~3/Bus~~	1, 2, 3, 4 (a)	31, 32, 33	M3.3-52
~~9.~~	~~BORIC ACID STORAGE TANK~~						
	~~a. Lo-Lo Level~~	~~2 channel with 2 sensors per channel~~	~~1 sensor per channel in both channels~~	~~2 sensors in one channel~~	~~1, 2, 3, 4~~	~~34~~	A3.3-50
	~~b. Automatic Actuation Logic and Actuation Relays~~	~~2~~	~~1~~	~~2~~	~~1, 2, 3, 4~~		

~~TABLE TS.3.5-2B~~
~~Page 6 of 9~~
~~Rev 143 3/17/99~~

LCO3.3.4 M3.3-52

(a) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources - Shutdown."

Action Statements

ACTION 20: With ~~the number of OPERABLE channels~~ one train inoperable~~less than the Total Number of Channels~~, restore the inoperable train~~channel~~ to OPERABLE status within 6 hours or be in at least MODE 3 ~~HOT SHUTDOWN~~ within 12~~the next 6~~ hours and in MODE 5 ~~COLD SHUTDOWN~~ within 42~~the following 30~~ hours; however, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.1, provided the other channel is OPERABLE.

LCO3.3.2 Cond C

A3.3-18

A3.3-21

A3.3-29

ACTION 21: With one or two containment pressure ~~the number of OPERABLE~~ channels ~~less than the Total Number of Channels~~ inoperable, operation may proceed provided the first inoperable channel(s) is placed in the tripped condition within 6 hours and the second inoperable channel is placed in bypass within 6 hours or be in MODE 3 in 12 hours and MODE 4 in 18 hours ~~and the Minimum Channels OPERABLE requirement is met~~. One inoperable channel may be bypassed at a time for up to 4 hours for surveillance testing per Specification 4.1.

LCO3.3.2 Cond D,E

L3.3-58

L3.3-22

ACTION 22: With one radiation monitoring train inoperable, place and maintain inservice purge valves closed within 4 hours. With one or more other functions inoperable or the radiation monitoring train not restored within 4 hours~~the number of OPERABLE channels less than the Total Number of Channels~~, operation may continue provided the

LCO3.3.5

L3.3-53

~~TABLE TS.3.5-2B~~
~~Page 7 of 9~~
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LCO3.3.5 containment inservice purge supply and exhaust valves are maintained closed (as required by ITS LCO 3.6.3 and 3.9.4). A3.3-54

ACTION 23: With one ~~the number of OPERABLE~~ channels or train inoperable ~~one less than the Total Number of Channels~~, restore the inoperable channel to OPERABLE status within 48 hours or be in at least MODE 3 ~~HOT SHUTDOWN~~ within 54~~the next 6~~ hours and in MODE 5 ~~COLD SHUTDOWN~~ within 84~~the following 30~~ hours. A3.3-18 A3.3-21 A3.3-29

LCO3.3.2 Cond B

ACTION 24: With one channel inoperable ~~the number of OPERABLE channels one less than the Total Number of Channels~~, operation in the applicable MODE may proceed provided the following conditions are satisfied: A3.3-18

LCO3.3.2 Cond D,G

a. The inoperable channel is placed in the tripped condition within 6 hours

LCO3.3.2 Cond D,G — or be in MODE 3 within 12 hours, and, L3.3-22

LCO3.3.2 Cond D only — be in MODE 4 within 18 hours.

b. ~~The Minimum Channels OPERABLE requirement is met; however,~~ the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.1. A3.3-18

TABLE TS 3.5-2B Page 7 of 9 (Overflow) Rev 111 8/10/94

TABLE 3.5-2B (Page 8 of 9)

Action Statements

LCO3.3.2 Cond F

ACTION 25: With ~~the number of OPERABLE channels~~ one train inoperable ~~less than the Total Number of Channels~~, restore the inoperable channel to OPERABLE status within 6 hours or be in at least MODE 3 ~~HOT SHUTDOWN~~ within 12~~the next 6~~ hours. Operation in MODE 3 ~~HOT SHUTDOWN~~ may proceed provided the main steam isolation valves are closed, or ~~if not~~, be in at least MODE 4 ~~INTERMEDIATE SHUTDOWN~~ within 18~~the following 6~~ hours. However, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.1, provided the other channel is OPERABLE.

A3.3-18

A3.3-21

A3.3-29

LCO3.3.2 Cond I

ACTION 26: With ~~the number of OPERABLE channels~~ one channel inoperable ~~less than the Total Number of Channels~~, declare the associated auxiliary feedwater pump inoperable and take the action required by specification 3.4.2.

A3.3-18

ACTION 27: With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT SHUTDOWN within the next 6 hours and close the associated valve.

Addressed Elsewhere

~~TABLE TS.3.5-2B~~
~~Page 8 of 9~~
~~Rev 111 8/10/94~~

~~TABLE 3.5-2B (Page 8 of 9) (Overflow)~~

ACTION 28: With ~~the number of OPERABLE channels~~ one train inoperable ~~less than the Total Number of Channels~~, restore the inoperable channel to OPERABLE status within 6 hours or be in at least MODE 3 ~~HOT SHUTDOWN~~ within 12~~the next 6~~ hours. Operation in MODE 3 may continue provided the main steam isolation valves are closed, or be in at least MODE 4 within 18 hours. However, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.1~~, provided the other channel is OPERABLE~~.

LCO3.3.2 Cond F

A3.3-18

A3.3-21

A3.3-29

M3.3-60

A3.3-18

ACTION 29: With one channel inoperable (Condition H; or both channel(s) inoperable on one bus) ~~the number of OPERABLE channels less than the Total Number of Channels~~, operation in the applicable MODE may proceed provided the following conditions are satisfied:

LCO3.3.2 Cond D, H

A3.3-18

a. The inoperable channel(s) is placed in the tripped condition within 6 hours

LCO3.3.2 Cond D, H

or be in MODE 3 within 12 hours, and,

L3.3-22

LCO3.3.2 Cond D only

be in MODE 4 within 18 hours.

b. ~~The Minimum Channels OPERABLE requirement is met; however,~~ one inoperable channel may be bypassed at a time for up to 4 hours for surveillance testing of other channels per Specification 4.1

A3.3-18

TABLE TS 3.5-2B Page 8 of 9 (Overflow) Rev 111 8/10/94

TABLE 3.5-2B (Page 9 of 9)

Action Statements

ACTION 30: With one ~~the number of OPERABLE~~ channel~~s~~ inoperable ~~one less than the Total Number of Channels~~, declare the associated auxiliary feedwater pump inoperable and take the action required by Specification 3.4.2. ~~However, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.1, provided the other channel is OPERABLE.~~

LCO3.3.2 Cond I

A3.3-18

A3.3-55

ACTION 31: With one or more Functions with ~~the number of OPERABLE channels~~ one channel per bus inoperable ~~less than the Total Number of Channels~~, operation in the applicable MODE may proceed provided the inoperable channel is placed in the bypassed condition within 6 hours.

LCO3.3.4 Cond A

A3.3-18

~~ACTION 32: With the number of OPERABLE channels two less than the Total Number of Channels, operation in the applicable MODE may proceed provided the following conditions are satisfied:~~

A3.3-56

~~a. One inoperable channel is placed in the bypassed condition within 6 hours, and,~~

~~b. The other inoperable channel is placed in the tripped condition within 6 hours, and,~~

~~c. All of the channels associated with the redundant 4kV Safeguards Bus are OPERABLE.~~

ACTION 33: If the requirements of ACTIONS 30 or 31 cannot be met within the time specified, or with one or more Functions with two~~the number of OPERABLE channels three~~ or more channels per bus inoperable ~~less than the Total Number of Channels~~, declare the associated load sequencer ~~diesel generator(s)~~ inoperable and take the ACTION required by Specification 3.7.B.

LCO3.3.4 Cond B | A3.3-18 | M3.3-57

New Action Statements C and D for the load sequencer with appropriate Required Actions and Completion Times.

LCO3.3.4 Cond C, D | M3.3-61

~~ACTION 34: With the number of OPERABLE channels less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the tripped condition within 6 hours and the Minimum Channels OPERABLE requirement is met. Restore the inoperable channel to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

A3.3-50

~~ACTION 35: With one channel inoperable, restore the inoperable channel to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

~~ACTION 36: Two channels may be inoperable for up to 1 hour for surveillance testing per Specification 4.1. Restore at least one channel to operable status within this 1 hour or initiate the action necessary to place the affected unit in HOT SHUTDOWN, and be in at least HOT SHUTDOWN within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

~~TABLE TS 3.5-2B~~
~~Page 9 of 9 (Overflow)~~
~~Rev 143 3/17/99~~

3.6.D. Containment Purge System

1. The 36-inch containment purge system double gasketed blind flanges shall be installed whenever the reactor is above COLD SHUTDOWN. The 18-inch containment inservice purge system double gasketed blind flanges shall be installed whenever the reactor is above COLD SHUTDOWN except as noted below.

2. The inservice purge system may be operated above COLD SHUTDOWN if the following conditions are met:

   a. The debris screens are installed on the supply and exhaust ducts in containment.

   b. The two automatic primary containment isolation valves in each duct that penetrates containment shall satisfactorily pass a local leak rate test prior to use.

Addressed Elsewhere

LCO3.3.5

   c. The two automatic primary containment isolation valves and the automatic shield building ventilation damper in each duct that penetrates containment shall be OPERABLE, including instruments and controls associated with them.

LCO3.3.5 Cond B

   ~~d~~. If an inservice purge system automatic primary containment isolation valve or automatic shield building ventilation damper becomes inoperable, apply the requirements of Specification 3.6.C.3.

   e. The blind flanges (i.e., 42B (53 in Unit 2) and 43A (52 in Unit 2)) shall be reinstalled and satisfactorily pass a local leak rate test, each time after the in-service purge system is used.

E. Auxiliary Building Special Ventilation Zone Integrity

1. A reactor shall not be made or maintained critical nor shall reactor coolant system average temperature exceed 200°F unless AUXILIARY BUILDING SPECIAL VENTILATION ZONE INTEGRITY is maintained. If these conditions cannot be satisfied (except as specified in 3.6.E.2 and 3 below) within 24 hours initiate the actions necessary to place both units in HOT SHUTDOWN, and be in at least HOT SHUTDOWN within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

2. Openings in the Auxiliary Special Ventilation Zone are permitted provided they are under direct administrative control and can be reduced to less than 10 square feet within 6 minutes following an accident.

3. Valves and actuation circuits that isolate the Auxiliary Building Normal Ventilation System following an accident may be inoperable for 7 days provided the ventilation system can be manually isolated within 6 minutes following an accident.

Addressed Elsewhere

3.7 AUXILIARY ELECTRICAL SYSTEMS

Applicability

Applies to the availability of electrical power for the operation of plant auxiliaries.

Objectives

To define those conditions of electrical power availability necessary to assure safe reactor operation and continuing availability of engineered safeguards.

Specification

A. A reactor shall not be made or maintained critical nor shall reactor coolant system average temperature exceed 200°F unless all of the following requirements are satisfied for the applicable unit (except as specified in 3.7.B below):

1. At least two separate paths from the transmission grid to the unit 4 kV safeguards distribution system each capable of providing adequate power to minimum safety related equipment, shall be OPERABLE.

2. The 4 kV safeguards buses 15 and 16 (Unit 2 buses: 25 and 26) shall be energized.

3.3.4 LCO c. New Specification requiring two trains of 4 kV safeguards bus automatic load sequencers to be operable. M3.3-59

Addressed Elsewhere

3. The 480 V safeguards buses 111, 112, 121, and 122 (Unit 2 buses: 211, 212, 221 and 222), and their safeguards motor control centers shall be energized.

4. Reactor protection instrument AC buses shall be energized: 111, 112, 113 and 114 (Unit 2 buses: 211, 212, 213 and 214).

5. The following unit specific conditions apply:

(a) Unit 1: D1 and D2 diesel generators are OPERABLE; and a fuel supply of 51,000 gallons is available for the D1 and D2 diesel generators in the Unit 1 interconnected diesel fuel oil storage tanks. A total fuel supply of 70,000 gallons is available for the D1 and D2 diesel generators and the

3.8.A.1.c. The core subcritical neutron flux shall be continuously monitored by at least two neutron monitors, each with continuous visual indication in the control room and one with audible indication in the containment, which are in service whenever core geometry is being changed. When core geometry is not being changed, at least one neutron flux monitor shall be in service.

d. The plant shall be in the REFUELING condition.

e. During movement of fuel assemblies or control rods out of the reactor vessel, at least 23 feet of water shall be maintained above the reactor vessel flange. The required water level shall be verified prior to moving fuel assemblies or control rods and at least once every day while the cavity is flooded.

f. At least one residual heat removal pump shall be OPERABLE and running. The pump may be shut down for up to one hour to facilitate movement of fuel or core components.

g. If the water level above the top of the reactor vessel flange is less than 20 feet, except for control rod unlatching/latching operations or upper internals removal/replacement, both residual heat removal loops shall be OPERABLE.

h. Direst communication between the control room and the operating floor of the containment shall be available whenever CORE ALTERATIONS are taking place.

i. No movement of irradiated fuel in the reactor shall be made until the reactor has been subcritical for at least 100 hours.

