1.0 USE AND APPLICATION
1.1-1 ....Revision 1
1.1-2 ....Revision 69
1.1-3 ....Revision 13
1.1-4 ....Revision 84
1.1-5 ....Revision 75
1.1-6 ....Revision 75
1.1-7 ....Revision 93
1.2-1 ....Revision 1
1.2-2 ....Revision 1
1.2-3 ....Revision 1
1.3-1 ....Revision 1
1.3-2 ....Revision 1
1.3-3 ....Revision 1
1.3-4 ....Revision 1
1.3-5 ....Revision 1
1.3-6 ....Revision 1
1.3-7 ....Revision 1
1.3-8 ....Revision 1
1.3-9 ....Revision 1
1.3-10 ....Revision 1
1.3-11 ....Revision 1
1.3-12 ....Revision 1
1.3-13 ....Revision 1
1.3-14 ....Revision 1
1.4-1 ....Revision 1
1.4-2 ....Revision 38
1.4-3 ....Revision 1
1.4-4 ....Revision 1
1.4-5 ....Revision 1
1.4-6 ....Revision 1
1.4-7 ....Revision 1
1.5-1 ....Revision 1
1.6-1 ....Revision 13

2.0.a RTS INSTRUMENTATION TRIP SETPOINTS
2.0.a-1 ....Revision 52
2.0.a-2 ....Revision 52
2.0.a-3 ....Revision 52

2.0.b ESFAS INSTRUMENTATION TRIP SETPOINTS
2.0.b-1 ....Revision 52
2.0.b-2 ....Revision 52
2.0.b-3 ....Revision 92
2.0.b-4 ....Revision 95

2.0.c BDPS INSTRUMENTATION TRIP SETPOINT
2.0.c-1 ....Revision 52

2.1.a MISCELLANEOUS TEST REQUIREMENTS
2.1.a-1 ....Revision 1
2.1.a-2 ....Revision 1
2.1.a-3 ....Revision 1
2.1.a-4 ....Revision 1
2.1.a-5 ....Revision 28
2.1.a-6 ....Revision 28
2.1.a-7 ....Revision 62
2.1.a-8 ....Revision 62
2.1.a-9 ....Revision 62
2.1-a-10 ....Revision 62

3.0 TRM LIMITING CONDITION FOR OPERATION (TLCO) AND SURVEILLANCE REQUIREMENT (TSR) APPLICABILITY
3.0-1 ....Revision 1
3.0-2 ....Revision 37
3.0-3 ....Revision 1
3.0-4 ....Revision 23
3.0-5 ....Revision 37

3.1 REACTIVITY CONTROL SYSTEMS
3.1.a-1 ....Revision 6
3.1.a-2 ....Revision 1
3.1.b-1 ....Revision 1
3.1.b-2 ....Revision 1
3.1.b-3 ....Revision 90
3.1.c-1 ....Revision 6
3.1.d-1 ....Revision 1
3.1.d-2 ....Revision 1
3.1.e-1 ....Revision 6
3.1.e-2 ....Revision 1
3.1.e-3 ....Revision 88
3.1.f-1 ....Revision 1
3.1.f-2 ....Revision 1
3.1.g-1 ....Revision 11
3.1.g-2 ....Revision 11
3.1.h-1 ....Revision 1
3.1.h-2 ....Revision 1
3.1.i-1 ....Revision 18
3.1.i-2 ....Revision 1
3.1.j-1 ....Revision 1
3.1.j-2 ....Revision 1
3.1.k-1 ....Revision 14
3.1.k-2 ....Revision 11
3.1.k-3 ....Revision 11

3.2 POWER DISTRIBUTION LIMITS
None

3.3 INSTRUMENTATION

3.3.a-1 .... Revision 29
3.3.a-2 .... Revision 12
3.3.b-1 .... Revision 1
3.3.b-2 .... Revision 1
3.3.b-3 .... Revision 1
3.3.b-4 .... Revision 88
3.3.c-1 .... Revision 1
3.3.c-2 .... Revision 1
3.3.c-3 .... Revision 1
3.3.d-1 .... Revision 1
3.3.d-2 .... Revision 1
3.3.d-3 .... Revision 1
3.3.e-1 .... Revision 1
3.3.e-2 .... Revision 1
3.3.e-3 .... Revision 1
3.3.e-4 .... Revision 46
3.3.f-1 .... Revision 1
3.3.f-2 .... Revision 1
3.3.f-3 .... Revision 49
3.3.g-1 .... Revision 57
3.3.g-2 .... Revision 57
3.3.g-3 .... Revision 57
3.3.g-4 .... Revision 8
3.3.g-5 .... Revision 70
3.3.g-6 .... Revision 57
3.3.h-1 .... Revision 16
3.3.h-2 .... Revision 16
3.3.h-3 .... Revision 16
3.3.h-4 .... Revision 16
3.3.h-5 .... Revision 16
3.3.i-1 .... Revision 37
3.3.i-2 .... Revision 1
3.3.i-3 .... Revision 1
3.3.i-4 .... Revision 1
3.3.j-1 .... Revision 38
3.3.j-2 .... Revision 38
3.3.k-1 .... Revision 84
3.3.k-2 .... Revision 91
3.3.o-1 .... Revision 1
3.3.o-2 .... Revision 1
3.3.o-3 .... Revision 1
3.3.o-4 .... Revision 1
3.3.p-1 .... Revision 1
3.3.p-2 .... Revision 1
3.3.p-3 .... Revision 1
3.3.p-4 .... Revision 87
3.3.y-1 .... Revision 78

3.3.y-2 .... Revision 78
3.3.y-3 .... Revision 78

3.4 REACTOR COOLANT SYSTEM (RCS)
3.4.b-1 .... Revision 1
3.4.b-2 .... Revision 1
3.4.b-3 .... Revision 40
3.4.b-4 .... Revision 1
3.4.c-1 .... Revision 1
3.4.c-2 .... Revision 1
3.4.d-1 .... Revision 1
3.4.e-1 .... Revision 34
3.4.e-2 .... Revision 37
3.4.e-3 .... Revision 34
3.4.f-1 .... Revision 82
3.4.f-2 .... Revision 82

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)
3.5.a-1 .... Revision 1
3.5.a-2 .... Revision 1

3.6 CONTAINMENT SYSTEMS
None

3.7 PLANT SYSTEMS
3.7.a-1 .... Revision 1
3.7.a-2 .... Revision 1
3.7.b-1 .... Revision 81
3.7.b-2 .... Revision 81
3.7.b-3 .... Revision 60
3.7.b-4 .... Revision 81
3.7.c-1 .... Revision 1
3.7.c-2 .... Revision 1
3.7.c-3 .... Revision 1
3.7.d-1 .... Revision 1
3.7.d-2 .... Revision 1
3.7.d-3 .... Revision 24
3.7.i-1 .... Revision 77
3.7.i-2 .... Revision 1
3.7.j-1 .... Revision 1
3.7.k-1 .... Revision 21

3.8 ELECTRICAL POWER SYSTEMS
3.8.a-1 .... Revision 37
3.8.a-2 .... Revision 1
3.8.a-3 .... Revision 1
3.8.a-4 .... Revision 1
3.8.a-5 .... Revision 1
3.8.a-6 .... Revision 1
3.8.a-7 .... Revision 46
3.8.a-8 .... Revision 46
3.8.a-9 .... Revision 46
3.8.a-10 .... Revision 46
3.8.a-11 .... Revision 46
3.8.a-12 .... Revision 46
3.8.a-13 .... Revision 46
3.8.a-14 .... Revision 46
3.8.a-15 .... Revision 46
3.8.a-16 .... Revision 46
3.8.a-17 .... Revision 46
3.8.a-18 .... Revision 46
3.8.a-19 .... Revision 46
3.8.a-20 .... Revision 46
3.8.b-1 .... Revision 1
3.8.b-2 .... Revision 1
3.8.b-3 .... Revision 88
3.8.b-4 .... Revision 1
3.8.b-5 .... Revision 76
3.8.b-6 .... Revision 88
3.8.b-7 .... Revision 1
3.8.b-8 .... Revision 85
3.8.c-1 .... Revision 26
3.8.c-2 .... Revision 26
3.8.c-3 .... Revision 63
3.8.c-4 .... Revision 63
3.8.c-5 .... Revision 26

3.9 REFUELING OPERATIONS
3.9.a-1 .... Revision 89
3.9.a-2 .... Revision 89
3.9.a-3 .... Revision 89
3.9.a-4 .... Revision 89
3.9.a-5 .... Revision 89
3.9.a-6 .... Revision 89
3.9.a-7 .... Revision 89
3.9.a-8 .... Revision 89
3.9.a-9 .... Revision 89
3.9.a-10 .... Revision 89
3.9.a-11 .... Revision 89
3.9.b-1 .... Revision 1
3.9.c-1 .... Revision 17

3.9.c-2 .... Revision 17
3.9.d-1 .... Revision 75
3.9.d-2 .... Revision 75
3.9.e-1 .... Revision 1

4.0 DESIGN FEATURES
None

5.0 ADMINISTRATIVE CONTROLS
5.1-1 .... Revision 1
5.2-1 .... Revision 1
5.2-2 .... Revision 1
5.2-3 .... Revision 1
5.3-1 .... Revision 1
5.3-2 .... Revision 1
5.3-3 .... Revision 1

APPENDICES

Appendix A ODCM AND RADIOLOGICAL CONTROLS REPORTS AND PROGRAM
1 of 5 .... Revision 33
2 of 5 .... Revision 33
3 of 5 .... Revision 33
4 of 5 .... Revision 33
5 of 5 .... Revision 33

Appendix B PRIMARY COOLANT SOURCES OUTSIDE CONTAINMENT
1 of 4 .... Revision 58
2 of 4 .... Revision 58
3 of 4 .... Revision 58
4 of 4 .... Revision 58

Appendix C Not used

Appendix D RADIOACTIVE EFFLUENT CONTROLS PROGRAM
1 of 5 .... Revision 33
2 of 5 .... Revision 33
3 of 5 .... Revision 33
4 of 5 .... Revision 33
5 of 5 .... Revision 33

Appendix E TRANSIENT MONITORING PROGRAM
1 of 6 .... Revision 1
2 of 6 .... Revision 1
3 of 6 .... Revision 1
4 of 6 .... Revision 1
5 of 6 .... Revision 1
6 of 6 .... Revision 1

Appendix F PRE-STRESSED CONCRETE CONTAINMENT TENDON SURVEILLANCE PROGRAM
1 of 5.....................................Revision 61
2 of 5.....................................Revision 61
3 of 5.....................................Revision 61
4 of 5.....................................Revision 61
5 of 5.....................................Revision 61

Appendix G REACTOR COOLANT PUMP FLYWHEEL INSPECTION PROGRAM
1 of 5.....................................Revision 71
2 of 5.....................................Revision 71
3 of 5.....................................Revision 71
4 of 5.....................................Revision 71
5 of 5.....................................Revision 71

Appendix H INSERVICE TESTING PROGRAM
1 of 4.....................................Revision 59
2 of 4.....................................Revision 59
3 of 4.....................................Revision 59
4 of 4.....................................Revision 59

Appendix I STEAM GENERATOR PROGRAM
1 of 9.....................................Revision 89
2 of 9.....................................Revision 89
3 of 9.....................................Revision 89
4 of 9.....................................Revision 89
5 of 9.....................................Revision 89
6 of 9.....................................Revision 89
7 of 9.....................................Revision 89
8 of 9.....................................Revision 89
9 of 9.....................................Revision 89

Appendix J SECONDARY WATER CHEMISTRY
1 of 5.....................................Revision 1
2 of 5.....................................Revision 1
3 of 5.....................................Revision 1
4 of 5.....................................Revision 1
5 of 5.....................................Revision 1

Appendix K VENTILATION FILTER TESTING PROGRAM
1 of 15....................................Revision 65
2 of 15....................................Revision 65
3 of 15....................................Revision 65
4 of 15....................................Revision 65
5 of 15....................................Revision 65
6 of 15....................................Revision 65
7 of 15....................................Revision 65
8 of 15....................................Revision 65
9 of 15....................................Revision 65
10 of 15...................................Revision 65
11 of 15...................................Revision 65
12 of 15...................................Revision 65
13 of 15...................................Revision 65
14 of 15...................................Revision 65
15 of 15...................................Revision 65

Appendix L EXPLOSIVE GAS AND STORAGE TANK RADIOACTIVITY MONITORING PROGRAM
1 of 7.....................................Revision 44
2 of 7.....................................Revision 44
3 of 7.....................................Revision 44
4 of 7.....................................Revision 44
5 of 7.....................................Revision 44
6 of 7.....................................Revision 44
7 of 7.....................................Revision 44

Appendix M DIESEL FUEL OIL TESTING PROGRAM
1 of 9.....................................Revision 48
2 of 9.....................................Revision 48
3 of 9.....................................Revision 48
4 of 9.....................................Revision 48
5 of 9.....................................Revision 48
6 of 9.....................................Revision 48
7 of 9.....................................Revision 48
8 of 9.....................................Revision 48
9 of 9.....................................Revision 48

Appendix N TECHNICAL SPECIFICATION BASES CONTROL PROGRAM
1 of 13....................................Revision 64
2 of 13....................................Revision 64
3 of 13....................................Revision 64
4 of 13....................................Revision 64
5 of 13....................................Revision 64
6 of 13....................................Revision 64
7 of 13....................................Revision 64
8 of 13....................................Revision 64
9 of 13....................................Revision 64
10 of 13...................................Revision 64

Appendix N (continued)	11 of 13	Revision 64
	12 of 13	Revision 64
	13 of 13	Revision 64
Appendix O	SAFETY FUNCTION DETERMINATION PROGRAM	
	1 of 43	Revision 87
	2 of 43	Revision 87
	3 of 43	Revision 87
	4 of 43	Revision 87
	5 of 43	Revision 87
	6 of 43	Revision 87
	7 of 43	Revision 87
	8 of 43	Revision 87
	9 of 43	Revision 87
	10 of 43	Revision 87
	11 of 43	Revision 87
	12 of 43	Revision 87
	13 of 43	Revision 87
	14 of 43	Revision 87
	15 of 43	Revision 87
	16 of 43	Revision 87
	17 of 43	Revision 87
	18 of 43	Revision 87
	19 of 43	Revision 87
	20 of 43	Revision 87
	21 of 43	Revision 87
	22 of 43	Revision 87
	23 of 43	Revision 87
	24 of 43	Revision 87
	25 of 43	Revision 87
	26 of 43	Revision 87
	27 of 43	Revision 87
	28 of 43	Revision 87
	29 of 43	Revision 87
	30 of 43	Revision 87
	31 of 43	Revision 87
	32 of 43	Revision 87
	33 of 43	Revision 87
	34 of 43	Revision 87
	35 of 43	Revision 87
	36 of 43	Revision 87
	37 of 43	Revision 87
	38 of 43	Revision 87
	39 of 43	Revision 87
	40 of 43	Revision 87
	41 of 43	Revision 87
	42 of 43	Revision 87
	43 of 43	Revision 87

Appendix P CONTAINMENT LEAKAGE RATE TESTING PROGRAM
1 of 6 .... Revision 57
2 of 6 .... Revision 57
3 of 6 .... Revision 57
4 of 6 .... Revision 57
5 of 6 .... Revision 57
6 of 6 .... Revision 57

Appendix Q Not Used

Appendix R Not Used

Appendix S TECHNICAL REQUIREMENTS MANUAL CONTROL PROGRAM
1 of 12 .... Revision 64
2 of 12 .... Revision 64
3 of 12 .... Revision 64
4 of 12 .... Revision 64
5 of 12 .... Revision 64
6 of 12 .... Revision 64
7 of 12 .... Revision 64
8 of 12 .... Revision 64
9 of 12 .... Revision 64
10 of 12 .... Revision 64
11 of 12 .... Revision 64
12 of 12 .... Revision 64

Appendix T CONFIGURATION RISK MANAGEMENT PROGRAM
1 of 4 .... Revision 9
2 of 4 .... Revision 9
3 of 4 .... Revision 9
4 of 4 .... Revision 9

Appendix U BATTERY MONITORING AND MAINTENANCE PROGRAM
1 of 4 .... Revision 26
2 of 4 .... Revision 26
3 of 4 .... Revision 26
4 of 4 .... Revision 26
B 3.8.c-1 .... Revision 26
B 3.8.c-2 .... Revision 26
B 3.8.c-3 .... Revision 26
B 3.8.c-4 .... Revision 26
B 3.8.c-5 .... Revision 26
B 3.8.c-6 .... Revision 26
B 3.8.c-7 .... Revision 26
B 3.8.c-8 .... Revision 26
B 3.8.c-9 .... Revision 26

Appendix V	1 of 7	Revision 56
	2 of 7	Revision 56
	3 of 7	Revision 56
	4 of 7	Revision 56
	5 of 7	Revision 56
	6 of 7	Revision 56
	7 of 7	Revision 56
Appendix W	1 of 4	Revision 74
	2 of 4	Revision 74
	3 of 4	Revision 74
	4 of 4	Revision 74

1.0 USE AND APPLICATION 1.0-1

1.1 Definitions 1.1-1
1.2 Logical Connectors 1.2-1
1.3 Completion Times 1.3-1
1.4 Frequency 1.4-1
1.5 TLCO and TSR Implementation 1.5-1
1.6 TRM Revisions 1.6-1