Addressed Elsewhere

LCO3.3.5

j. The radiation monitors which initiate isolation of the Containment Purge System shall be tested and verified to be OPERABLE prior to CORE ALTERATIONS.

2. If any of the above conditions are not met, CORE ALTERATIONS shall cease. Work shall be initiated to correct the violated conditions so that the specifications are met, and no operations which may increase the reactivity of the core shall be performed.

3. If Specification 3.8.A.1.f or 3.8.A.1.g cannot be satisfied, all fuel handling operations in containment shall be suspended, the requirements of Specification 3.8.A.1.a.1) shall be satisfied, at least one door in each personnel air lock shall be closed, and no reduction in reactor coolant boron concentration shall be made.

LCO3.3.3 3.15 EVENT MONITORING INSTRUMENTATION

Applicability

LCO3.3.3 Applies during MODES 1, and 2.

~~Objective~~ A3.3-62

~~To ensure that sufficient information is available to operators to determine the effects of and determine the course of an accident to the extent required to carry out required manual actions.~~

Specification

LCO3.3.3 A. Event monitoring instrumentation shall be OPERABLE as specified in Table TS. 3.15-1.

~~B. Action statements applicable by reference from Table TS. 3.15-1.~~ A3.3-04

3.3.3 Actions Note 1 C. LCO 3.0.4 is not applicable~~MODES 1, and 2 may be entered when a LIMITING CONDITION FOR OPERATION is not met~~. A3.3-63

~~D. The provisions of specification 3.0.C are not applicable.~~ M3.3-64

TABLE TS 3.15-1 (Page 1 of 2)
EVENT MONITORING INSTRUMENTATION

		Function	Required Channels	Action[a]	
Table 3.3.3-1 Func 1	1.	Power Range Neutron Flux (Logarithmic Scale)	2	I ~~1, 2~~	A3.3-07
Table 3.3.3-1 Func 2	2.	Source Range Neutron Flux (Logarithmic Scale)	2	I ~~1, 2~~	
Table 3.3.3-1 Func 3	3.	Reactor Coolant System (RCS) Hot Leg Temperature	2	I ~~1, 2~~	
Table 3.3.3-1 Func 4	4.	RCS Cold Leg Temperature	2	I ~~1, 2~~	
Table 3.3.3-1 Func 5	5.	RCS Pressure (Wide Range)	2	I ~~1, 2~~	
Table 3.3.3-1 Func 6	6.	Reactor Vessel Water Level	2	J ~~1, 3~~	
Table 3.3.3-1 Func 7	7.	Containment Sump Water Level (Wide Range)	2	I ~~1, 2~~	
Table 3.3.3-1 Func 8	8.	Containment Pressure (Wide Range)	2	I ~~1, 2~~	
Table 3.3.3-1 Func 9	9.	Penetration Flow Path Automatic Containment Isolation Valve Position	2 per penetration flow path [b] [c]	I ~~1, 2~~	A3.3-65

~~Table TS.3.15-1~~
~~(Page 1 of 2)~~
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TABLE TS 3.15-1 (Page 1 of 2) (Overflow)

Table 3.3.3-1 Func 10	10.	Containment Area Radiation (High Range)	2	D 1, 3
Table 3.3.3-1 Func 11	11.	Hydrogen Monitors	2	I 1, 4
Table 3.3.3-1 Func 12	12.	Pressurizer Level	2	I 1, 2
Table 3.3.3-1 Func 13	13.	Steam Generator Water Level (Wide Range)	2 per steam generator	I 1, 2
Table 3.3.3-1 Func 14	14.	Condensate Storage Tank Level	2	I 1, 2
Table 3.3.3-1 Func 15	15.	Core Exit Temperature Thermocouples	4 per core quadrant(c)	I 5, 6
Table 3.3.3-1 Func 16	16.	Refueling Water Storage Tank Level	2	I 1, 2

A3.3-68

Table 3.3.3-1 Note c

(c) A channel consists of one core exit thermocouple (CET).

A3.3-68

Table TS 3.15-1 (Page 1 of 2) (Overflow) REV 121 11/9/95

TABLE TS. 3.15-1 (Page 2 of 2)

EVENT MONITORING INSTRUMENTATION

(a) Action Statements

LCO3.3.3 Actions Note 2		Separate Action Statement entry is allowed for each Function.
LCO3.3.3 Cond A	1.	With one required channel inoperable, either restore the required channel to OPERABLE status within 30 days,
LCO3.3.3 Cond C		or submit a report to the Commission within the following 14 days.
LCO3.3.3 Cond D	2.	With two required channels inoperable, either restore one channel to OPERABLE status within 7 days
LCO3.3.3 Cond I		or be in at least MODE 3 within the next 6 hours.
LCO3.3.3 Cond D	3.	With two required channels inoperable, either restore one channel to OPERABLE status within 7 days,
LCO3.3.3 Cond J		or submit a report to the Commission within the following 14 days.
LCO3.3.3 Cond E	4.	With two required channels inoperable, either restore one channel to OPERABLE status within 72 hours
LCO3.3.3 Cond I		or be in at least MODE 3 within the next 6 hours.
LCO3.3.3 Cond H		New Condition H - enter Table 3.3.3-1 as required when other Conditions are not met.

A3.3-69

Table TS.3.15-1 (Page 2 of 2) REV 121 11/9/95

LCO3.3.3 Cond B

5. With the number of OPERABLE channels for the core exit thermocouples less than the Required Channels shown on Table TS.3.15-1, but with greater than or equal to 4 core exit thermocouples OPERABLE in the center core region and greater than or equal to one core exit thermocouple OPERABLE in each quadrant of the outside core region, restore the inoperable channels to OPERABLE status within 30 days,

LCO3.3.3 Cond C

or submit a report to the Commission within the next 14 days.

LCO3.3.3 Actions Note 3

As a minimum, the Required Channels shall ~~will~~ be operable ~~restored~~ prior to MODE 2 ~~startup~~ following each ~~the next~~ refueling outage. A3.3-66

LCO3.3.3 Cond F, G

6. With ~~the~~ less than two core exit thermocouple channels OPERABLE in one or more quadrants, and with either less than 4 core exit thermocouple OPERABLE in the center region or less than one core exit thermocouple OPERABLE in each quadrant of the outside core region, restore the inoperable channels to OPERABLE status within 7 days, A3.3-66

LCO3.3.3 Cond I

or be in at least MODE 3 within the next 6 hours.

Table 3.3.3-1 Note a

(b) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, ~~or~~ blind flange or check valve with flow through the valve secured. L3.3-67

Table 3.3.3-1 Note b

(c) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

~~Table TS.3.15-1 (Page 2 of 2) (Overflow) REV 121 11/7/95~~

~~4.1 OPERATIONAL SAFETY REVIEW~~

~~Applicability~~

~~Applies to items directly related to safety limits and limiting conditions for operation.~~

A3.3-01

~~Objective~~

~~To specify the minimum frequency and type of surveillance to be applied to plant equipment and conditions.~~

Specification

A3.3-04

~~A. Calibration, testing, and checking of instrumentation channels and testing of logic channels shall be performed as specified in Tables TS.4.1-1A, 4.1-1B and 4.1-1C.~~

A3.3-04

~~B. Equipment tests shall be conducted as specified in Table TS.4.1-2A.~~

A3.3-04

~~C. Sampling tests shall be conducted as specified in Table TS.4.1-2B.~~

Addressed Elsewhere

D. Whenever the plant condition is such that a system or component is not required to be OPERABLE the surveillance testing associated with that system or component may be discontinued. Discontinued surveillance tests shall be resumed less than one test interval before establishing plant conditions requiring OPERABILITY of the associated system or component, unless such testing is not practicable (i.e., nuclear power range calibration cannot be done prior to reaching POWER OPERATION) in which case the testing will be resumed within 48 hours of attaining the plant condition which permits testing to be accomplished.

TABLE TS.4.1-1A (Page 1 of 5)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

	FUNCTIONAL UNIT	CHANNEL CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
				A3.3-72			
Table 3.3.1-1 Funct 1	1. Manual Reactor Trip	N.A.	N.A.	R(13) SR3.3.1.14	N.A.	1, 2, 3(1), 4(1), 5(1)	
Table 3.3.1-1 Funct 2a Funct 6 Funct 7	2. Power Range, Neutron Flux a) High Setpoint	S SR3.3.1.1	D(5, 7) SR3.3.1.2 ~~M(6, 7)~~ ~~Q(7, 8)~~ R(7, AA) SR3.3.1.11	Q~~(18)~~ SR3.3.1.7	R(ZZ) SR3.3.1.16	1, 2	LR3.3-75
Table 3.3.1-1 Funct 2b	b) Low Setpoint	S SR3.3.1.1	R(7, AA) SR3.3.1.11	S/U(17, 19) SR3.3.1.8	R(ZZ) SR3.3.1.16	1(3), 2	M3.3-73
Table 3.3.1-1 Funct 3a	3a. Power Range, Neutron Flux, High Positive Rate	N.A.	R(7, AA) SR3.3.1.11	Q SR3.3.1.7	R(ZZ) SR3.3.1.16	1, 2	
Table 3.3.1-1 Funct 3b	3b4. Power Range, Neutron Flux, High Negative Rate	N.A.	R(7, AA) SR3.3.1.11	Q SR3.3.1.7	R(ZZ) SR3.3.1.16	1, 2	
Table 3.3.1-1 Funct 4	45. Intermediate Range, Neutron Flux	S SR3.3.1.1	R(7, AA) SR3.3.1.11	S/U(4, 19) SR3.3.1.8	~~R~~	1(3), 2(YY)	M3.3-73 A3.3-11 L3.3-74

~~TABLE TS.4.1-1A (Page 1 of 5)~~
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TABLE TS 4.1-1A (Page 1 of 5) (Overflow)

A3.3-08

M3.3-73

Reference	Item	Function					Modes
Table 3.3.1-1 Funct 5	56.	Source Range, Neutron Flux a. Startup	S SR3.3.1.1	R(7,AA) SR3.3.1.11	S/U(4,10) SR3.3.1.8	R(ZZ) SR3.3.1.16	2(2)
		b. Shutdown	S SR3.3.1.1	R(7,AA) SR3.3.1.11	Q(10) SR3.3.1.8	R(ZZ) SR3.3.1.16	3(1), 4(1), 5(1)
Table 3.3.1-1 Funct 6	67.	Overtemperature ΔT	S SR3.3.1.1	R(AA) SR3.3.1.12 SR3.3.1.6 SR3.3.1.3	Q SR3.3.1.7	R(ZZ) SR3.3.1.16	1, 2
Table 3.3.1-1 Funct 7	78.	Overpower ΔT	S SR3.3.1.1	R(AA) SR3.3.1.12 SR3.3.1.6 SR3.3.1.3	Q SR3.3.1.7	R(ZZ) SR3.3.1.16	1, 2

M3.3-76

M3.3-76

TABLE TS 4.1-1A (Page 1 of 5) (Overflow) REV 111 8/10/94

TABLE TS.4.1-1A (Page 2 of 5)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

	FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
Table 3.3.1-1 Funct 8a	8a ~~9~~. Low Pressurizer Pressure	S SR3.3.1.1	R(AA) SR3.3.1.10	Q SR3.3.1.7	N.A.	1(BB)	L3.3-13
Table 3.3.1-1 Funct 8b	8b ~~10~~. High Pressurizer Pressure	S SR3.3.1.1	R(AA) SR3.3.1.10	Q SR3.3.1.7	N.A.	1, 2	
Table 3.3.1-1 Funct 9	9 ~~11~~. Pressurizer High Water Level	S SR3.3.1.1	R(AA) SR3.3.1.10	Q SR3.3.1.7	N.A.	1(BB)	L3.3-13
Table 3.3.1-1 Funct 10	10 ~~12~~. Reactor Coolant Flow Low	S SR3.3.1.1	R(AA) SR3.3.1.10	Q SR3.3.1.7	N.A.	1(CC)	L3.3-13
	14 ~~13~~. Turbine Trip						
Table 3.3.1-1 Funct 14	a. Low AST Oil Pressure	N.A.	R(AA) SR3.3.1.10	S/U(4, 11) SR3.3.1.15	N.A.	1(DD)	L3.3-13
	b. Turbine Stop Valve Closure	N.A.	~~R~~ (L3.3-77)	S/U(4, 11) SR3.3.1.15	N.A.	1(DD)	L3.3-13
Table 3.3.1-1 Funct 13	13 ~~14~~. Lo-Lo Steam Generator Water Level	S SR3.3.1.1	R(AA) SR3.3.1.10	Q SR3.3.1.7	N.A.	1, 2	
Table 3.3.1-1 Funct 12	12 ~~15~~. Undervoltage 4KV RCP Bus	N.A.	R(AA) SR3.3.1.10	Q(II) SR3.3.1.9 (A3.3-81)	N.A.	1(BB)	L3.3-13

~~TABLE TS.4.1-1A~~
~~(Page 2 of 5)~~
~~REV 111 8/10/94~~

TABLE TS.4.1-1A (Page 3 of 5)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

	FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
	116. Loss of Reactor Coolant Pump						L3.3-82, L3.3-83
Table 3.3.1-1 Funct 11	a. RCP Breaker Open	N.A.	~~R~~	~~S/U(4)~~ SR3.3.1.14	N.A.	1(CC)	L3.3-13
	b. Underfrequency 4KV Bus	N.A.	R(AA) SR3.3.1.10	Q(11) SR3.3.1.9	N.A.	1(BB)	A3.3-81, L3.3-13
Table 3.3.1-1 Funct 15	157. Safety Injection Input	N.A.	N.A.	R SR3.3.1.14	N.A.	1, 2	A3.3-19, A3.3-84
Table 3.3.1-1 Funct 19	198. Automatic Trip ~~and Interlock~~ Logic	N.A.	N.A.	M(9) SR3.3.1.5	~~R~~	1, 2, 3(1), 4(1), 5(1)	
Table 3.3.1-1 Funct 17	179. Reactor Trip Breakers (16)	N.A.	N.A.	M(9, ~~12~~) SR3.3.1.4	~~R~~	1, 2, 3(1), 4(1), 5(1)	A3.3-14, M3.3-16, A3.3-84
	~~20. Reactor Trip Bypass Breakers~~	~~N.A.~~	~~N.A.~~	~~M(14)~~	~~R(15)~~	~~See Note (16)~~	A3.3-14

Table 3.3.1-1 Note g

(g) Not a direct reactor trip, underfrequency will trip the RCP breaker open. A3.3-41

~~TABLE TS.4.1-1A (Page 3 of 5) REV 111 8/10/94~~

TABLE TS 4.1-1A (Page 3 of 5) (Overflow)

Table 3.3.1-1 Funct 16	16. Reactor Trip System Interlocks				
	a. P-6	SR3.3.1.11	SR3.3.1.13	2[2]	M3.3-15
	b. P-7				
	1. Power Range Neutron Flux	SR3.3.1.11	SR3.3.1.13	1	
	2. Turbine Impulse Pressure	SR3.3.1.10	SR3.3.1.13	1	
	c. P-8	SR3.3.1.11	SR3.3.1.13	1	
Table 3.3.1-1 Funct 16	d. P-9	SR3.3.1.11	SR3.3.1.13	1	M3.3-15
	e. P-10	SR3.3.1.11	SR3.3.1.13	1,2	
Table 3.3.1-1 Funct 18 and Note j	18. Note (12) RTB Undervoltage and Shunt Trip Mechanism, (j) only applies to breakers OPERABLE and closed.		SR3.3.1.4	1,2	M3.3-16
			SR3.3.1.4	3[1], 4[1], 5[1]	

TABLE TS 4.1-1A
(Page 3 of 5)(Overflow)
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TABLE NOTATIONS

~~FREQUENCY NOTATION~~

A3.3-85

~~NOTATION~~	~~FREQUENCY~~
~~S~~	~~Shift~~
~~D~~	~~Daily~~
~~M~~	~~Monthly~~
~~Q~~	~~Quarterly~~
~~S/U~~	~~Prior to each reactor startup~~
~~R~~	~~Each Refueling Shutdown~~
~~N.A.~~	~~Not applicable.~~

TABLE NOTATION

Table 3.3.1-1 Note a — (a~~1~~) With ~~When the Reactor Trip Breakers are closed and the~~ Control Rod Drive System is capable of rod withdrawal or one or more rods not fully inserted. — M3.3-12

Table 3.3.1-1 Note d — (d~~2~~) Below P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

Table 3.3.1-1 Note b — (b~~3~~) Below P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

SR3.3.1.8 Frequency — (4) Prior to each startup following shutdown ~~in excess of two days~~ if not done in previous 92~~30~~ days and every 92 days thereafter when the unit is in MODE 3, 4, and 5. — L3.3-86

4a

SR3.3.1.15 — New SR, Perform TADOT prior to exceeding the P-9 interlock whenever the unit has been shutdown in excess of 2 days, if not performed within the previous 31 days. — M3.3-87

~~TABLE TS.4.1-1A~~
~~(Page 4 of 5)~~
~~REV 111 8/10/94~~

TABLE TS 4.1-1A (Page 4 of 5) (Overflow)

(5) Comparison of calorimetric to excore power indication within 12 hours after above 15% of RATED THERMAL POWER. Adjust excore channel gains consistent with calorimetric power if absolute difference is greater than 2%. [SR3.3.1.2] [M3.3-91]

(6) Single point comparison of incore to excore for axial off-set prior to exceeding 75% RTP after each refueling after above 15% of RATED THERMAL POWER. Recalibrate if the absolute difference is greater than 32%. [SR3.3.1.3] [M3.3-88] [L3.3-93]

(7) Neutron detectors aremay be excluded from CHANNEL CALIBRATION. [SR3.3.1.11 Note] [A3.3-94]

(8) Incore - Excore Calibration, within 24 hours after above 75% of RATED THERMAL POWER. [SR3.3.1.6] [M3.3-92]

(9) Each train shall be tested at least every two monthlys on a STAGGERED TEST BASIS. [SR3.3.1.4 SR3.3.1.5] [A3.3-95]

TABLE TS 4.1-1A (Page 4 of 5) (Overflow) REV 11 8/10/94

TABLE TS.4.1-1A (Page 5 of 5)

TABLE NOTATIONS Continued)

SR3.3.1.8 Note	(10)	Quarterly surveillance in MODES 3, 4 and 5 shall also include verification that permissives P-6 and P-10 are in their required state for existing plant conditions ~~by observation of the permissive annunciator window~~.	LR3.3-96
SR3.3.1.9 SR3.3.1.15 Note	(11)	Setpoint verification is not applicable.	
Table 3.3.1-1 Funct 18	(12)	The Functional Test shall independently verify the OPERABILITY of the undervoltage and shunt trip attachments of the Reactor Trip Breakers.	
	~~(13)~~	~~The Functional Test shall independently verify the OPERABILITY of the undervoltage and shunt trip circuits for the Manual Reactor Trip Function. The test shall also verify the OPERABILITY of the Bypass Breaker trip circuit(s).~~	LR3.3-101
	~~(14)~~	~~Manually trip the undervoltage trip attachment remotely (i.e., from the protection system racks).~~	LR3.3-101

~~TABLE TS.4.1-1A~~
~~(Page 5 of 5)~~
~~REV 111 8/10/94~~

~~TABLE TS 4.1-1A (Page 5 of 5)(Overflow)~~

Table 3.3.1-1 Func 17	(15)	Automatic undervoltage trip.	A3.3-14
Table 3.3.1-1 Note i	(16)	Including any~~Whenever the~~ Reactor Trip Bypass Breakers that are racked in and closed for bypassing a Reactor Trip Breaker~~and the Control Rod Drive System is capable of rod withdrawal~~.	A3.3-14 M3.3-17
SR3.3.1.4 Note 1		Test Reactor Trip Bypass Breaker when placing in service.	M3.3-108
SR3.3.1.8 Frequency	(17)	Prior to each startup if not done previous 92 days and every 92 thereafter when unit is in MODE 3, 4, and 5~~week~~.	L3.3-86
	~~(18)~~	~~Including quadrant power tilt monitor.~~	
	(19)	Not Used	LR3.3-102
Table 3.3.1-1 Note c	(yy)	Above P-6.	A3.3-11
SR3.3.1.16	(ZZ)	On a STAGGERED TEST BASIS.	
SR3.3.1.10 SR3.3.1.11 SR3.3.1.12 Note	(AA)	This Surveillance shall include verification that the time constants are adjusted to the prescribed values.	L3.3-104 M3.3-105
Table 3.3.1-1 Note e	(BB)	Above P-7.	L3.3-13
Table 3.3.1-1 Note f	(CC)	Above P-7 or P-8.	L3.3-13
Table 3.3.1-1 Note h	(DD)	Above P-9.	L3.3-13

~~TABLE TS 4.1-1A (Page 5 of 5) (Overflow)~~

TABLE TS.4.1-1B (Page 1 of 7)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

	FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
	1. SAFETY INJECTION						
Table 3.3.2-1 Func 1a	a. Manual Initiation	N.A.	N.A.	R[20] SR3.3.2.5	N.A.	1, 2, 3, 4	
Table 3.3.2-1 Func 1c	cb. High Containment Pressure	S SR3.3.2.1	R[27] SR3.3.2.6	Q SR3.3.2.3	N.A.	1, 2, 3, ~~4~~	L3.3-36
Table 3.3.2-1 Func 1e	ec. Steam Line Low Pressure	S SR3.3.2.1	R[27] SR3.3.2.6	Q SR3.3.2.3	N.A.	1, 2, 3[21]	
Table 3.3.2-1 Func 1d	d. Pressurizer Low Pressure	S SR3.3.2.1	R[27] SR3.3.2.6	Q SR3.3.2.3	N.A.	1, 2, 3[21]	A3.3-35
Table 3.3.2-1 Func 1b	be. Automatic Actuation Relay Logic ~~and Actuation Relays~~	N.A.	N.A.	M[22] SR3.3.2.2	N.A.	1, 2, 3, 4	
	2. CONTAINMENT SPRAY						
Table 3.3.2-1 Func 2a	a. Manual Initiation	N.A.	N.A.	R SR3.3.2.4	N.A.	1, 2, 3, 4	
Table 3.3.2-1 Func 2c	cb. Hi-Hi Containment Pressure	S SR3.3.2.1	R[27] SR3.3.2.6	Q SR3.3.2.3	N.A.	1, 2, 3~~, 4~~	L3.3-37
Table 3.3.2-1 Func 2b	bc. Automatic Actuation Relay Logic ~~and Actuation Relays~~	N.A.	N.A.	M[22] SR3.3.2.2	N.A.	1, 2, 3, 4	A3.3-35

~~TABLE TS.4.1-1B (Page 1 of 7) REV 111 8/10/94~~

TABLE TS.4.1-1B (Page 2 of 7)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

LR3.3-72

	FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
	3. CONTAINMENT ISOLATION					
Table 3.3.2-1 Func 3c	c. ~~a.~~ Safety Injection	See Functional Unit 1 above for all Safety Injection Surveillance Requirements				
Table 3.3.2-1 Func 3a	a. ~~b.~~ Manual	N.A.	N.A.	R SR3.3.2.4	N.A.	1, 2, 3, 4
Table 3.3.2-1 Func 3b	b. ~~c.~~ Automatic Actuation Relay Logic ~~and Actuation Relays~~	N.A.	N.A.	M(22) SR3.3.2.2	N.A.	1, 2, 3, 4
	~~4.~~ CONTAINMENT VENTILATION ISOLATION					
Table 3.3.5-1 Func 5	5. ~~a.~~ Safety Injection	See Functional Unit 1 above for all Safety Injection Surveillance Requirements				
Table 3.3.5-1 Func 1	1. ~~b.~~ Manual	N.A.	N.A.	R SR3.3.5.4	N.A.	See Note (26)

A3.3-35

~~TABLE TS.4.1-1B (Page 2 of 7) REV 111 8/10/94~~

TABLE TS 4.1-1B (Page 2 of 7) (Overflow)

Table 3.3.5-1 Func 6	e6. Manual Containment Spray	See Functional Unit 2a above for all Manual Containment Spray Surveillance Requirements				
Table 3.3.5-1 Func 4	4d. Manual Containment Isolation	See Functional Unit 3b above for all Manual Containment Isolation Surveillance Requirements				
Table 3.3.5-1 Func 3	3e. High Radiation in Exhaust Air	SD(25) SR3.3.5.1	R SR3.3.5.5	M SR3.3.5.3	N.A.	See Note (26)
Table 3.3.5-1 Func 2	2f. Automatic Actuation Relay Logic and Actuation Relays	N.A.	N.A.	M(22) SR3.3.5.2	N.A.	See Note (26)

A3.3-35

TABLE TS 4.1-1B (Page 2 of 7) (Overflow)

TABLE TS.4.1-1B (Page 3 of 7)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

	FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
							A3.3-72
	4. STEAM LINE ISOLATION						Addressed Elsewhere
	a. Manual	N.A.	N.A.	R	N.A.	1, 2, 3(23)	
Table 3.3.2-1 Func 4b	b. Hi-Hi Containment Pressure	S SR3.3.2.1	R(27) SR3.3.2.6	Q(28) SR3.3.2.4	N.A.	1, 2(23), 3(23)	L3.3-42
Table 3.3.2-1 Func 4d	d. Hi-Hi Steam Flow with Safety Injection						
	1. Hi-Hi Steam Flow	S SR3.3.2.1	R(27) SR3.3.2.6	Q(28) SR3.3.2.4	N.A.	1, 2(23), 3(23)	L3.3-42
	2. Safety Injection	See Functional Unit 1 above for all Safety Injection Surveillance Requirements					
Table 3.3.2-1 Func 4c	c. ~~Hi Steam Flow and~~ 2 of 4 Lo-Lo T_{avg} with Safety Injection						
	~~1. Hi Steam Flow~~ Deleted	~~S~~	~~R~~	~~Q~~	~~N.A.~~	~~1, 2, 3(23)~~	A3.3-20
	2. Lo-Lo T_{avg}	S SR3.3.2.1	R(27) SR3.3.2.6	Q(28) SR3.3.2.4	N.A.	1, 2(23), 3(24)	L3.3-42
	3. Safety Injection	See Functional Unit 1 above for all Safety Injection Surveillance Requirements					L3.3-42
Table 3.3.2-1 Func 4a	a. Automatic Actuation Relay Logic ~~and Actuation Relays~~	N.A.	N.A.	M(22) SR3.3.2.2	N.A.	1, 2(23), 3(23)	A3.3-35