2.0.a RTS Instrumentation Trip Setpoints 2.0.a-1
2.0.b ESFAS Instrumentation Trip Setpoints 2.0.b-1
2.1.a Miscellaneous Test Requirements 2.1.a-1

3.0 TLCO Applicability 3.0-1
3.0 TSR Applicability 3.0-4

3.1 REACTIVITY CONTROL SYSTEMS 3.1.a-1

3.1.a Boration Flow Path - Shutdown 3.1.a-1
3.1.b Boration Flow Paths - Operating 3.1.b-1
3.1.c Charging Pump - Shutdown 3.1.c-1
3.1.d Charging Pumps - Operating 3.1.d-1
3.1.e Borated Water Source - Shutdown 3.1.e-1
3.1.f Borated Water Sources - Operating 3.1.f-1
3.1.g Position Indication System - Shutdown 3.1.g-1
3.1.h SDM - MODE 1 and MODE 2 with $k_{eff} \geq 1.0$ 3.1.h-1
3.1.i SDM - MODE 5 .... 3.1.i-1
3.1.j Shutdown and Control Rods 3.1.j-1
3.1.k Position Indication System - Shutdown (Special Test Exception) 3.1.k-1

3.2 Not Used

3.3	INSTRUMENTATION	3.3.a-1
3.3.a	Movable Incore Detectors	3.3.a-1
3.3.b	Seismic Monitoring Instrumentation	3.3.b-1
3.3.c	Meteorological Monitoring Instrumentation	3.3.c-1
3.3.d	Loose-Part Detection System	3.3.d-1
3.3.e	Explosive Gas Monitoring Instrumentation	3.3.e-1
3.3.f	High Energy Line Break Isolation Sensors	3.3.f-1
3.3.g	Turbine Overspeed Protection	3.3.g-1
3.3.h	PDMS Instrumentation	3.3.h-1
3.3.i	PAM Instrumentation	3.3.i-1
3.3.j	Hydrogen Monitors	3.3.j-1
3.3.k	Feedwater Flow	3.3.k-1
3.3.l	Not Used	
3.3.m	Not Used	
3.3.n	Not Used	
3.3.o	FHB Ventilation System Actuation Instrumentation	3.3.o-1
3.3.p	Radiation Monitoring Instrumentation	3.3.p-1
3.3.q	Not Used	
3.3.r	Not Used	
3.3.s	Not Used	
3.3.t	Not Used	
3.3.u	Not Used	
3.3.v	Not Used	
3.3.w	Not Used	
3.3.x	Not Used	
3.3.y	Engineereed Safety Feature Actuation System (ESFAS) Instrumentation	3.3.y-1
3.4	REACTOR COOLANT SYSTEM (RCS)	3.4.b-1
3.4.a	Not Used	
3.4.b	RCS Chemistry	3.4.b-1
3.4.c	Pressurizer Temperature Limits	3.4.c-1
3.4.d	Pressurizer PORVs	3.4.d-1
3.4.e	Reactor Vessel Head Vents	3.4.e-1
3.4.f	Structural Integrity	3.4.f-1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)................3.5.a-1

3.5.a ECCS Subsystems - T_{avg} ≤ 200°F and Pressurizer Level ≤ 5%..................................3.5.a-1

3.6 Not Used

3.7 PLANT SYSTEMS...3.7.a-1

3.7.a Steam Generator Pressure/Temperature Limitations.................................3.7.a-1
3.7.b Snubbers 3.7.b-1
3.7.c Sealed Source Contamination 3.7.c-1
3.7.d Area Temperature Monitoring 3.7.d-1
3.7.e Not Used
3.7.f Not Used
3.7.g Not Used
3.7.h Not Used
3.7.i FHB Ventilation Systems 3.7.i-1
3.7.j Spent Fuel Pool Water Level 3.7.j-1
3.7.k Spent Fuel Pool Boron Concentration 3.7.k-1

3.8 ELECTRICAL POWER SYSTEMS.............................3.8.a-1

3.8.a Containment Penetration Conductor Overcurrent Protective Devices...........................3.8.a-1
3.8.b Motor Operated Valves Thermal Overload Protection Devices.......................................3.8.b-1
3.8.c Battery Monitoring and Maintenance 3.8.c-1

3.9 REFUELING OPERATIONS.................................3.9.a-1

3.9.a Decay Time 3.9.a-1
3.9.b Communications 3.9.b-1
3.9.c Refueling Machine/Auxiliary Hoist 3.9.c-1
3.9.d Crane Travel - Spent Fuel Pool 3.9.d-1
3.9.e Refueling Cavity Water Level 3.9.e-1

4.0 Not Used

5.0 ADMINISTRATIVE CONTROLS.................................. 5.1-1

5.1 Safety Limit Violation............................... 5.1-1

5.2 Procedures and Programs.............................. 5.2-1

5.2.a Process Control Program 5.2-1
5.2.b In-Plant Radiation Monitoring 5.2-2
5.2.c Radiological Environmental Monitoring Program ... 5.2-2
5.2.d Radiation Protection Program 5.2-3
5.2.e Offsite Dose Calculation Manual 5.2-3

5.3 Reporting Requirements............................... 5.3-1

5.3.a Startup Report 5.3-1
5.3.b Annual Specific Activity Report 5.3-2
5.3.c Special Reports 5.3-2

TABLE T1.1-1	MODES	1.1-7
TABLE T2.0.a-1	Reactor Trip System Instrumentation Trip Setpoints	2.0.a-1
TABLE T2.0.b-1	Engineered Safety Feature Actuation System Instrumentation Trip Setpoints	2.0.b-1
TABLE T2.0.c-1	Boron Dilution Protection System Instrumentation Trip Setpoint	2.0.c-1
TABLE T3.3.b-1	Seismic Monitoring Instrumentation	3.3.b-4
TABLE T3.3.c-1	Meteorological Monitoring Instrumentation	3.3.c-3
TABLE T3.3.d-1	Loose-Part Detection Instrumentation	3.3.d-3
TABLE T3.3.e-1	Explosive Gas Monitoring Instrumentation	3.3.e-4
TABLE T3.3.f-1	High Energy Line Break Instrumentation	3.3.f-3
TABLE T3.3.g-1	Turbine Overspeed Protection	3.3.g-5
TABLE T3.3.g-2	Extraction Steam Non-Return Check Valves and the Associated MOV or Manual Isolation Valve	3.3.g-6
TABLE T3.3.i-1	Post Accident Monitoring Instrumentation	3.3.i-4
TABLE T3.3.o-1	FHB Ventilation System Actuation Instrumentation	3.3.o-4
TABLE T3.3.p-1	Radiation Monitoring Instrumentation for Plant Operations	3.3.p-4
TABLE T3.3.y-1	Engineered Safety Feature Actuation System Instrumentation	3.3.y-3
TABLE T3.4.b-1	RCS Chemistry Limits	3.4.b-4
TABLE T3.7.b-1	Snubber Inservice Inspection Program Elements	3.7.b-4
TABLE T3.7.d-1	Area Temperature Monitoring	3.7.d-3
TABLE T3.8.a-1	Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)	3.8.a-7
TABLE T3.8.a-2	Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)	3.8.a-14
TABLE T3.8.b-1	Motor-Operated Valves Thermal Overload Protective Devices (Unit 1)	3.8.b-3
TABLE T3.8.b-2	Motor-Operated Valves Thermal Overload Protective Devices (Unit 2)	3.8.b-6

FIGURE 3.9.a-1 41 MBTU/hr SFP Heat Load Margin 3.9.a-3
FIGURE 3.9.a-2 42 MBTU/hr SFP Heat Load Margin 3.9.a-4
FIGURE 3.9.a-3 43 MBTU/hr SFP Heat Load Margin 3.9.a-5
FIGURE 3.9.a-4 44 MBTU/hr SFP Heat Load Margin 3.9.a-6
FIGURE 3.9.a-5 44 MBTU/hr SFP Heat Load Margin 3.9.a-7
FIGURE 3.9.a-6 45 MBTU/hr SFP Heat Load Margin 3.9.a-8
FIGURE 3.9.a-7 46 MBTU/hr SFP Heat Load Margin 3.9.a-9
FIGURE 3.9.a-8 47 MBTU/hr SFP Heat Load Margin 3.9.a-10
FIGURE 3.9.a-9 48 MBTU/hr SFP Heat Load Margin 3.9.a-11