~~TABLE TS.4.1-1B (Page 3 of 7)~~

TABLE TS.4.1-1B (Page 4 of 7)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

	FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
	5 ~~6~~. FEEDWATER ISOLATION						
Table 3.3.2-1 Func 5b	b ~~a~~. Hi-Hi Steam Generator Level	S SR3.3.2.1	R[27] SR3.3.2.6	Q SR3.3.2.3	N.A.	1, 2[29]	
Table 3.3.2-1 Func 5c	c ~~b~~. Safety Injection	See Functional Unit 1 above for all Safety Injection Surveillance Requirements					
	~~c. Reactor Trip with 2 of 4 Low T_{avg} (Main Valves Only)~~						
	~~1. Reactor Trip~~	~~N.A.~~	~~N.A.~~	~~R~~	~~N.A.~~	~~1, 2~~	LR3.3-44
	~~2. Low T_{avg}~~	~~S~~	~~R~~	~~Q~~	~~N.A.~~	~~1, 2~~	
Table 3.3.2-1 Func 5a	a ~~d~~. Automatic Actuation Relay Logic ~~and Actuation Relays~~	N.A.	N.A.	M[22] SR3.3.2.2	N.A.	1, 2[29], 3[29]	M3.3-106

A3.3-35

~~TABLE TS.4.1-1B (Page 4 of 7) REV 111 8/10/94~~

TABLE TS.4.1-1B (Page 5 of 7)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

	FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
	6~~7~~. AUXILIARY FEEDWATER						
	~~a. Manual~~	~~N.A.~~	~~N.A.~~	~~R~~	~~N.A.~~	~~1, 2, 3~~	LR3.3-46
Table 3.3.2-1 Func 6b	b. Steam Generator Low-Low Water Level	S SR3.3.2.1	R(27) SR3.3.2.6	Q SR3.3.2.3	N.A.	1, 2, 3	
Table 3.3.2-1 Func 6d; Table 3.3.2-1 Note f	d~~c~~. Undervoltage on 4.16 kV Buses 11 and 12 (Unit 2: 21 and 22) (Start Turbine Driven Pump only)	N.A.	R(27) SR3.3.2.6	R(28) SR3.3.2.4	N.A.	1, 2	
Table 3.3.2-1 Func 6e	e~~d~~. Trip of Both Main Feedwater Pumps						
	~~1. Turbine Driven~~	N.A.	N.A.	R SR3.3.2.4	N.A.	1, 2(EE)	
	~~2. Motor Driven~~	~~N.A.~~	~~N.A.~~	~~R~~	~~N.A.~~	~~1, 2~~	A3.3-51
Table 3.3.2-1 Func 6c	c~~e~~. Safety Injection	See Functional Unit 1 above for all Safety Injection Surveillance Requirements					
Table 3.3.2-1 Func 6a	a~~f~~. Automatic Actuation Relay Logic ~~and Actuation Relays~~	N.A.	N.A.	M(22) SR3.3.2.2	N.A.	1, 2, 3	A3.3-35

~~TABLE TS.4.1-1B (Page 5 of 7) REV 111 8/10/94~~

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ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
~~8.~~ LOSS OF POWER (LCO3.3.4)					
a. Degraded Voltage 4kV Safeguards Bus	N.A.	R SR3.3.4.2	M SR3.3.4.1	N.A.	1, 2, 3, 4
b. Undervoltage 4kV Safeguards Bus	N.A.	R SR3.3.4.2	M SR3.3.4.1	N.A.	1, 2, 3, 4

~~TABLE TS.4.1-1B~~
~~(Page 6 of 7)~~
~~REV 111 8/10/94~~

TABLE NOTATIONS

~~FREQUENCY NOTATION~~

~~NOTATION~~	~~FREQUENCY~~
~~S~~	~~Shift~~
~~D~~	~~Daily~~
~~M~~	~~Monthly~~
~~Q~~	~~Quarterly~~
~~R~~	~~Each Refueling Shutdown~~
~~N.A.~~	~~Not applicable.~~

A3.3-85

TABLE NOTATION

SR3.3.2.5 Frequency

(20) One manual switch shall be tested at each refueling on a STAGGERED TEST BASIS.

Table 3.3.2-1 Note a

(21) Pressurizer ~~Trip function may be blocked in this MODE below a reactor coolant system~~ pressure at or above~~of~~ 2000 psig.

A3.3-38

SR3.3.2.2 Frequency

(22) Each train shall be tested monthly ~~at least every two months~~ on a STAGGERED TEST BASIS.

A3.3-95

Table 3.3.2-1 Note c

(23) Except When both~~either~~ main steam isolation valves are~~is~~ closed~~open~~.

A3.3-43

~~TABLE TS.4.1-1B (Page 7 of 7) REV 111 8/10/94~~

[Table 3.3.2-1 Note d] (24) When reactor coolant system average temperature is greater than 520°F and either main steam isolation valve is open.

~~(25) See Table 4.17-2.~~ [A3.3-107]

[Table 3.3.5-1 Applicability] (26) MODES 1, 2, 3, 4 and during irradiated fuel movement Whenever ~~CONTAINMENT INTEGRITY is required and either of~~ the containment inservice purge systems ~~s~~ is not blind flanged ~~are in operation~~. [A3.3-39]

[SR3.3.2.6 Note] (27) ~~Not Used~~ This surveillance shall include verification that the time constants are adjusted to the prescribed values. [M3.3-105]

[SR3.3.2.4 Note] (28) ~~Not Used~~ Verification of setpoint not required. [A3.3-109]

[Table 3.3.2-1 Note e] (29) ~~Not Used~~ Except when all MFRVs and MFRV bypass valves are closed and in manual or isolated by a closed non-automatic valve. [L3.3-45]

[Table 3.3.2-1 Note g] (EE) This function may be bypassed during alignment and operation of the AFW System for SG level control. [A3.3-48]

~~TABLE TS 4.1-1B (Page 7 of 7) (Overflow) REV 111 8/10/94~~

TABLE TS.4.1-1C (Page 1 of 4)

MISCELLANEOUS INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
					Addressed Elsewhere
1. Control Rod Insertion Monitor	M	R	S/U(30)	N.A.	1, 2
2. Analog Rod Position	S	R	S/U(30)	N.A.	1, 2, 3(31), 4(31), 5(31)
3. Rod Position Deviation Monitor	M	N.A.	S/U(30)	N.A.	1, 2
4. Rod Position Bank Counters	S(32)	N.A.	N.A.	N.A.	1, 2, 3(31) 4(31), 5(31)
~~5. Charging Flow~~	~~S~~	~~R~~	~~N.A.~~	~~N.A.~~	~~1, 2, 3, 4~~
~~6. Residual Heat Removal Pump Flow~~	~~S~~	~~R~~	~~N.A.~~	~~N.A.~~	~~4(37), 5(37), 6(37)~~
~~7. Boric Acid Tank Level~~	~~D~~	~~R(33)~~	~~M(33)~~	~~N.A.~~	~~1, 2, 3, 4~~

A3.3-114

LR3.3-112

A3.3-114

~~TABLE TS.4.1-1C~~
~~(Page 1 of 4)~~
~~REV 111 8/10/94~~

TABLE TS.4.1-1C (Page 1 of 4)(Overflow)

L3.3-113

Table 3.3.3-1 Func 16	8.	Refueling Water Storage Tank Level	MW SR3.3.3.1	R SR3.3.3.2	M	N.A.	1, 2, 3, 4
A3.3-114	~~9.~~	~~Volume Control Tank Level~~	~~S~~	~~R~~	~~N.A.~~	~~N.A.~~	~~1, 2, 3, 4~~
Addressed elsewhere	10.	Annulus Pressure (Vacuum Breaker)	N.A.	R	R	N.A.	See Note (89)
LCO3.3.4	11.	Auto Load Sequencers	N.A.	N.A.	M SR3.3.4.1	N.A.	1, 2, 3, 4
A3.3-114	~~12.~~	~~Boric Acid Make-up Flow Channel~~	~~N.A.~~	~~R~~	~~N.A.~~	~~N.A.~~	~~1, 2, 3, 4~~

TABLE TS.4.1-1C (Page 2 of 4)

MISCELLANEOUS INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

FUNCTIONAL UNIT	CHECK	CALIBRATE	FUNCTIONAL TEST	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
13. Containment Sump A, B and C Level	N.A.	R	R	N.A.	1, 2, 3, 4	LR3.3-115
14. Deleted						
15. Turbine First Stage Pressure	S	R	Q	N.A.	1	LR3.3-115
16. Emergency Plan Radiation Instruments (35)	M	R	M	N.A.	1, 2, 3, 4, 5, 6	
17. Seismic Monitors	R	R	N.A.	N.A.	1, 2, 3, 4, 5, 6	LR3.3-115
18. Coolant Flow - RTD Bypass Flowmeter	S	R SR3.3.1.12	M	N.A.	1, 2, 3(34)	LR3.3-116 L3.3-117
19. CRDM Cooling Shroud Exhaust Air Temperature	S	N.A.	R	N.A.	1, 2, 3(31), 4(31), 5(31)	LR3.3-115
20. Reactor Gap Exhaust Air Temperature	S	N.A.	R	N.A.	1, 2, 3, 4	LR3.3-115
21. Post-Accident Monitoring Instruments (Table TS.3.15-1)(36)	M SR3.3.3.1	R SR3.3.3.2	N.A. R(40) SR3.3.3.3	N.A.	1, 2	A3.3-121
22. Deleted						

SR3.3.1.12 Note 1

SR3.3.3.1
SR3.3.3.2
SR3.3.3.3

TABLE TS.4.1-1C (Page 2 of 4) REV 121 11/9/95

TABLE TS.4.1-1C (Page 3 of 4)

MISCELLANEOUS INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

FUNCTIONAL UNIT	CHECK	CALIBRATE	FUNCTIONAL TEST	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED	
23. Deleted						
24. Steam Exclusion Actuation	W	Y	M	N.A.	1, 2, 3	LR3.3-10
25. Overpressure Mitigation	N.A.	R	R	N.A.	4 (38), 5	Addressed Elsewhere
26. Auxiliary Feedwater Pump Suction Pressure	N.A.	R	R	N.A.	1, 2, 3	LR3.3-115
27. Auxiliary Feedwater Pump Discharge Pressure	N.A.	R	R	N.A.	1, 2, 3	LR3.3-115
28. NaOH Caustic Stand Pipe Level	W	R	M	N.A.	1, 2, 3, 4	LR3.3-115
SR3.3.3.1 SR3.3.3.2 29. Hydrogen Monitors	MS SR3.3.3.1	RQ SR3.3.3.2	M	N.A.	1, 2	LR3.3-118
30. Containment Temperature Monitors	M	R	N.A.	N.A.	1, 2, 3, 4	LR3.3-115
31. Turbine Overspeed Protection Trip Channel	N.A.	R	M	N.A.	1	LR3.3-115

TABLE TS.4.1-1C (Page 3 of 4) REV 121 11/9/95

TABLE TS.4.1-1C (Page 4 of 4)

TABLE NOTATIONS

~~FREQUENCY NOTATION~~

~~NOTATION~~	~~FREQUENCY~~
~~S~~	~~Shift~~
~~D~~	~~Daily~~
~~W~~	~~Weekly~~
~~M~~	~~Monthly~~
~~Q~~	~~Quarterly~~
~~S/U~~	~~Prior to each reactor startup~~
~~Y~~	~~Yearly~~
~~R~~	~~Each Refueling Shutdown~~
~~N.A.~~	~~Not applicable.~~

A3.3-85

TABLE NOTATION

(30) Prior to each startup following shutdown in excess of two days if not done in previous 30 days.

(31) When the reactor trip system breakers are closed and the control rod drive system is capable of rod withdrawal.

(32) Following rod motion in excess of six inches when the computer is out of service.

Addressed Elsewhere

~~(33) Transfer logic to Refueling Water Storage Tank.~~

A3.3-114

~~TABLE TS.4.1-1C~~
~~(Page 4 of 4)~~
~~REV 135 5/4/98~~

TABLE TS.4.1-1C (Page 4 of 4) (Overflow)

L3.3-117

(34) When either main steam isolation valve is open.

A3.3-123

(35) Includes those instruments named in the emergency procedure.

(36) Except for containment hydrogen monitors and refueling water storage tank level which are separately specified in this table.

(37) When RHR is in operation.

Addressed Elsewhere

(38) When the reactor coolant system average temperature is less than the Over Pressure Protection System Enable Temperature specified in the PTLR.

(39) Whenever CONTAINMENT INTEGRITY is required.

SR3.3.3.3 (40) Applies only to Containment Isolation Valve Position Instrumentation in lieu of calibration. A3.3-121

TABLE TS.4.1-1C (Page 4 of 4) (Overflow) REV 135 5/4/98

Addressed Elsewhere

3.10.C.2. If the QUADRANT POWER TILT RATIO exceeds 1.02 but is less than 1.07 for a sustained period of more than 24 hours, or if such a tilt recurs intermittently, the reactor shall be brought to the HOT SHUTDOWN condition. Subsequent operation below 50% of rating, for testing, shall be permitted.

3. Except for PHYSICS TESTS if the QUADRANT POWER TILT RATIO exceeds 1.07, the reactor shall be brought to the HOT SHUTDOWN condition. Subsequent operation below 50% of rating, for testing, shall be permitted.

LCO 3.3.1 Cond D Note

4. If the core is operating above 85% power with one excore nuclear channel inoperable, then the core quadrant power balance shall be determined every 12 hours~~daily and after a 10% power change~~ using either 2 movable detectors or 4 core thermocouples per quadrant, (ITS SR 3.2.4.2) ~~per Specification 3.11~~.

L3.3-125

A3.3-126

Addressed Elsewhere

D. Rod Insertion Limits

1. The shutdown rods shall be limited in physical insertion as specified in the CORE OPERATING LIMITS REPORT when the reactor is critical or approaching criticality.

2. When the reactor is critical or approaching criticality, the control banks shall be limited in physical insertion as specified in the CORE OPERATING LIMITS REPORT.

3. Insertion limits do not apply during PHYSICS TESTS or during periodic exercise of individual rods. The shutdown margin specified in the Core Operating Limits Report must be maintained except for low power PHYSICS TESTING. For this test the reactor may be critical with all but one high worth full-length control rod inserted for a period not to exceed 2 hours per year provided a rod drop test is run on the high worth full-length rod prior to this particular low power PHYSICS TEST.

PACKAGE 3.3

INSTRUMENTATION

PART D

DISCUSSION OF CHANGES (DOC)

to

PRAIRIE ISLAND CURRENT TECHNICAL SPECIFICATIONS

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

PART D

PACKAGE 3.3

INSTRUMENTATION

DISCUSSION OF CHANGES TO CURRENT TECHNICAL SPECIFICATIONS

The proposed changes to PI Operating License Appendix A, TS are discussed below and the specific wording changes are shown in Parts B, C and E.

For ease of review, all package parts and discussions are organized according to the proposed PI ITS Table of Contents.

NSHD category	Change number 3.3-	Discussion Of Change
A	001	The current format for the CTS includes Applicability and Objective statements at the beginning of each TS Section. For most of the TS Sections, these statements are vague and do not provide meaningful information in the ITS format and therefore, these statements are not included in the ITS. Since these general CTS statements do not establish any regulatory requirements and are incorporated in a broad sense in the ITS, these are considered administrative changes. A few Sections, such as CTS 3.15, have been revised to conform to NUREG-1431 guidance and the Applicability statement is meaningful and will be addressed in the discussion of those Sections.

NSHD category	Change number 3.3-	Discussion Of Change
A	002	2.3.A.3.d. Since this is simply a reference to another section in the CTS, this statement is not included in the ITS. Since no substantive information is included, this is an administrative change.
LR	003	2.3.C. Control Rod Stops are not instrumentation used to detect RCS leakage, they are not a design feature that assumes the failure of or presents a challenge to the integrity of a fission product barrier, they are not a system that is part of the primary success path to mitigate a design basis accident nor have they been shown to be significant to public health and safety. Since the control rod stops do not meet the TS Selection Criteria of 10CFR50.36, they have been relocated to the TRM. This is acceptable since the TRM is part of the USAR and therefore is under the regulatory controls of 10CFR50.59. Since the TRM is under licensee control this is a less restrictive change. This change conforms to the guidance of NUREG-1431.
A	004	3.5.A, 3.5.B, 3.15.B, 4.1.A, 4.1.B, and 4.1.C. The CTS introductory statements which direct the TS user to the Tables which contain the Specification limits are not included. These statements are not necessary in the ITS format which contains all required references for internal guidance and consistency. This is an administrative change since these statements are not substantive and the ITS is complete without them.

NSHD category	Change number 3.3-	Discussion Of Change
A	005	Tables 3.5-2A and 3.5-2B. The column heading has been revised to "Required Channels" to be consistent with the guidance of NUREG-1431. Functionally, the same number of channels is used and therefore this is an administrative change.
A	006	Tables 3.5-2A and 3.5-2B. The columns titled, "Channels to Trip" and, "Minimum Channels Operable" have not been included in the ITS. The format of the ITS and the individual Action Statements within the ITS Conditions provide an indication of the number of channels which may be inoperable or the number which are allowed to be operable. For most of the functions in these tables, these format changes make these columns unnecessary and thus these columns are not included. Since this does not involve substantive changes, this is an administrative change. This change is consistent with the guidance of NUREG-1431. In a few instances, the ITS format change does not accurately define the limits provided in the CTS. Those instances are individually addressed in separate Discussion of Changes.

NSHD category	Change number 3.3-	Discussion Of Change
A	007	Tables 3.5-2A, 3.5-2B, and 3.15-1. The CTS Action Statement references have all been replaced the ITS Action Statement references. The CTS and ITS Action Statements do not have a simple one-to-one correspondence to each other. Any change in the Action Statement as it applies to the Table function is addressed in separate Discussion of Changes with the individual CTS Action Statement. Therefore this is an administrative change.
A	008	Table 3.5-2A, Function 6, Table 4.1-1A, Function 6. To be consistent with the guidance of NUREG-1431, the general collective titles of the applicable modes for these requirements have not been included in the ITS. The applicable modes are specifically defined in the table and do not need to be described in the function title. Since no plant operational requirements are changed, this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
M	009	Table 3.5-1, Function 10. The actual title for the time delays has been included to provide clarity on which time delays are under consideration. The time range for degraded voltage DG start time delay (Time Delay 2) has been narrowed to reflect the actual time delay implemented at PI. When new DG were installed in 1992 a large time delay was specified due to lack of operating experience with this new plant feature. Since the time delay range is narrower, this is a more restrictive change. This change is acceptable since it will assure that the plant operates with the proper time delay for this function.
LR	010	Table 3.5-1, Function 8 and Table 4.1-1C, Function 24. The Steam Exclusion System (SES) actuation instrumentation and the associated setpoint have been relocated to the TRM. This is acceptable because the TRM will require this instrumentation to be operational. Since the TRM is licensee controlled, this is a less restrictive change. Changes to the TRM will continue to be under the regulatory controls of 10 CFR 50.59.
A	011	Table 3.5-2A and Table 4.1-1A, Function 5, new note. For consistency with NUREG-1431, the Applicable Modes is modified by a note which limits the applicability in Mode 2 to above P-6. Since Mode 2 above P-6 is the only time that the intermediate range neutron flux is operational, the addition of this clarifying note is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
M	012	Table 3.5-2A, Note a and Table 4.1-1A, Note 1. This note was modified to be consistent with ITS Table 3.3.1-1 Note a and the guidance of NUREG-1431. This change is more restrictive since it now includes the condition when one or more rods are not fully inserted. The other changes to this note provide clarification, but do not change the note substantively. This change is acceptable since it requires the affected portions of the reactor trip system to be operable under additional conditions which may improve the safety of plant operations.
L	013	Table 3.5-2A and Table 4.1-1A, Functions 9, 11, 12, 13, 15, 16 and applicable Required Actions, new notes. The Applicable Modes for these functions are modified by notes which limit the Mode of Applicability of the specification consistent with the guidance of NUREG-1431. The Required Actions are modified to place the plant in the out-of-limit portion of the Mode of Applicability as remedial action. These changes are less restrictive since they further limit the applicability of the specification and may allow the plant to remain at a higher power level. These changes are acceptable since these functions are not assumed for the mitigation of any accident in the out-of-limit portion of the Mode of Applicability. Placing the plant in the out-of-limit portion of the Mode of Applicability removes the plant from the Mode or other conditions of Applicability. Thus these functions, in the out-of-limit portion of the Mode of Applicability, are not required and do not meet the TS Selection Criteria.

NSHD category	Change number 3.3-	Discussion Of Change
A	014	Table 3.5-2A, Functions 19 and 20, Note (d), and Table 4.1-1A, Functions 19 and 20 and Notes (15) and (16). In conformance with the guidance of NUREG-1431, the Reactor Trip Bypass Breakers have been included with the Reactor Trip Breaker rather than listed as a separate function. Since all specification requirements have been retained in the TS this is an administrative change.
M	015	New Function 16 in Table 3.5-2A and Table 4.1-1A. In conformance with the guidance of NUREG-1431, a new Function 16 has been provided to include Reactor Trip System Interlocks, including appropriate Required Channels, Applicable Modes and Action Statements. Since this includes new specification requirements, this is a more restrictive change. This change is acceptable since it places additional requirements on plant operations that assure safe plant operation. This change does not create any unsafe plant conditions since the new TS requirements are consistent with current plant operating practices.

NSHD category	Change number 3.3-	Discussion Of Change
M	016	New Function 18 in Table 3.5-2A and Table 4.1-1A. In conformance with the guidance of NUREG-1431, a new Function 18 has been provided to include RTB Undervoltage and Shunt Trip Mechanisms, including appropriate Required Channels, Applicable Modes and Action Statements, as a separate Function. Since this includes new specification requirements, this is a more restrictive change. Table 4.1-1A Note 12 no longer applies to Function 19 because of the new Function 18. A new Note (j) is included to clarify to which breakers this function applies. This change is acceptable since it places additional requirements on plant operations that assure safe operation of the plant. This change does not create any unsafe plant conditions since the new TS requirements are consistent with current plant operating practices.
M	017	Table 3.5-2A, Note d and Table 4.1-1A Note 16. This note was modified to be consistent with ITS Table 3.3.1-1 Note i and the guidance of NUREG-1431. This change is more restrictive since it now applies any time the RTBB is racked in and closed, whether or not the control rod system is capable of withdrawal. The other changes to this note provide clarification, but do not change the note substantively. This change is acceptable since it requires the affected portions of the reactor trip system to be operable under additional conditions which may improve the safety of plant operations.

NSHD category	Change number 3.3-	Discussion Of Change
A	018	Table 3.5-2A and Table 3.5-2B, Actions. The CTS Action Statements are modified to be consistent with the format and content guidance of NUREG-1431. Since these changes do not add or remove any TS requirements, these are administrative changes. Any changes which do affect TS requirements are addressed separately.
A	019	Table 3.5-2A, Function 18 and Table 4.1-1A, Function 18. The title of this function has been revised to be consistent with the guidance of NUREG-1431 by deleting "and Interlock". The reactor trip system interlocks are addressed as a separate function and any changes in TS requirements are addressed in the Discussion of Change for this new function. Therefore, this title change is considered an administrative change.
A	020	CTS Table 3.5-1, Function 5, Table 3.5-2B and Table 4.1-1B, Function 5d. These Specifications have been revised to be consistent with proposed LAR entitled, "Remove High Steam Flow Signal from Input to MSLI Logic." Since these changes are justified in that submittal, they are considered administrative changes in this submittal.

NSHD category	Change number 3.3-	Discussion Of Change
A	021	Table 3.5-2A and Table 3.5-2B, Actions. The CTS Action Statements Mode titles have been replaced with the Mode numbers for consistency with NUREG-1431. Since the applicable Mode has not been changed, this is an administrative change. Also the Completion Times have been changed to require action times in total hours consistent with NUREG-1431 rather than the next increment of time as given in the CTS. Since the actual time to perform the actions is not changed this is also an administrative change.
L	022	Table 3.5-2A, Actions 2 and 6, and Table 3.5-2B, Actions 21, 24 and 29. A new Required Action is included within these action statements to provide guidance when the CTS Required Actions are not met. This change is included in accordance with the guidance of NUREG-1431. In the CTS, if the Required Actions are not met, the plant would be required to enter CTS LCO 3.0.C (ITS LCO 3.0.3) which would require plant shutdown to MODE 5. This new Required Action allows the plant to avoid shutdown to MODE 5 and therefore this change is less restrictive. This change is acceptable, since the new Required Action places the plant in a safe condition in a Mode which is at a lower power level and outside the Mode of Applicability for the Specification.

NSHD category	Change number 3.3-	Discussion Of Change
A	023	Table 3.5-2A, Action 3. CTS Required Actions for instrument inoperability prior to entering the Mode or other conditions of Applicability are not included. In accordance with ITS LCO 3.0.4, the plant can not change Modes to a higher power level with inoperable equipment, unless a specific exemption is stated. Since an exemption is not stated, this Required Action is unnecessary in the ITS and this is an administrative change.
L	024	Table 3.5-2A, Action 3. The Required Action when one intermediate range neutron flux channel is inoperable is modified to require the plant to reduce power or increase power so the plant is outside the Mode or other conditions of Applicability for this instrumentation. This change is consistent with the guidance of NUREG-1431. Since this change may allow plant startup to continue with an inoperable instrument channel, this is a less restrictive change. This change is acceptable, since this is a backup reactor trip which is not credited in any plant safety analyses. Safety is also assured since the plant continues to have the function of the redundant operable channel and the probability of its failure is low during the period when the power is increased. When the power is below P-6 or above P-10, the plant does not require intermediate range neutron flux instrumentation for safe operation.