Appendix A: ODCM AND RADIOLOGICAL CONTROLS REPORTS AND PROGRAM
Appendix B: PRIMARY COOLANT SOURCES OUTSIDE CONTAINMENT
Appendix C: Not Used
Appendix D: RADIOACTIVE EFFLUENT CONTROLS PROGRAM
Appendix E: TRANSIENT MONITORING PROGRAM
Appendix F: PRE-STRESSED CONCRETE CONTAINMENT TENDON SURVEILLANCE PROGRAM
Appendix G: REACTOR COOLANT PUMP FLYWHEEL INSPECTION PROGRAM
Appendix H: INSERVICE TESTING PROGRAM
Appendix I: STEAM GENERATOR PROGRAM
Appendix J: SECONDARY WATER CHEMISTRY PROGRAM
Appendix K: VENTILATION FILTER TESTING PROGRAM
Appendix L: EXPLOSIVE GAS AND STORAGE TANK RADIOACTIVITY MONITORING PROGRAM
Appendix M: DIESEL FUEL OIL TESTING PROGRAM
Appendix N: ITS BASES CONTROL PROGRAM
Appendix O: SAFETY FUNCTION DETERMINATION PROGRAM
Appendix P: CONTAINMENT LEAKAGE RATE TESTING PROGRAM
Appendix Q: Not used
Appendix R: Not used
Appendix S: TECHNICAL REQUIREMENTS MANUAL CONTROL PROGRAM
Appendix T: CONFIGURATION RISK MANAGEMENT PROGRAM
Appendix U: BATTERY MONITORING AND MAINTENANCE PROGRAM
Appendix V: CONTROL ROOM ENVELOPE HABITABILITY PROGRAM
Appendix W: SURVEILLANCE FREQUENCY CONTROL PROGRAM

1.0 USE AND APPLICATION

1.1 Definitions

------------------------------------NOTE------------------------------------
The defined terms of this section appear in capitalized type and are applicable throughout this Technical Requirements Manual.

Term	Definition
ACTIONS	ACTIONS shall be that part of a Requirement that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
CHANNEL CALIBRATION	A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel so that it responds within the required range and accuracy to known inputs. The CHANNEL CALIBRATION shall encompass the entire channel, including the required sensor, alarm, interlock, display, and trip functions. Calibration of instrument channels with Resistance Temperature Detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping calibrations or total channel steps so that the entire channel is calibrated.
CHANNEL CHECK	A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter.

CHANNEL OPERATIONAL TEST (COT)	A COT shall be the injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify the OPERABILITY of required alarm, interlock, display, and trip functions. The COT shall include adjustments, as necessary, of the required alarm, interlock, and trip setpoints so that the setpoints are within the required range and accuracy.
CORE ALTERATION	CORE ALTERATION shall be the movement of any fuel, sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.
CORE OPERATING LIMITS REPORT (COLR)	The COLR is the unit specific document that provides cycle specific parameter limits for the current reload cycle. These cycle specific parameter limits shall be determined for each reload cycle in accordance with Specification 5.6.5. Unit operation within these limits is addressed in individual Specifications.
DOSE EQUIVALENT I-131	DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcurie per gram) that alone would produce the same dose when inhaled as the combined activities of iodine isotopes I-131, I-132, I-133, I-134, and I-135 actually present. The determination of DOSE EQUIVALENT I-131 shall be performed using the Committed Effective Dose Equivalent (CEDE) dose conversion factors from Table 2.1 of EPA Federal Guidance Report No. 11, 1988, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion."

1.1 Definitions

MEMBER(S) OF THE PUBLIC	MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the plant. This category does not include employees of the licensee, its contractors or vendors and persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.
MODE	A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table T1.1-1 with fuel in the reactor vessel.
OFFSITE DOSE CALCULATION MANUAL (ODCM)	The ODCM shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Environmental Radiological Monitoring Program. The ODCM shall also contain (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Radioactive Effluent Release Reports.
OPERABLE - OPERABILITY	A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

1.1 Definitions

PROCESS CONTROL PROGRAM (PCP)	The PCP shall contain the current formulas, sampling, analyses, tests, and determinations to be made to ensure that processing and packaging of solid radioactive wastes based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure compliance with 10 CFR Parts 20, 61, and 71, State regulations, burial ground requirements, and other requirements governing the disposal of solid radioactive waste.
PURGE - PURGING	PURGE or PURGING shall be any controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is required to purify the confinement.
QUADRANT POWER TILT RATIO (QPTR)	QPTR shall be the ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater.
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 3645 MWt.
SHUTDOWN MARGIN (SDM)	SDM shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming: a. All Rod Cluster Control Assemblies (RCCAs) are fully inserted except for the single RCCA of highest reactivity worth, which is assumed to be fully withdrawn. With any RCCA not capable of being fully inserted, the reactivity worth of the RCCA must be accounted for in the determination of SDM; and b. In MODES 1 and 2, the fuel and moderator temperatures are changed to the hot zero power temperature.

1.1 Definitions

SINGLE-FAILURE PROOF LOAD HANDLING SYSTEM	Cranes meeting requirements of ASME NOG-1-2004, NUREG-0554 and NUREG-0612, as applicable. Special Lifting Devices meeting requirements of NUREG-0612, Section 5.1.6(1)(a). Lifting devices that are not specially designed that meet the requirements of NUREG-0612, Section 5.1.6(1)(b). Interfacing lift points such as lifting lugs or cask trunions meeting requirements of NUREG-0612, Section 5.1.6(3).
SITE BOUNDARY	The SITE BOUNDARY shall be that line beyond which the land is neither owned, nor leased, nor otherwise controlled by the licensee.
THERMAL POWER	THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.
TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT)	A TADOT shall consist of operating the trip actuating device and verifying the OPERABILITY of required alarm, interlock, display, and trip functions. The TADOT shall include adjustment, as necessary, of the trip actuating device so that it actuates at the required setpoint within the required accuracy.
UNRESTRICTED AREA	An UNRESTRICTED AREA shall be any area at or beyond the SITE BOUNDARY access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, or any area within the SITE BOUNDARY used for residential quarters or for industrial, commercial, institutional, and/or recreational purposes.

1.1 Definitions

VENTILATION EXHAUST TREATMENT SYSTEM	A VENTILATION EXHAUST TREATMENT SYSTEM shall be any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal adsorbers and/or HEPA filters for the purpose of removing iodines or particulates from the gaseous exhaust stream prior to the release to the environment. Such a system is not considered to have any effect on noble gas effluents. Engineered Safety Features Atmospheric Cleanup Systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.
WASTE GAS HOLDUP SYSTEM	A WASTE GAS HOLDUP SYSTEM shall be any system designed and installed to reduce radioactive gaseous effluents by collecting Reactor Coolant System off-gases from the Reactor Coolant System and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

Table T1.1-1 (page 1 of 1)
MODES

MODE	TITLE	REACTIVITY CONDITION (k_{eff})	% RATED THERMAL POWER[a]	AVERAGE REACTOR COOLANT TEMPERATURE (°F)
1	Power Operation	≥ 0.99	> 5	NA
2	Startup	≥ 0.99	≤ 5	NA
3	Hot Standby	< 0.99	NA	≥ 350
4	Hot Shutdown[b]	< 0.99	NA	$350 > T_{avg} > 200$
5	Cold Shutdown[b]	< 0.99	NA	≤ 200
6	Refueling[c]	NA	NA	NA

(a) Excluding decay heat.

(b) All required reactor vessel head closure bolts fully tensioned.

(c) One or more required reactor vessel head closure bolts less than fully tensioned.

1.0 USE AND APPLICATION

1.2 Logical Connectors

PURPOSE	The purpose of this section is to explain the meaning of logical connectors. Logical connectors are used in the Technical Requirements Manual (TRM) to discriminate between, and yet connect, discrete Conditions, Required Actions, Completion Times, Surveillances, and Frequencies. The only logical connectors that appear in the TRM are <u>AND</u> and <u>OR</u>. The physical arrangement of these connectors constitutes logical conventions with specific meanings.
BACKGROUND	Several levels of logic may be used to state Required Actions. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to a Required Action and the placement of the logical connector in the first level of nesting (i.e., left justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indentations of the logical connectors. When logical connectors are used to state a Condition, Completion Time, Surveillance, or Frequency, only the first level of logic is used, and the logical connector is left justified with the statement of the Condition, Completion Time, Surveillance, or Frequency.
EXAMPLES	The following examples illustrate the use of logical connectors.

1.2 Logical Connectors

EXAMPLES (continued)

EXAMPLE 1.2-1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. TLCO not met.	A.1 Verify . . . AND A.2 Restore . . .	

In this example the logical connector AND is used to indicate that when in Condition A, both Required Actions A.1 and A.2 must be completed.

1.2 Logical Connectors

EXAMPLES (continued)

EXAMPLE 1.2-2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. TLCO not met.	A.1 Trip . . . OR A.2.1 Verify . . . AND A.2.2.1 Reduce . . . OR A.2.2.2 Perform . . . OR A.3 Align . . .	

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices, only one of which must be performed as indicated by the use of the logical connector OR and the left justified placement. Any one of these three Actions may be chosen. If A.2 is chosen, then both A.2.1 and A.2.2 must be performed as indicated by the logical connector AND. Required Action A.2.2 is met by performing A.2.2.1 or A.2.2.2. The indented position of the logical connector OR indicates that A.2.2.1 and A.2.2.2 are alternative choices, only one of which must be performed.

1.0 USE AND APPLICATION

1.3 Completion Times

PURPOSE	The purpose of this section is to establish the Completion Time convention and to provide guidance for its use.
BACKGROUND	Technical Requirements Manual Limiting Conditions for Operation (TLCOs) specify minimum requirements for ensuring safe operation of the unit. The ACTIONS associated with a TLCO state Conditions that typically describe the ways in which the requirements of the TLCO can fail to be met. Specified with each stated Condition are Required Action(s) and Completion Time(s).
DESCRIPTION	The Completion Time is the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., inoperable equipment or variable not within limits) that requires entering an ACTIONS Condition unless otherwise specified, providing the unit is in a MODE or specified condition stated in the Applicability of the TLCO. Required Actions must be completed prior to the expiration of the specified Completion Time. An ACTIONS Condition remains in effect and the Required Actions apply until the Condition no longer exists or the unit is not within the TLCO Applicability. If situations are discovered that require entry into more than one Condition at a time within a single TLCO (multiple Conditions), the Required Actions for each Condition must be performed within the associated Completion Time. When in multiple Conditions, separate Completion Times are tracked for each Condition starting from the time of discovery of the situation that required entry into the Condition.

1.3 Completion Times

DESCRIPTION (continued)

Once a Condition has been entered, subsequent trains, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition, unless specifically stated. The Required Actions of the Condition continue to apply to each additional failure, with Completion Times based on initial entry into the Condition.

However, when a subsequent train, subsystem, component, or variable expressed in the Condition is discovered to be inoperable or not within limits, the Completion Time(s) may be extended. To apply this Completion Time extension, two criteria must first be met. The subsequent inoperability:

a. Must exist concurrent with the first inoperability; and

b. Must remain inoperable or not within limits after the first inoperability is resolved.

The total Completion Time allowed for completing a Required Action to address the subsequent inoperability shall be limited to the more restrictive of either:

a. The stated Completion Time, as measured from the initial entry into the Condition, plus an additional 24 hours; or

b. The stated Completion Time as measured from discovery of the subsequent inoperability.

The above Completion Time extension does not apply to those TLCOs that have exceptions that allow completely separate re-entry into the Condition (for each train, subsystem, component, or variable expressed in the Condition) and separate tracking of Completion Times based on this re-entry. These exceptions are stated in individual TLCOs.

1.3 Completion Times

DESCRIPTION (continued)

The above Completion Time extension does not apply to a Completion Time with a modified "time zero." This modified "time zero" may be expressed as a repetitive time (i.e., "once per 8 hours," where the Completion Time is referenced from a previous completion of the Required Action versus the time of Condition entry) or as a time modified by the phrase "from discovery . . . ." Example 1.3-3 illustrates one use of this type of Completion Time. The 10 day Completion Time specified for Conditions A and B in Example 1.3-3 may not be extended.

EXAMPLES

The following examples illustrate the use of Completion Times with different types of Conditions and changing Conditions.

EXAMPLE 1.3-1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

Condition B has two Required Actions. Each Required Action has its own separate Completion Time. Each Completion Time is referenced to the time that Condition B is entered.

1.3 Completion Times

EXAMPLES (continued)

The Required Actions of Condition B are to be in MODE 3 within 6 hours AND in MODE 5 within 36 hours. A total of 6 hours is allowed for reaching MODE 3 and a total of 36 hours (not 42 hours) is allowed for reaching MODE 5 from the time that Condition B was entered. If MODE 3 is reached within 3 hours, the time allowed for reaching MODE 5 is the next 33 hours because the total time allowed for reaching MODE 5 is 36 hours.

If Condition B is entered while in MODE 3, the time allowed for reaching MODE 5 is the next 36 hours.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pump inoperable.	A.1 Restore pump to OPERABLE status.	7 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

When a pump is declared inoperable, Condition A is entered. If the pump is not restored to OPERABLE status within 7 days, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start. If the inoperable pump is restored to OPERABLE status after Condition B is entered, Condition A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

When a second pump is declared inoperable while the first pump is still inoperable, Condition A is not re-entered for the second pump. TLCO 3.0.c is entered, since the ACTIONS do not include a Condition for more than one inoperable pump. The Completion Time clock for Condition A does not stop after TLCO 3.0.c is entered, but continues to be tracked from the time Condition A was initially entered.

While in TLCO 3.0.c, if one of the inoperable pumps is restored to OPERABLE status and the Completion Time for Condition A has not expired, TLCO 3.0.c may be exited and operation continued in accordance with Condition A.

1.3 Completion Times

EXAMPLES (continued)

While in TLCO 3.0.c, if one of the inoperable pumps is restored to OPERABLE status and the Completion Time for Condition A has expired, TLCO 3.0.c may be exited and operation continued in accordance with Condition B. The Completion Time for Condition B is tracked from the time the Condition A Completion Time expired.

On restoring one of the pumps to OPERABLE status, the Condition A Completion Time is not reset, but continues from the time the first pump was declared inoperable. This Completion Time may be extended if the pump restored to OPERABLE status was the first inoperable pump. A 24 hour extension to the stated 7 days is allowed, provided this does not result in the second pump being inoperable for > 7 days.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Function X train inoperable.	A.1 Restore Function X train to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the TLCO
B. One Function Y train inoperable.	B.1 Restore Function Y train to OPERABLE status.	72 hours AND 10 days from discovery of failure to meet the TLCO
C. One Function X train inoperable. AND One Function Y train inoperable.	C.1 Restore Function X train to OPERABLE status. OR C.2 Restore Function Y train to OPERABLE status.	72 hours 72 hours

1.3 Completion Times

EXAMPLES (continued)

When one Function X train and one Function Y train are inoperable, Condition A and Condition B are concurrently applicable. The Completion Times for Condition A and Condition B are tracked separately for each train starting from the time each train was declared inoperable and the Condition was entered. A separate Completion Time is established for Condition C and tracked from the time the second train was declared inoperable (i.e., the time the situation described in Condition C was discovered).

If Required Action C.2 is completed within the specified Completion Time, Conditions B and C are exited. If the Completion Time for Required Action A.1 has not expired, operation may continue in accordance with Condition A. The remaining Completion Time in Condition A is measured from the time the affected train was declared inoperable (i.e., initial entry into Condition A).

The Completion Times of Conditions A and B are modified by a logical connector with a separate 10 day Completion Time measured from the time it was discovered the TLCO was not met. In this example, without the separate Completion Time, it would be possible to alternate between Conditions A, B, and C in such a manner that operation could continue indefinitely without ever restoring systems to meet the TLCO. The separate Completion Time modified by the phrase "from discovery of failure to meet the TLCO" is designed to prevent indefinite continued operation while not meeting the TLCO. This Completion Time allows for an exception to the normal "time zero" for beginning the Completion Time "clock". In this instance, the Completion Time "time zero" is specified as commencing at the time the TLCO was initially not met, instead of at the time the associated Condition was entered.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more valves inoperable.	A.1 Restore valve(s) to OPERABLE status.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

A single Completion Time is used for any number of valves inoperable at the same time. The Completion Time associated with Condition A is based on the initial entry into Condition A and is not tracked on a per valve basis. Declaring subsequent valves inoperable, while Condition A is still in effect, does not trigger the tracking of separate Completion Times.

Once one of the valves has been restored to OPERABLE status, the Condition A Completion Time is not reset, but continues from the time the first valve was declared inoperable. The Completion Time may be extended if the valve restored to OPERABLE status was the first inoperable valve. The Condition A Completion Time may be extended for up to 4 hours provided this does not result in any subsequent valve being inoperable for > 4 hours.

If the Completion Time of 4 hours (plus the extension) expires while one or more valves are still inoperable, Condition B is entered.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-5

ACTIONS

----------------------------NOTE----------------------------
Separate Condition entry is allowed for each inoperable valve.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more valves inoperable.	A.1 Restore valve to OPERABLE status.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

The Note above the ACTIONS Table is a method of modifying how the Completion Time is tracked. If this method of modifying how the Completion Time is tracked was applicable only to a specific Condition, the Note would appear in that Condition rather than at the top of the ACTIONS Table.

The Note allows Condition A to be entered separately for each inoperable valve, and Completion Times tracked on a per valve basis. When a valve is declared inoperable, Condition A is entered and its Completion Time starts. If subsequent valves are declared inoperable, Condition A is entered for each valve and separate Completion Times start and are tracked for each valve.

1.3 Completion Times

EXAMPLES (continued)

If the Completion Time associated with a valve in Condition A expires, Condition B is entered for that valve. If the Completion Times associated with subsequent valves in Condition A expire, Condition B is entered separately for each valve and separate Completion Times start and are tracked for each valve. If a valve that caused entry into Condition B is restored to OPERABLE status, Condition B is exited for that valve.