NSHD category	Change number 3.3-	Discussion Of Change
L	025	Table 3.5-2A, New Action G. CTS Table 3.5-2A, Action 3 allows for a single channel of the Intermediate Range Neutron Flux instrumentation to be inoperable. New Required Actions are included to address the condition when two intermediate range neutron flux channels are inoperable. Since CTS does not provide any guidance for this condition, CTS LCO 3.0.C (ITS LCO 3.0.3) would be required to be entered. LCO 3.0.C requires the plant to be in MODE 3 within 7 hours. The new CTS action, ITS Required Actions G.1 and G.2, require immediate suspension of operations involving positive reactivity additions and reduction in power below P-6 within 2 hours. Since this allows the plant to remain critical, this is a less restrictive change. This change is acceptable since the safety analysis does not credit the Intermediate Range channels. The plant can safely remain critical below P-6 indefinitely since this is outside and below the Modes of Applicability for the Intermediate Range channels. Furthermore, this change provides additional plant safety by requiring actions applicable to this specific condition, that is, suspension of operations involving reactivity additions. This change is consistent with the guidance of NUREG-1431 as modified by approved traveler, TSTF-286, Revision 2.

NSHD category	Change number 3.3-	Discussion Of Change
M	026	Table 3.5-2A, New Action I. A new action is included to address the condition when two source range neutron flux channels are inoperable. CTS does not provide any specific guidance for this condition and therefore LCO 3.0.C would be entered. This is a more restrictive change since the ITS requires the reactor trip breakers to be immediately opened. This action assures the plant is operated in a safe manner. This change is acceptable since it is consistent with current plant practices to operate the plant in a conservative manner.
A	027	Table 3.5-2A, Actions 5 and 8. This Action Statement has been modified to provide the option of initiating action to insert all rods and prevent rod withdrawal in lieu of opening the RTBs. These changes are consistent with the guidance of NUREG-1431 as modified by approved traveler, TSTF-135. These changes provide plant protection which is equivalent to that provided in the CTS therefore this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
A	028	CTS 2.3.B.1, 2.3.B.2, 2.3.B.2.a, 2.3.B.2.b, 2.3.B.4, and 2.3.B.5. CTS uses a mixture of "unblocked" and "blocked" terminology when describing the use of the reactor trip interlocks. The specific terminology used determines the direction of the inequality on the allowable value. To be consistent with NUREG-1431, only the term "blocked" is used and the direction of the inequality has been reversed where "blocked" has replaced "unblocked". This change only involves a change in terminology and convention, and does not cause any change in plant operation, limits or testing. Since there are no substantive changes, this is an administrative change.
A	029	CTS Table 3.5-2A, Actions 1, 7, 8, 9, and 10, and Table 3.5-2B, Actions 20, 23, 25, and 28. The format for CTS and ITS fundamentally differ in the presentation of shutdown tracks in that the CTS states the incremental time to shut down to the next MODE. ITS shutdown tracks state the total time within which the next MODE must be entered. The total Completion Time for both format is the same. The CTS format has been changed to the ITS format. Since there is no net change in plant operations, this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
L	030	CTS Table 3.5-2A, Action 4. CTS requires suspension of ". . . all operations involving positive reactivity changes" when one Source Range Neutron Flux channel is inoperable. ITS requires suspending operations involving reactivity additions and further clarifies that cooldown or boron dilution is allowed when it is accounted for in the calculated SDM. The specified SDM assures that the reactor will remain subcritical, and thus safe. This change is acceptable because plant safety is assured by meeting the SDM requirements during allowed reactivity changes. This change is less restrictive since it allows additional plant operating flexibility. This change is consistent with the guidance of NUREG-1431 as modified by approved TSTF-286, Revision 2.

NSHD category	Change number 3.3-	Discussion Of Change
L	031	CTS 2.3.A.2.a, 2.3.A.2.b, 2.3.A.2.c, 2.3.A.2.f,2.3.A.2.g, 2.3.A.2.i.1, 2.3.A.2.i.2, 2.3.B.2.b, 2.3.B.3, 2.3.B.4, Table 3.5-1, Functions 3 and 5.

CTS Section 2.3, "Limiting Safety System Settings, Protective Instrumentation, " provides limits for RCS protective instrumentation. Most of these limits were established prior to Unit 1 startup in December 1973. These limits do not serve a uniform purpose in PI operations; that is, some of these values may be Limiting Safety System Settings, some may be Allowable Values, some may be Analytical Limits, and some may be Nominal Trip Setpoints as the nuclear industry now understands these terms consistent with approved traveler, TSTF-355, Revision 0. These values do have a commonality in that they all provide for instrument uncertainty. CTS Table 3.5-1, "Engineered Safety Features Initiation Instrument Limiting Set Points" provides limits for Engineered Safety Features instrumentation. Most of these limits were also established prior to Unit 1 startup in December 1973. These limits do not have a regulatory definition and thus have been characterized as "limiting set points". Like the values in CTS Section 2.3, these values also provide for instrument uncertainty.

The NRC recognizes that the methods for treatment of instrument uncertainty have evolved over the years. This evolution of the treatment of instrument uncertainties is discussed in NUREG-0138, "Staff discussion of fifteen technical issues listed in attachment to November 3, 1976 Memorandum from Director NRR to NRR Staff." As discussed in NUREG-0138, prior to October 1974 a generalized method of addressing instrument uncertainty for

NSHD category	Change number 3.3-	Discussion Of Change
L	031	(continued)

instrumentation setpoints was used. This method was described as the following: "In this approach, the discrete components of each of the margins to safety in trip setpoint values are not evaluated on an individual basis but are included in an overall safety margin. Each setpoint value is based upon the most limiting transient or postulated accident condition associated with the bases for that setpoint. The magnitude of this safety margin and the resulting setpoints are established to ensure that there is a low probability of the margin being removed by an adverse combination of instrument calibration error, instrument error and instrument drift. The Staff believes that this method is acceptable."

The NRC Staff, in NUREG-0138, proceeded to delineate their future intention for the treatment of instrument uncertainties for instrument setpoints in the Technical Specifications. The NRC Staff concluded in this NUREG the following: "The staff is, however, changing from a generalized method of trip setpoint evaluation to a method that considers each of the discrete factors that make up the margins of safety for each safety related instrumentation channel. Either method contains conservatism; however, the newer method will allow the safety margin in the trip setpoints to be quantified in a more detailed manner. In addition, consideration of instrument error will be explicit in the newer method, whereas previously it was an implicit assumption presumed to be considered as part of the overall margin." Guidance which embodies NRC acceptable methods for determining instrumentation setpoints for safety-related Technical Specification Limiting Safety System Settings (LSSS) is documented in Regulatory Guide 1.105, industry standard ISA S67.04 and associated practices, and subsequent plant specific methodology approvals. NRC espousal of setpoint methodology employing discrete factors

NSHD category	Change number 3.3-	Discussion Of Change
L	031	(continued)

in the margins of safety is evidenced in NUREG-1431, Revision 1 Section 3.3 Specifications and Bases, as modified by approved traveler, TSTF-355.

In support of the conversion of Prairie Island Technical Specifications to conform to the guidance of NUREG-1431, as modified by TSTF-355, PI developed a detailed setpoint methodology, "Engineering Manual Section 3.3.4.1, Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations," (Methodology) in accordance with the guidance of Regulatory Guide 1.105 and ISA S67.04 and associated practices. This Methodology provides the allowable value for each of the instruments in Specifications 3.3.1, 3.3.2 and 3.3.4. Some of these allowable values are coincident with the CTS values and no change is indicated. Many of the allowable values differ in an apparent more conservative direction while others have moved to an apparent less conservative value. Since there are apparent changes in both directions, these are considered less restrictive changes.

These changes have been characterized as "apparent" changes since it can be argued that there have not been real changes in the plant margins of safety. The intent of the Methodology is to maintain or improve the current plant margins of safety. However, some values presented in the ITS have changed because: 1) these values are now all consistent as "allowable values" whereas in CTS the presented values may serve differing purposes; and 2) the CTS values are based on early 1970's generalized methods for addressing instrument uncertainty whereas ITS values are based on the Methodology using discrete components

NSHD category	Change number 3.3-	Discussion Of Change
L	031	(continued) for each margin of safety which is consistent with current industry practices. Thus, where ITS uses apparently more conservative values, the CTS is not deficient because the methodology is different and was acceptable at the time these values were established. Where ITS uses apparently less conservative values, the ITS is acceptable because these values have been established using methodology in accordance with current NRC and industry guidance, and maintain or improve the current plant margins of safety. These changes are also consistent with the guidance of NUREG-1431 as modified by approved traveler, TSTF-355.
M	032	Table 3.5-2A, Action 9. The Required Actions of Part a. of this Action Statement has been modified to be consistent ITS LCO 3.3.1 Condition S which conforms with the guidance of NUREG-1431. The maintenance exception of Part a. of this Required Action is included with Note 2 in Condition P. CTS allow the breaker to be bypassed to perform maintenance and testing to restore the diverse trip feature to operable status without any stated time limit. As ITS Condition P Note 2, the time the breaker may be bypassed is limited to 4 hours, thus this is a more restrictive change. Providing a specific time limit is acceptable and does not cause an unsafe plant condition since most maintenance and testing would normally be performed in this time frame.

NSHD category	Change number 3.3-	Discussion Of Change
L	033	Table 3.5-2A, Action 9 Part b. and Action 10. These Action Statements have been modified to be consistent with ITS LCO 3.3.1 Condition P which conforms with the guidance of NUREG-1431. The changes include an additional hour to restore an inoperable breaker to operable status prior to initiating plant shutdown to MODE 3 and therefore this is a less restrictive change. These changes are acceptable since some time should be allowed to attempt restoration and one hour is consistent with the provisions of CTS LCO 3.0.C (ITS LCO 3.0.3). Allowing the one hour may avoid a plant shutdown evolution which has attendant risks.
A	034	Table 3.5-2A, Action 10. The provisions of this Action Statement which address an inoperable RTBB prior to use are not included. The ITS rules of use do not permit placing inoperable equipment into service; therefore these provisions are unnecessary. Since this change does not affect plant operations, this is an administrative change. This change conforms to the guidance of NUREG-1431.

NSHD category	Change number 3.3-	Discussion Of Change
A	035	Table 3.5-2B, Functions 1e, 2c, 3c, 4f, 5e, 6d, and 7f, Table 4.1-1B, Functions 1e, 2c, 3c, 4f, 5e, 6d, and 7f. The title of the logic portion of these instrumentation systems is revised to more accurately describe the function at PI. PI has relay logic and does not have actuation relays as a separate part of the logic function; thus the title, "Automatic Actuation Relay Logic" is more correct. The CTS title is the same as the NUREG-1431 title due to an LAR to conform to the guidance of the NUREG. However, this title is incorrect and misleading. Since no changes in function, testing or other TS requirements are involved, this is an administrative change.
L	036	Table 3.5-2B and Table 4.1-1B, Function 1.b. CTS Applicability for this function in MODE 4 is not included in the ITS which is consistent with the guidance of NUREG-1431. This change is acceptable since there are no accident analyses which credit SI performance in MODE 4. Furthermore, there is insufficient energy in the primary or secondary systems to pressurize the containment and the operators will have sufficient time to respond to an accident; thus automatic initiation of SI on high containment pressure in MODE 4 is unnecessary.

NSHD category	Change number 3.3-	Discussion Of Change
L	037	Table 3.5-2B and Table 4.1-1B, Function 2.b. CTS Applicability for this function in MODE 4 is not included in the ITS which is consistent with the guidance of NUREG-1431. This change is acceptable, since in MODE 4 there is insufficient energy in the primary or secondary systems to pressurize the containment to reach the High-High setpoint; thus automatic initiation of containment spray on high containment pressure in MODE 4 is unnecessary.
A	038	Table 3.5-2B, Note a and Table 4.1-1B, Note 21. This note has been modified to be consistent with NUREG-1431 Table 3.3.2-1 Note a. The meaning and use of this note is the same in both applications since it states that the function is not required below 2000 psig in the RCS. Since there is no change in the meaning or application, this is an administrative change.
A	039	Table 3.5-2B, Note b and Table 4.1-1B, Note 26. This note has been modified to be consistent with NUREG-1431 Table 3.3.5-1 Notes a and b. The meaning and use of this note is the same in both applications since it states that the function is required when containment integrity is required and during movement of irradiated fuel in containment when this system is operating. Since there is no change in the meaning or application, this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
	040	Not used.
A	041	A new note has been included to provide clarity to the plant operators that this RTS function does not provide a direct reactor trip.
L	042	Table 3.5-2B and Table 4.1-1B, Function 5. Applicability in MODE 2 for each element of this Function is modified by a note which does not require this specification to be applicable when both MSIVs are closed. Since this change limits the applicability of this specification, this is a less restrictive change. This change is acceptable since the steam line isolation safety function is met passively without this instrumentation operable in accordance with the Specification when both MSIVs are closed. This change conforms to the guidance of NUREG-1431.
A	043	Table 3.5-2B, Note c and Table 4.1-1B, Note 23. The format of this note has been revised to conform to the guidance of NUREG-1431. The note has been restated but has the same meaning, therefore this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
LR	044	Table 3.5-2B, Function 6c and Table 4.1-1B, Function 6c. The feedwater isolation on a reactor trip with 2 of 4 low T_{ave} function is not included in the ITS which is consistent with the guidance of NUREG-1431. This change is acceptable since this function does not detect RCS leakage, it is not a design feature that is an initial condition of a design basis accident, it is not a component or design feature that is part of the primary success path to mitigate a design basis accident and it has not been shown to be significant to public health and safety. Since it does not meet these criteria for a TS as defined in 10CFR50.36 it will be relocated to the TRM where it will be under the regulatory controls of 10CFR50.59. Since this function will be under licensee control, this is a less restrictive change.
L	045	Table 3.5-2B and Table 4.1-1B, Function 6. Applicability in MODE 2 for each element of this function is modified by a new note which does not require this specification to be applicable when all MFRVs and MFRV bypass valves are closed and in manual or isolated by a closed non-automatic valve. Since this change limits the applicability of this specification, this is a less restrictive change. This change is acceptable since the feedwater line isolation safety function is met passively without this instrumentation operable in accordance with the Specification when the conditions of the new note are met. This change conforms to the guidance of NUREG-1431.