Since the Note in this example allows multiple Condition entry and tracking of separate Completion Times, Completion Time extensions do not apply.

EXAMPLE 1.3-6

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Perform TSR 3.x.x.x. OR A.2 Reduce THERMAL POWER to ≤ 50% RTP.	Once per 8 hours 8 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

1.3 Completion Times

EXAMPLES (continued)

Entry into Condition A offers a choice between Required Action A.1 or A.2. Required Action A.1 has a "once per" Completion Time, which qualifies for the 25% extension, per TSR 3.0.b, to each performance after the initial performance. The initial 8 hour interval of Required Action A.1 begins when Condition A is entered and the initial performance of Required Action A.1 must be complete within the first 8 hour interval. If Required Action A.1 is followed, and the Required Action is not met within the Completion Time (plus the extension allowed by TSR 3.0.b), Condition B is entered. If Required Action A.2 is followed and the Completion Time of 8 hours is not met, Condition B is entered.

If after entry into Condition B, Required Action A.1 or A.2 is met, Condition B is exited and operation may then continue in Condition A.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-7

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Verify affected subsystem isolated.	1 hour AND Once per 8 hours thereafter
	AND	
	A.2 Restore subsystem to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours

Required Action A.1 has two Completion Times. The 1 hour Completion Time begins at the time the Condition is entered and each "Once per 8 hours thereafter" interval begins upon performance of Required Action A.1.

1.3 Completion Times

EXAMPLES (continued)

If after Condition A is entered, Required Action A.1 is not met within either the initial 1 hour or any subsequent 8 hour interval from the previous performance (plus the extension allowed by TSR 3.0.b), Condition B is entered. The Completion Time clock for Condition A does not stop after Condition B is entered, but continues from the time Condition A was initially entered. If Required Action A.1 is met after Condition B is entered, Condition B is exited and operation may continue in accordance with Condition A, provided the Completion Time for Required Action A.2 has not expired.

IMMEDIATE COMPLETION TIME

When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner.

1.0 USE AND APPLICATION

1.4 Frequency

PURPOSE	The purpose of this section is to define the proper use and application of Frequency requirements.
DESCRIPTION	Each Technical Requirements Manual Surveillance Requirement (TSR) has a specified Frequency in which the Surveillance must be met in order to meet the associated Limiting Condition for Operation (TLCO). An understanding of the correct application of the specified Frequency is necessary for compliance with the TSR. The "specified Frequency" is referred to throughout this section and Section 3.0, Surveillance Requirement (TSR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each TSR as well as certain Notes in the Surveillance column that modify performance requirements. Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated TLCO is within its Applicability, represent potential TSR 3.0.d conflicts. To avoid these conflicts, the TSR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With a TSR satisfied, TSR 3.0.d imposes no restriction. Sometimes special situations dictate when the requirements of a Surveillance are to be met. They are "otherwise stated" conditions allowed by TSR 3.0.a. They may be stated as clarifying Notes in the Surveillance, as part of the Surveillance, or both. Example 1.4-5 discusses these special situations.

1.4 Frequency

DESCRIPTION (continued)

The use of "met" or "performed" in these instances conveys specific meaning. A surveillance is "met" only when the acceptance criteria are satisfied. Known failure of the requirements of a Surveillance, even without a Surveillance specifically being "performed," constitutes a Surveillance not "met." "Performance" refers only to the requirement to specifically determine the ability to meet the acceptance criteria. TSR 3.0.d restrictions would not apply if both the following conditions are satisfied:

a. The Surveillance is not required to be performed; and

b. The Surveillance is not required to be met or, even if required to be met, is not known to be failed.

EXAMPLES

The following examples illustrate the various ways that Frequencies are specified. In these examples, the Applicability of the TLCO (TLCO not shown) is MODES 1, 2, and 3. The examples do not reflect the potential application of TLCO 3.0.d.2.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Perform CHANNEL CHECK.	12 hours

Example 1.4-1 contains the type of TSR most often encountered in the Technical Requirements Manual (TRM). The Frequency specifies an interval (12 hours) during which the associated Surveillance must be performed at least one time. Performance of the Surveillance initiates the subsequent interval. Although the Frequency is stated as 12 hours, an extension of the time interval to 1.25 times the stated Frequency is allowed by TSR 3.0.b for operational flexibility. The measurement of this interval continues at all times, even when the TSR is not required to be met per TSR 3.0.a (such as when the equipment is inoperable, a variable is outside specified limits, or the unit is outside the Applicability of the TLCO). If the interval specified by TSR 3.0.b is exceeded while the unit is in a MODE or other specified condition in the Applicability of the TLCO, and the performance of the Surveillance is not otherwise modified (refer to Example 1.4-3), then TSR 3.0.c becomes applicable.

If the interval as specified by TSR 3.0.b is exceeded while the unit is not in a MODE or other specified condition in the Applicability of the TLCO for which performance of the TSR is required, the Surveillance must be performed within the Frequency requirements of TSR 3.0.b prior to entry into the MODE or other specified condition. Failure to do so would result in a violation of TSR 3.0.d.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify flow is within limits.	Once within 12 hours after ≥ 25% RTP AND 24 hours thereafter

Example 1.4-2 has two Frequencies. The first is a one time performance Frequency, and the second is of the type shown in Example 1.4-1. The logical connector "AND" indicates that both Frequency requirements must be met. Each time reactor power is increased from a power level < 25% RTP to ≥ 25% RTP, the Surveillance must be performed within 12 hours.

The use of "once" indicates a single performance will satisfy the specified Frequency (assuming no other Frequencies are connected by "AND"). This type of Frequency does not qualify for the extension allowed by TSR 3.0.b.

"Thereafter" indicates future performances must be established per TSR 3.0.b, but only after a specified condition is first met (i.e., the "once" performance in this example). If reactor power decreases to < 25% RTP, the measurement of both intervals stops. New intervals start upon reactor power reaching 25% RTP.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-3

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
------------------NOTE------------------ Not required to be performed until 12 hours after ≥ 25% RTP. ------------------------------------	
Perform channel adjustment.	7 days

The interval continues, whether or not the unit operation is < 25% RTP between performances.

As the Note modifies the required performance of the Surveillance, it is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is < 25% RTP, this Note allows 12 hours after power reaches ≥ 25% RTP to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency." Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by TSR 3.0.b) interval, but operation was < 25% RTP, it would not constitute a failure of the TSR or failure to meet the TLCO. Also, no violation of TSR 3.0.d occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not exceed 12 hours with power ≥ 25% RTP.

Once the unit reaches 25% RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of TSR 3.0.c would apply.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
-------------------NOTE------------------ Only required to be performed in MODE 1. -------------------- ------------------ Perform complete cycle of the valve.	7 days

The interval continues, whether or not the unit operation is in MODE 1, 2, or 3 (the assumed Applicability of the associated TLCO) between performances.

As the Note modifies the required performance of the Surveillance, the note is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is not in MODE 1, this Note allows entry into and operation in MODES 2 and 3 to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency" if completed prior to MODE 1. Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by TSR 3.0.b) interval, but operation was not in MODE 1, it would not constitute a failure of the TSR or failure to meet the TLCO. Also, no violation of TSR 3.0.d occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not result in entry into MODE 1.

Once the unit reaches MODE 1, the requirement for the Surveillance to be performed within its specified Frequency applies and would require that the Surveillance had been performed. If the Surveillance were not performed prior to MODE 1, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of TSR 3.0.c would apply.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-5

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
-------------------NOTE------------------ Only required to be met in MODE 1. -------------------- ------------------ Verify leakage rates are within limits.	24 hours

Example 1.4-5 specifies that the requirements of this Surveillance do not have to be met until the unit is in MODE 1. The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by TSR 3.0.b), but the unit was not in MODE 1, there would be no failure of the TSR nor failure to meet the TLCO. Therefore, no violation of TSR 3.0.d occurs when changing MODES, even with the 24 hour Frequency exceeded, provided the MODE change was not made into MODE 1. Prior to entering MODE 1 (assuming again that the 24 hour Frequency were not met), TSR 3.0.d would require satisfying the TSR.

1.0 USE AND APPLICATION

1.5 TLCO and TSR Implementation

The Technical Requirements Manual (TRM) provides those limitations upon plant operations which are part of the licensing basis for the station but do not meet the criteria for continued inclusion in the Technical Specifications.

It also provides information which supplements the Technical Specifications such as specific plant setpoints for Technical Specification equipment. Nothing in the TRM shall supersede any Technical Specification requirement.

TLCOs and TSRs are implemented the same as Technical Specifications (see TRM 3.0). However, TLCOs and TSRs are treated as plant procedures and are not part of the Technical Specifications. Therefore the following exceptions apply:

a. Violations of the Action or Surveillance requirements in a TLCO are not reportable as conditions prohibited by, or deviations from, the Technical Specifications per 10 CFR 50.72 or 10 CFR 50.73, unless specifically required by the TRM.

b. Power reduction or plant shutdowns required to comply with the Actions of a TLCO or as a result of the application of TLCO 3.0.c are not reportable per 10 CFR 50.72 or 10 CFR 50.73.

c. Violations of TLCO or TSR requirements, except as provided for in TLCO 3.0 of this manual, shall be treated the same as plant procedure violations.

1.0 USE AND APPLICATION

1.6 Technical Requirements Manual Revisions

Changes to this manual shall be made under the following provisions:

a. Changes to the TRM shall be made under appropriate administrative controls and reviews.

b. Licensees may make changes to TRM without prior NRC approval provided the change does not require prior NRC approval pursuant to 10 CFR 50.59.

c. The TRM revision process shall contain provisions to ensure that the TRM is maintained consistent with the UFSAR.

d. Proposed changes that require NRC approval pursuant to 10 CFR 50.59 shall be reviewed and approved by the NRC prior to implementation. Changes to the TRM implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e) as modified by approved exemptions.

Table T2.0.a-1 (page 1 of 3)
Reactor Trip System Instrumentation Trip Setpoints

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
1.	Manual Reactor Trip	1,2,	NA
		3[(a)], 4[(a)], 5[(a)]	
2.	Power Range Neutron Flux		
	a. High	1,2	109% RTP[(h)]
	b. Low	1[(b)],2	25% RTP
3.	Power Range Neutron Flux Rate - High Positive Rate	1,2	5% RTP with time constant ≥ 2 sec
4.	Intermediate Range Neutron Flux	1[(b)], 2[(c)]	25% RTP
5.	Source Range Neutron Flux	2[(d)]	1.0 E5 cps
		3[(a)], 4[(a)], 5[(a)]	1.0 E5 cps
6.	Overtemperature ΔT	1,2	See LCO 3.3.1
7.	Overpower ΔT	1,2	See LCO 3.3.1

(continued)

(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) interlock.

(c) Above the P-6 (Source Range Block Permissive) interlock.

(d) Below the P-6 (Source Range Block Permissive) interlock.

(h) Trip setpoint may be set more conservative than Nominal Trip Setpoint as necessary in response to plant conditions.

Table T2.0.a-1 (page 2 of 3)
Reactor Trip System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
8. Pressurizer Pressure		
a. Low	1(e)	1885 psig
b. High	1,2	2385 psig
9. Pressurizer Water Level - High	1(e)	92% of instrument span
10. Reactor Coolant Flow - Low (per loop)	1(e)	90% of loop minimum measured flow
11. Reactor Coolant Pump (RCP) Breaker Position (per train)	1(e)	NA
12. Undervoltage RCPs (per train)	1(e)	5268 V
13. Underfrequency RCPs (per train)	1(e)	57.0 Hz
14. Steam Generator (SG) Water Level-Low Low (per SG)		
a. Unit 1	1,2	18.0% of narrow range instrument span
b. Unit 2	1,2	36.3% of narrow range instrument span
15. Turbine Trip		
a. Emergency Trip Header Pressure (per train)	1(f)	1000 psig
b. Turbine Throttle Valve Closure (per train)	1(f)	1% open

(continued)

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

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

Table T2.0.a-1 (page 3 of 3)
Reactor Trip System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
16. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	NA
17. Reactor Trip System Interlocks		
a. Source Range Block Permissive, P-6	2[d]	1E-10 amp
b. Low Power Reactor Trips Block, P-7		
(1) P-10 Input	1	NA
(2) P-13 Input	1	NA
c. Power Range Neutron Flux, P-8	1	30% RTP
d. Power Range Neutron Flux, P-10	1,2	10% RTP
e. Turbine Impulse Pressure, P-13	1	10% turbine power
18. Reactor Trip Breakers (RTBs)[g]	1,2	NA
	3[a], 4[a], 5[a]	NA
19. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	1,2	NA
	3[a], 4[a], 5[a]	NA
20. Automatic Trip Logic	1,2	NA
	3[a], 4[a], 5[a]	NA

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(d) Below the P-6 (Source Range Block Permissive) interlock.

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

Table T2.0.b-1 (page 1 of 4)
Engineered Safety Feature Actuation System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
1. Safety Injection		
a. Manual Initiation	1,2,3,4	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
c. Containment Pressure-High 1	1,2,3	3.4 psig
d. Pressurizer Pressure-Low	1,2,3[(a)]	1829 psig
e. Steam Line Pressure-Low	1,2,3[(a)]	640 psig[(b)]
2. Containment Spray		
a. Manual Initiation	1,2,3,4	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
c. Containment Pressure High-3	1,2,3	20.0 psig

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

Table T2.0.b-1 (page 2 of 4)
Engineered Safety Feature Actuation System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
3. Containment Isolation		
a. Phase A Isolation		
(1) Manual Initiation	1,2,3,4	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.	
b. Phase B Isolation		
(1) Manual Initiation	1,2,3,4	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
(3) Containment Pressure High-3	1,2,3	20.0 psig
4. Steam Line Isolation		
a. Manual Initiation	1,2(c),3(c)	NA
b. Automatic Actuation Logic and Actuation Relays	1,2(g),3(g)	NA
c. Containment Pressure-High 2	1,2(g),3(g)	8.2 psig
d. Steam Line Pressure		
(1) Low	1,2(g),3(a)(f)(g)	640 psig(b)
(2) Negative Rate-High	3(d)(g)	100.0 psi(e)

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

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

(d) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.1 blocked.

(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(f) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.2 not enabled.

(g) Except when all Main Steam Isolation Valves (MSIVs) and MSIV bypass valves are closed.

Table T2.0.b-1 (page 3 of 4)
Engineered Safety Feature Actuation System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
5. Turbine Trip and Feedwater Isolation		
a. Automatic Actuation Logic and Actuation Relays	1,2[(h)],3[(h)]	NA
b. Steam Generator (SG) Water Level-High High (P-14)		
1) Unit 1	1,2[(h)],3[(h)]	88.0% of narrow range instrument span
2) Unit 2	1,2[(h)],3[(h)]	80.8% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.	
6. Auxiliary Feedwater		
a. Automatic Actuation Logic and Actuation Relays	1,2,3	NA
b. SG Water Level-Low Low		
1) Unit 1	1,2,3	18.0% of narrow range instrument span
2) Unit 2	1,2,3	36.3% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.	
d. Loss of Offsite Power (Undervoltage on Bus 141(241))	1,2,3	2870 V
e. Undervoltage Reactor Coolant Pump (per train)	1,2	5268 V
f. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure-Low		
Pressure Transmitter Pressure Switch	1,2,3	18.1 psia 20.5 psia

(continued)

(h) Except when all Feedwater Isolation Valves are closed or isolated by a closed manual valve.

Table T2.0.b-1 (page 4 of 4)
Engineered Safety Feature Actuation System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
7. Switchover to Containment Sump		
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
b. Refueling Water Storage Tank (RWST) Level-Low Low	1,2,3,4	46.7% of instrument span
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.	
8. ESFAS Interlocks		
a. Reactor Trip, P-4	1,2,3	NA
b. Pressurizer Pressure, P-11	1,2,3	1930 psig
c. T_{avg} - Low Low, P-12	1,2,3	550°F
9. Loss of Power		
a. Loss of Voltage	1,2,3,4,5[(i)],6[(i)]	2870 V with time delay of ≤ 1.8 sec
b. Degraded Voltage	1,2,3,4,5[(i)],6[(i)]	3987 V with a time delay of 310 sec
c. Low Degraded Voltage	1,2,3,4,5[(i)],6[(i)]	3244.15 V with a time delay of 3.0 sec

(i) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources-Shutdown."

Table T2.0.c-1 (page 1 of 1)
Boron Dilution Protection System Instrumentation Trip Setpoint

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
Boron Dilution Alert Channels		
Volume Control Tank Level High	3,4,5	70.0%

2.1.a MISCELLANEOUS TEST REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Each of the following Surveillances shall be completed within its specified frequency.

2. Failure to meet the surveillance requirement require immediate actions to determine OPERABILITY of the associated equipment. LCOs potentially impacted are identified in the TSR with ().