NSHD category	Change number 3.3-	Discussion Of Change
LR	046	Table 3.5-2B and Table 4.1-1B, Function 7a. The AFW manual initiation function is not included in the ITS which is consistent with the guidance of NUREG-1431. This change is acceptable since the manual AFW pump switch only starts the pump as opposed to actuating the system and manual operations of the pumps to support plant startup and cooldown will verify operability of the switches. This function will be relocated to the TRM where it will be under the regulatory controls of 10CFR50.59. Since this function will be under licensee control, this is a less restrictive change.
A	047	Table 3.5-2B, Function 7. The title for this function is changed to delete "4.16 kV" since this is unnecessary redundant information in the title. Since this is only a title change, this is an administrative change.
A	048	Table 3.5-2B, Footnote and Table 4.1-1B, new note. This note has been revised to agree more closely with the wording used in LCO 3.7.5. The meaning and applicability have not been changed, therefore this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
M	049	Table 3.5-2B, Function 6d. To be consistent with the format and guidance of NUREG-1431, the feedwater isolation logic is required to be operable in Mode 3 (except as modified by the note) since these valves are required to close in response to an SI signal. This change imposes a TS requirement for this logic to be operable. Since this is a new TS requirement, this is a more restrictive change. This change is acceptable since it assures the plant is maintained in a safe condition. Also the plant design requires this logic to be operable when the SI logic is operable.
A	050	Table 3.5-2B, Function 9 and Actions 34, 35, and 36. This Specification requirement was deleted by LAR entitled, "Removal of Boric Acid Storage Tanks from the Safety Injection System," submitted April 17, 2000. Since this change was justified in that submittal, this is considered an administrative change in this submittal.
A	051	Table 3.5-2B and Table 4.1-1B, Function 7d. CTS subdivides this into two sub-functions for the turbine driven AFW pump and the motor driven AFW pump. However, the specification requirements for these two sub-functions are identical. Thus, in conformance with the guidance of NUREG-1431, this is presented as a single function. Since the specification requirements remain the same, this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
M	052	Table 3.5-2B, Function 8. A new condition of applicability is provided for the loss of power function which requires this function to be OPERABLE, "When associated DG is required to be OPERABLE by LCO 3.8.2, 'AC Sources - Shutdown'." Since this change places additional TS requirements on plant operations, this is a more restrictive change. This change is acceptable since it is generally consistent with current plant practices and does not cause the plant to be operated in an unsafe manner.
L	053	Table 3.5-2B, Action 22. In conformance with the guidance of NUREG-1431, this action statement has been modified to allow this system to continue operating for up to 4 hours with one train of radiation monitoring inoperable. Since this change may allow additional operating flexibility, this is a less restrictive change. This change is acceptable since it is usual to allow some time to operate with one train of equipment inoperable when the redundant train is operable and able to perform the safety function.
A	054	Table 3.5-2B, Action 22. Since this system is normally blind flanged and therefore not operating, this action statement is modified to reference the specifications which govern its operation. This change is only a clarification which does not change any specification requirements or affect plant operations, therefore; this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
A	055	Table 3.5-2B, Action 30. The last sentence of this action statement allows one channel to be bypassed for up to 8 hours for surveillance testing. This provision is not included in the ITS in accordance with the guidance of NUREG-1431. Due to the relay logic design of the AFW logic, this change does not change the capability to test this system; thus this is an administrative change.
A	056	Table 3.5-2B, Action 32. This Action Statement has not been included in the ITS. The LCO, action statements and required actions have been revised to be more technically correct by redefining the channels. Thus the condition when two channels are inoperable is addressed in CTS Action 33 and the required actions in CTS Action 32 are not applicable in this new format; thus, Action 32 is not included in the ITS. Since this change does not change any plant operating conditions, this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
M	057	Table 3.5-2B, Action 33. This Action Statement has been revised to take the required action when two channels per bus are inoperable since the definition of channels has been redefined in the LCO to be more technically correct. Also, CTS requirements to declare the DGs out of service have been revised to declare the load sequencer out of service. These changes have been made to be more consistent with the philosophy of NUREG-1431 and provide an improved response to these plant conditions. Since this change will impact more plant equipment, this is a more restrictive change. This change will assure that the plant is maintained in a safe condition and does introduce any new safety concerns.
L	058	Table 3.5-2B, Action 21. CTS allows high-high containment pressure channels to be inoperable provided they are placed in a tripped position. However, with two channels in the tripped position, the containment spray system could actuate on a single spurious signal. The ITS will allow two channels to be inoperable with one channel tripped and one channel bypassed. This is desirable because it prevents the containment spray system from actuating on a single spurious signal. This change is acceptable since only two additional high-high pressure signals are required to actuate the system (compared to three normally). This change involves both more restrictive and less restrictive requirements; thus this is treated as a less restrictive change.

NSHD category	Change number 3.3-	Discussion Of Change
M	059	CTS 3.7.A. Current TS do not explicitly require the automatic load sequencers to be operable. For the purpose of completeness and consistency with NUREG-1431 requirements, new specification requirements including an LCO statement, action statements and supporting Bases have been included in the PI ITS. This new specification implements the intent of ISTS 3.8.1 and its action statements. However, as discussed in Part F, Change X3.3-312, this new specification requirement is included in PI ITS LCO 3.3.4. Since this is new specification requirement in the TS, this is a more restrictive change. This new specification requirement is consistent with current plant practices for equipment operability and testing and therefore will not cause any unsafe plant operations or testing.
M	060	CTS Table 3.5-2B, Action 28. To be consistent with the guidance of NUREG-1431, a new requirement to reduce power to MODE 4 or shut the main steam isolation valves is included. This change is more restrictive in that it requires additional actions or reduction of plant power with 18 hours. This change is acceptable since it will maintain the plant in a safe condition and not introduce any unsafe plant operating conditions or tests.

NSHD category	Change number 3.3-	Discussion Of Change
M	061	New Required Actions, LCO 3.3.4, C and D, have been included to address plant conditions when an automatic load sequencer is inoperable. Since CTS do not have requirements for an inoperable load sequencer, this is a more restrictive change. These changes are included to make the ITS complete and technically accurate. These changes provide conservative management of the plant and assure that it is maintained in a safe condition. These changes do not introduce any new safety concerns.
A	062	3.15, Objective. The CTS Objective statement is not included in the ITS which is consistent with the guidance of NUREG-1431. An objective statement is not necessary since the ITS has detailed Bases which provide background on each specification. Since this statement does not provide operational restrictions or requirements, this is an administrative change.
A	063	3.15.C. The CTS statement which allows the plant to start up with inoperable Event Monitoring equipment has been revised to be consistent with the guidance of NUREG-1431. Since the meaning and applicability of the statement has not changed, this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
M	064	3.15.D. The CTS statement which takes exception to CTS LCO 3.0.C (ITS LCO 3.0.3) is not included in the ITS which is consistent with the guidance of NUREG-1431. ITS LCO 3.0.3 provides TS guidance when no other guidance is provided and therefore exception is not taken for the possibility that ITS Specification 3.3.3 might not always provide the required guidance. This change is more restrictive since it may require plant shutdown if Specification 3.3 requirements are not met or do not provide guidance for all conditions. This change is acceptable since the requirement to comply with LCO 3.0.3 provides conservative actions to maintain the plant in a safe condition when no other TS guidance is available.
A	065	Table 3.15-1, Function 9. The descriptive term "Penetration Flow Path" has been included which makes this Function name consistent with NUREG-1431 as modified by TSTF-295. This phrase is included to clarify the requirements for this function. Since changing the function name does not change any specification requirements, this is an administrative change.
A	066	Table 3.15-1, Actions 5 and 6. Minor wording changes were made to be consistent with the requirements included in the ITS. These changes do not change the requirements or applicability and therefore these are administrative changes.

NSHD category	Change number 3.3-	Discussion Of Change
L	067	Table 3.15-1, Note b. The phrase "or check valve with flow through the valve secured" has been included in the ITS to be consistent with NUREG-1431 guidance. Since this may provide operational flexibility, this change is less restrictive. This change is acceptable, since a check valve with flow through the valve secured provides a containment leakage prevention barrier equivalent to the other methods listed in this note.
A	68	A new note has been included in the Event Monitoring Table to clarify that each core exit thermocouple (CET) is a channel. This allows the terminology of the 3.3.3 Conditions to be applied to the CETs. The name of Function 15 has changed "Thermocouples" to "Temperature" to be consistent with NUREG-1431. Since these changes do not introduce any technical changes, these are administrative changes.
A	69	A new Condition H has been included to be consistent with the format guidance of NUREG-1431. Condition H requires entry into the ITS Table 3.3.3-1 as required by the other conditions. Since this change does not involve any technical changes, this is an administrative change.
	70	Not used.
	71	Not used.

NSHD category	Change number 3.3-	Discussion Of Change
A	072	Table 4.1-1A and Table 4.1-1B. The column title, Functional Test, is deleted since it is not needed in the ITS format. Each SR is defined by the type of surveillance that is required. The SRs listed in this column may correlate to different types of tests such as TADOT, COT, or ALT; thus this column title is not appropriate. Since no plant operational requirements are associated with this change, this is an administrative change.
M	073	Table 4.1-1A, Function 2, 3, 6. To be consistent with the guidance of NUREG-1431, a note has been included with this SR which will require verification that interlocks P-6 and P-10 are in their required state for existing unit conditions and will require performance of the SR within 12 hours after reducing power below P-10 for power and intermediate range instrumentation and within 12 hours after reducing power below P-6 for source range instrumentation. Since this change may require additional performances of this SR and verification of additional equipment, this is a more restrictive change. This change is acceptable since performance of this SR does not compromise the safety of the plant.

NSHD category	Change number 3.3-	Discussion Of Change
L	074	Table 4.1-1A, Function 5. The response time testing for this instrumentation has not been included in the ITS. This change is consistent with the guidance of NUREG-1431 which does not require response time testing for this instrumentation. This change is acceptable since the intermediate range trip is a backup function and the safety analyses do not credit this instrumentation with tripping the reactor. Since less testing may be required, this is a less restrictive change.
LR	075	Table 4.1-1A, Function 2a. CTS requires monthly and quarterly calibration of this instrumentation under the Function of Neutron Flux Power Range - High Setpoint. ITS has relocated these SRs (SR 3.3.1.3 and 3.3.1.6) to Overtemperature ΔT (which is consistent with NUREG-1431) and Overpower ΔT Functions. This is more appropriate for the purpose of these SRs. This change is acceptable since the SR will continue to be performed as TS requirements.
M	076	Table 4.1-1A, Function 7, 8. Two additional SRs have been included for these functions to be consistent with the guidance of NUREG-1431. These SRs are also consistent with the SRs for the Power Range Neutron Flux instrumentation. Since these are included in the TS as SRs, these are more restrictive changes. These changes are acceptable since they are included in SRs currently performed for the plant and do not introduce any safety concerns.

NSHD category	Change number 3.3-	Discussion Of Change
L	077	Table 4.1-1A, Function 13. The CTS requirement to calibrate the Turbine Stop Valve Closure has not been included to be consistent with the guidance of NUREG-1431. This change is acceptable since the stop valve is either open or closed and therefore there is not any instrumentation which requires calibration.
	78	Not used.
	79	Not used.
	80	Not used.
A	081	Table 4.1-1A, Functions 15, 16b. This CTS test is modified by a note which states that verification of setpoints is not required. The test with which this note has been included is a TADOT on the RCP undervoltage and underfrequency relays. Setpoint verification is not required by CTS; thus this note is simply a clarification and no substantive changes are involved. Therefore, this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
L	082	Table 4.1-1A, Function 16. To be consistent with the guidance of NUREG-1431, the CTS requirement to calibrate the RCP Breaker Open function has not been included. This change is acceptable since the RCP Breaker is either open or closed and therefore there is not any instrumentation which requires calibration.
L	083	Table 4.1-1A, Function 16. The CTS requirement to functionally test the RCP Breaker Open trip instrumentation prior to each startup after the reactor has been shutdown for more than 2 days if not tested in the previous 30 days has been replaced by the requirement to perform this SR every 24 months (during a refueling outage) which is consistent with the guidance of NUREG-1431. This change is acceptable since this equipment usually passes this test and the ITS and CTS requirement is nearly the same except some additional testing may be required under the CTS if there are intermediate cycle shutdowns of a unit. Since less testing may be required this is a less restrictive change.

NSHD category	Change number 3.3-	Discussion Of Change
A	084	Table 4.1-1A, Functions 18, 19. The CTS requirement to perform response time testing of the automatic trip and interlock logic and reactor trip breakers is not included in the ITS since this time is included in the time recorded for the other required response time tests and this presentation is consistent with the guidance of NUREG-1431. Since this is just a different presentation of the response time testing requirements and these times will continue to be measured with the individual reactor trip response time tests, this is an administrative change.
A	085	Table 4.1-1A, Table 4.1-1B, Table 4.1-1C. To be consistent with the format and content guidance of NUREG-1431, the definition of frequency notations is not included in the ITS. The ITS clearly specifies SR frequencies in the number of hours, days, months or years as appropriate without use of notation; thus this information is unnecessary. Since no substantive changes have been made with this change, this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
L	086	Table 4.1-1A, Notes 4 and 17. The frequency for this SR has been modified to be consistent with the guidance of NUREG-1431. This change requires performance of the SR every 92 days which is more restrictive than the CTS. It also removes the requirement to perform the SR if the unit is shutdown for 2 days when the SR has not been performed in the last 30 days, which is less restrictive. Since the change involves both more and less restrictive elements, this change is categorized as a less restrictive change. This change is acceptable since the instrumentation usually passes this SR when performed. It is usually obvious if this instrumentation is not functioning properly; then measures are taken to restore it to operable status. Thus performance of the SR each shutdown in excess of two days is unnecessary.
M	087	Table 4.1-1A, Note 4. The CTS note which applies to this SR has been modified to be consistent with the guidance of NUREG-1431 as modified by approved TSTF-311, Rev. 0 except that the CTS provision for the reactor to be shutdown for 2 days is included. With this change, the note will continue to require performance of the SR if the reactor is shutdown more than 2 days and if not performed in the previous 31 days. However, now the note requires the SR to be performed prior to exceeding P-9; thus this is a more restrictive change. This change is acceptable since performance of this SR will not cause the plant to be operated in an unsafe manner.

NSHD category	Change number 3.3-	Discussion Of Change
M	088	Table 4.1-1A, Note 6 . This note has been modified to require performance of the SR prior to exceeding 75% RTP after each refueling which is consistent with current plant practice and is proposed in lieu of NUREG-1431 requirement to perform this SR within 24 hours. CTS does not require the SR to be performed within any specific time, thus this is a more restrictive change. This change is acceptable since this power level limit is consistent with current plant practices and performance of this SR prior to 75% power does not cause the plant to be operated in an unsafe manner.
	89	Not used.
	90	Not used.
M	091	Table 4.1-1A, Note 5. This note has been modified to require performance of the SR within 12 hours of reaching 15% RTP which is consistent with the guidance of NUREG-1431. CTS does not require the SR to be performed within any specific time; thus this is a more restrictive change. This change is acceptable since this time frame is consistent with current plant practices, and performance of this SR within this specific time does not cause the plant to be operated in an unsafe manner.

NSHD category	Change number 3.3-	Discussion Of Change
M	092	Table 4.1-1A, Note 8. This note has been modified to require performance of the SR within 24 hours of reaching the stated percentage of RTP which is consistent with the guidance of NUREG-1431. CTS does not require the SR to be performed within any specific time; thus this is a more restrictive change. This change is acceptable since this time frame is consistent with current plant practices, and performance of this SR within this specific time does not cause the plant to be operated in an unsafe manner.
L	093	Table 4.1-1A, Note 6. This note has been modified to require recalibration if the absolute difference is greater than 3% which is consistent with the guidance of NUREG-1431. CTS requires recalibration if the difference is greater than 2%. Since this change will allow more flexibility in plant operations, this is a less restrictive change. This change is acceptable since CTS value of 2% was based on engineering judgement and a 1% change is a small difference from the nominal power level.
A	094	Table 4.1-1A, Note 7. This is a minor editorial change to make the sense of the requirement consistent with the guidance of NUREG-1431. This change does not involve any substantive changes and thus this is an administrative change.

NSHD category	Change number 3.3-	Discussion Of Change
A	095	Table 4.1-1A, Note 9 and Table 4.1-1B, Note 22. The requirement for Staggered Test Basis (STB) testing has been modified to agree with the guidance of NUREG-1431. The test frequency for these SRs remains unchanged because the definition of STB differs between CTS and ITS such that the result is that each train is tested every other month under both CTS and ITS. Since there is no change in the frequency with this change, this is an administrative change.
LR	096	Table 4.1-1A, Note 10. The CTS description of how the verification of permissives is performed is relocated to the Bases consistent with the guidance of NUREG-1431. This detail is not necessary in the specifications and thus is relocated. Since less information is provided in the specification, this change is less restrictive.
	97	Not used.
	98	Not used.
	99	Not used.
	100	Not used.

NSHD category	Change number 3.3-	Discussion Of Change
LR	101	Table 4.1-1A, Notes 13 and 14. These CTS notes have been relocated to the Bases. These notes provide details of "what and how" SRs are performed on the undervoltage and shunt trip mechanisms. These notes are not necessary in the specification for the proper performance of these SRs, and consistent with the guidance of NUREG-1431, these notes are relocated to the Bases. Since less information is provided in the specifications, this is a less restrictive change.
LR	102	Table 4.1-1A, Note 18. CTS SR requirements for the quadrant power tilt monitor have been relocated to the TRM. This change is consistent with the guidance of NUREG-1431 which does not include any SRs for core monitoring equipment. This change is also consistent with approved TSTF-110, which relocated core monitoring equipment from other NUREG-1431 Specifications. Since this change removes equipment from the TS, this is a less restrictive change. This change is acceptable since it will still be under the regulatory controls of 10CFR50.59 in the TRM.
	103	Not used.

NSHD category	Change number 3.3-	Discussion Of Change
L	104	Table 4.1-1A, New note. A new note has been included which allows this instrumentation to be tested each refueling (24 months) on a Staggered Test Basis (STB). This change is consistent with the guidance of NUREG-1431. Since this change requires less frequent testing of plant equipment, this is a less restrictive change. This change is acceptable because this instrumentation usually meets the test acceptance criteria when the test is performed.
M	105	Table 4.1-1A and Table 4.1-1B, New note. A new note has been included which requires verification that the time constants associated with this instrumentation are adjusted to the prescribed values when the SR is performed. This change is included to be consistent with the guidance of NUREG-1431 (SR 3.3.1.10 and 3.3.2.7) and current plant practices (SR 3.3.1.11 and 3.3.1.12). Since this is a new explicit requirement in the TS this is a more restrictive change. Since this requirement is consistent with current plant practice, it does not introduce any new unsafe operating conditions.
M	106	CTS Table 4.1-1B, Function 6d. To be consistent with the guidance of NUREG-1431, the Feedwater Isolation Logic is required to be functional in MODE 3 except when the MFRVs and MFRV bypass valves are closed. This change is more restrictive since the logic is required to be operational in more modes. This change is acceptable since having the logic operational in MODE 3 may increase plant safety.

NSHD category	Change number 3.3-	Discussion Of Change
A	107	Table 4.1-1B, Note 25. This note which references CTS Table 4.17-2 has not been included in the ITS. CTS Table 4.17-2 was removed from the CTS by License Amendments 122/115 dated January 24, 1996. Since this change does not involve any substantive changes, this is an administrative change.
M	108	Table 4.1-1A, Note 16. A new requirement is included which requires the Reactor Trip Bypass Breaker to be tested when it is placed in service. Since this is not an explicit requirement in CTS, this is a more restrictive change. This change is acceptable since it will assure that the breaker functions properly when it is placed in service and thus will ensure that the plant operates safely.
A	109	CTS Table 4.1-1B, new note 28. To be technically accurate and consistent with the guidance of NUREG-1431, a new note is provided which clarifies that verification of the setpoint is not required by this surveillance. This note is appropriate since this SR applies only to manual switches which do not have any associated setpoints. Thus, this new note does not introduce any substantive change in plant operations or tests. Accordingly this change is an administrative change.
	110	Not used.

NSHD category	Change number 3.3-	Discussion Of Change
	111	Not used.
LR	112	Table 4.1-1C, Function 6. The RHR pump flow function has been relocated to the TRM which is consistent with the guidance of NUREG-1431. The RHR pump is required to be OPERABLE in accordance with LCO 3.5.2 which includes instrumentation. Since this instrumentation is not a primary success path for mitigation of an accident, it is unnecessary to have this instrumentation listed separately in the TS. This instrumentation will continue to be under regulatory controls through 10CFR50.59. Since this instrumentation has been removed from TS controls, this is a less restrictive change.
L	113	Table 4.1-1C, Function 8. The weekly check of the RWST level instrumentation has been replaced by a monthly check which is consistent with the guidance of NUREG-1431. The monthly functional check of this instrumentation has been deleted which is also consistent with the guidance of NUREG-1431. Changing to monthly channel checks is acceptable since this instrumentation usually is functional during the weekly check and it is in the control room where it is normally observed on a frequent basis even if not required by TS. Deleting the monthly functional test of this instrumentation is acceptable since this is a simple instrumentation loop involving only indication. Thus, the functional test required by CTS is not meaningful and can be deleted to be consistent with NUREG-1431. Since these changes remove plant testing requirements, these are less restrictive changes.

NSHD category	Change number 3.3-	Discussion Of Change
A	114	Table 4.1-1C, Functions 5, 7, 9 and 12 and Note 33. These Specification requirements were deleted by LAR entitled, "Removal of Boric Acid Storage Tanks from the Safety Injection System," submitted April 17, 2000. Since these changes were justified in that submittal, these are considered administrative changes in this submittal.
LR	115	Table 4.1-1C, Functions 13, 15, 16, 17, 19, 20, 26, 27, 28, 30, and 31. These instruments have been relocated to the TRM which is by reference part of the USAR. These instruments are not included in NUREG-1431 and thus this change is consistent with its philosophy and guidance. This change is acceptable since these instruments are not a primary success path for mitigation of an accident; therefore it is unnecessary to have these instrument SRs in the TS. These instruments will continue to be under regulatory controls through 10CFR50.59. Since these instruments have been removed from TS controls, this is a less restrictive change.
LR	116	Table 4.1-1C, Function18. The instrumentation shift check and monthly functional test have been relocated to the TRM. This change is consistent with the guidance of NUREG-1431. This change is acceptable since this instrumentation usually passes these SRs when performed. Even though this instrumentation is removed from the TS, it will continue to be under the regulatory controls of 10CFR50.59 since the TRM is part of the USAR. Since these SRs are relocated from the TS, this is a less restrictive change.

NSHD category	Change number 3.3-	Discussion Of Change
L	117	Table 4.1-1C, Function 18, Calibration and Note 34. Mode 3 has not been included in the applicability for this SR. This SR is included as a note in SR 3.3.1.12 in support of the OTΔT and OPΔT functions. Since OTΔT and OPΔT are only applicable in Modes 1 and 2, this SR has been made applicable in Modes 1 and 2. This change is consistent with the guidance of NUREG-1431. This change is acceptable since the SR is required to be met in the modes where OTΔT and OPΔT perform a safety function. Since the SR is applicable in fewer modes, this is a less restrictive change.
LR	118	Table 4.1-1C, Function 29. The CTS Surveillance Requirements for the hydrogen monitors, which are more restrictive than NUREG-1431, have been relocated to the TRM which is by reference part of the USAR. The hydrogen monitors will continue to be included in the Event Monitoring Instrumentation specification and the NUREG-1431 SRs will apply. This change is acceptable since the hydrogen monitors will continue to be required by ITS and will have TS required testing. The current Surveillance Requirements will be under the regulatory controls of 10CFR50.59. Since the current Surveillance Requirements have been removed from TS controls, this is a less restrictive change.
	119	Not used.
	120	Not used.

NSHD category	Change number 3.3-	Discussion Of Change
A	121	Table 4.1-1C, Function 21. A new SR 3.3.3.3 has been included along with a new explanatory note to require a TADOT to be performed on the containment penetration flow path isolation valve position indication instrumentation in lieu of instrumentation calibration. Since this is consistent with current plant practice, this change is a clarification of the understanding of CTS requirements and therefore this is an administrative change. This change is consistent with NUREG-1431 as modified by TSTF-244.
	122	Not used.
A	123	Table 4.1-1C, Notes 35, 36 and 37. These notes are not included in the ITS since the functions to which they relate have been relocated or the note has been made inapplicable due to the format of the ITS. Since no substantive changes have been made in technical requirements or plant operations, this is an administrative change.
	124	Not used.

NSHD category	Change number 3.3-	Discussion Of Change
L	125	CTS 3.10.C.4. CTS requires verification of the core quadrant power balance daily and after 10% power changes when one excore nuclear channel is inoperable and the power is above 85%. This change will require the core quadrant power balance to be verified every 12 hours under these conditions. This change is more restrictive since the 12 hour Frequency is twice daily. For power changes of 10% or more which occur in less than 12 hours this is a less restrictive change. Therefore this change is considered a less restrictive change. This change is acceptable since: 1) most power changes occur slowly such that the 12 hour Frequency is not a significant extension of the time for verification of the core power quadrant balance; 2) the QPTR changes occur relatively slowly when there are power changes; 3) large quadrant power tilts are likely to be detected with the remaining operable excore nuclear channels; 4) sudden significant quadrant power tilts are typically associated with other indications of abnormality (for example, a dropped rod) that prompt verification of core power tilt; and 5) the probability of an accident is very low during the time between a controlled 10% power change and the 12 hour SR performance Frequency. This change is consistent with the guidance of NUREG-1431.
A	126	CTS 3.10.C.4. CTS references CTS Specification 3.11. This change references ITS SR 3.2.4.2. Since there is not a substantive technical change, this is an administrative change.