APPLICABILITY: Defined in the TSR

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 2.4.a.1	--------------------NOTES-------------------- 1. Only applicable in MODE 1. 2. TSR 3.0.d is not applicable. --- Perform CHANNEL CALIBRATION on Reactor Coolant System total flow rate indicators. (LCO 3.4.1)	18 months
TSR 2.5.a.1	--------------------NOTE-------------------- Required to be met in MODES 1, 2; and MODE 3 with the RCS pressure > 1000 psig. --- Perform CHANNEL CALIBRATION on accumulator water level channels. (LCO 3.5.1)	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.a.2	--------------------NOTE-------------------- Required to be met in MODES 1, 2; and MODE 3 with the RCS pressure > 1000 psig. -- Perform CHANNEL CALIBRATION on accumulator pressure channels. (LCO 3.5.1)	18 months
TSR 2.5.b.1	--------------------NOTE-------------------- Required to be met in MODES 1, 2, 3, and 4. -- Verify, through a visual inspection of all accessible areas of the containment, loose debris which could be transported to the containment sump during LOCA conditions has been removed. (LCO 3.5.2/3.5.3)	Prior to entering MODE 4

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.b.2	--------------------NOTES-------------------- 1. Required to be met in MODES 1, 2, 3, and 4. 2. Only required to be performed once TSR 2.5.b.1 has been completed. 3. TSR 3.0.d is not applicable. --- Verify, through a visual inspection of the areas affected within containment, loose debris which could be transported to the containment sump during LOCA conditions has been removed. (LCO 3.5.2/3.5.3)	Following each containment entry

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.1	-------------------NOTES------------------- 1. Only applicable to the following ECCS throttle valves: a. High Head SI System - SI8810A,B,C,D b. SI System - SI8822A,B,C,D and SI8816A,B,C,D 2. Required to be met in MODES 1, 2, 3; and MODE 4 when the associated ECCS subsystems are required to be OPERABLE. 3. Only required to be performed for affected valves following valve stroking operation or maintenance on the valve. --- Verify the correct position of each position stop for the ECCS throttle valves. (LCO 3.5.2)	Once within 4 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.2	--------------------NOTES-------------------- 1. A flow balance test that introduces flow to the loops shall not be performed in MODE 1, 2, 3, or 4. 2. Only required to be performed following alterations to the CV pump and/or piping system that alter the ECCS flow characteristics. 3. Required to be met in MODES 1, 2, 3; and MODE 4 when the associated ECCS subsystems are required to be OPERABLE. --	
	Verify through analytical means or a flow balance test that the CV pump performance curve and/or the following CV ECCS cold leg injection flow characteristics are met with a single pump running: a. The sum of the injection line flow rates, excluding the highest flow rate, is ≥ 330 gpm; and b. The total pump flow rate is ≤ 550 gpm, including a simulated seal injection flow of ≥ 80 gpm. <u>OR</u>	Prior to associated subsystems being declared OPERABLE
		(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
(continued)	-------------------NOTE-------------------- Only applicable in MODES 1, 2, 3, 4, and 5. --- Verify the CV pump performance curve and/or CV ECCS cold leg injection flow characteristics are acceptable by a technical evaluation that concludes the evaluation results are: 1. within the acceptance criteria of the accident analyses of record; and 2. acceptable for continued equipment operation. <u>AND</u> Demonstrate by a flow balance test that the flow rates specified in a. and b. above are within limits prior to the associated subsystems being declared OPERABLE following the next refueling. (LCO 3.5.2)	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.3	-------------------NOTES------------------- 1. A flow balance test that introduces flow to the loops shall not be performed in MODE 1, 2, 3, or 4. 2. Only required to be performed following alterations to the SI pump and/or piping system that alter the ECCS flow characteristics. 3. Required to be met in MODES 1, 2, 3; and MODE 4 when the associated ECCS subsystems are required to be OPERABLE. ---	
	Verify through analytical means or a flow balance test that the SI pump performance curve and/or the following SI ECCS cold leg injection flow characteristics are met with a single pump running: a. The sum of the injection line flow rates, excluding the highest flow rate, is ≥ 439 gpm; and b. The total pump flow rate is ≤ 655 gpm. <u>OR</u>	Prior to associated subsystems being declared OPERABLE
		(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
(continued) Verify the SI pump performance curve and/or SI ECCS cold leg injection flow characteristics are acceptable by a technical evaluation that concludes the evaluation results are: 1. within the acceptance criteria of the accident analyses of record; and 2. acceptable for continued equipment operation (e.g., pump NPSH, pump runout, etc.). Flow rates specified in a. and b. above shall be returned to within limits prior to the associated subsystems being declared OPERABLE if in a refueling outage or no later than the end of the next refueling if in MODES 1, 2, 3, 4, or 5. (LCO 3.5.2)	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.4	-------------------NOTES------------------- 1. Only required to be performed following alterations to the RHR pump and/or piping system that alter the ECCS flow characteristics. 2. Required to be met in MODES 1, 2, 3; and MODE 4 when the associated ECCS subsystems are required to be OPERABLE. --- Verify the RHR pump performance curve and/or RHR ECCS cold leg injection flow characteristics are consistent with the assumptions used in the safety analyses. (LCO 3.5.2/LCO 3.5.3)	Prior to associated ECCS subsystems required to be OPERABLE
TSR 2.6.a.1	Deleted.	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.7.a.1	-------------------NOTES------------------- 1. This surveillance shall not be performed in MODE 1, 2, or 3. 2. Required to be met in MODES 1, 2, and 3. --- Perform an inspection of the B Train Auxiliary Feedwater Pump diesel engine in accordance with manufacturer's recommendation for this class of service. (LCO 3.7.5)	18 months
TSR 2.7.a.2	-------------------NOTE-------------------- Required to be met in MODES 1, 2, 3, and 4. --- Perform a hydrographic survey to verify the Essential Service Cooling Pond (ESCP) slopes exhibit no excess degradation. (LCO 3.7.9)	18 months

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) LIMITING CONDITION FOR OPERATION (TLCO) APPLICABILITY

TLCO 3.0.a	TLCOs shall be met during the MODES or other specified conditions in the Applicability, except as provided in TLCO 3.0.b and TLCO 3.0.f.
TLCO 3.0.b	Upon discovery of a failure to meet a TLCO, the Required Actions of the associated Conditions shall be met, except as provided in TLCO 3.0.e. If the TLCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required unless otherwise stated.
TLCO 3.0.c	When a TLCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, action shall be initiated within 1 hour to: 1. Implement appropriate compensatory actions as needed, 2. Verify that the plant is not in an unanalyzed condition or that a required safety function is not compromised by the inoperabilities, and 3. Within 12 hours, obtain Station Duty Officer approval of the compensatory actions and plan for exiting TLCO 3.0.c. Exceptions to this TLCO are stated in the individual TLCOs. Where corrective measures are completed that permit operation in accordance with the TLCO or ACTIONS, completion of the actions required by TLCO 3.0.c is not required. TLCO 3.0.c is only applicable in MODES 1, 2, 3, and 4.

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) LIMITING CONDITION FOR OPERATION (TLCO) APPLICABILITY

TLCO 3.0.d

When a TLCO is not met, entry into a MODE or other specified condition in the Applicability shall only be made:

1. When the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time;

2. After performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering the MODE or other specified condition in the Applicability, and establishment of risk management actions, if appropriate; or

3. When an allowance is stated in the individual value, parameter, or other TLCO

This TLCO shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

TLCO 3.0.e

Equipment removed from service or declared inoperable to comply with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to TLCO 3.0.b for the system returned to service under administrative control to perform the required testing to demonstrate OPERABILITY.

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) LIMITING CONDITION FOR OPERATION (TLCO) APPLICABILITY

TLCO 3.0.f Exception TLCOs allow specified TRM requirements to be changed to permit performance of special tests and operations. Unless otherwise specified, all other TRM requirements remain unchanged. Compliance with Exception TLCOs is optional. When an Exception TLCO is desired to be met but is not met, the ACTIONS of the Exception TLCO shall be met. When an Exception TLCO is not desired to be met, entry into a MODE or other specified condition in the Applicability shall be made in accordance with the other applicable TLCOs.

TLCO 3.0.g TLCOs, including associated ACTIONs, shall apply to each unit individually, unless otherwise indicated. Whenever the TLCO refers to a system or component that is shared by both units, the ACTIONs will apply to both units simultaneously.

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) SURVEILLANCE REQUIREMENT (TSR) APPLICABILITY

TSR 3.0.a

TSRs shall be met during the MODES or other specified conditions in the Applicability for individual TLCOs, unless otherwise stated in the TSR. Failure to meet a TSR, whether such failure is experienced during the performance of the TSR or between performances of the TSR, shall be failure to meet the TLCO. Failure to perform a TSR within the specified Frequency shall be failure to meet the TLCO except as provided in TSR 3.0.c. TSRs do not have to be performed on inoperable equipment or variables outside specified limits.

TSR 3.0.b

The specified Frequency for each TSR is met if the TSR is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met.

For Frequencies specified as "once," the above interval extension does not apply.

If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance.

Exceptions to this TSR are stated in the individual TSRs.

TSR 3.0.c

If it is discovered that a TSR was not performed within its specified Frequency, then compliance with the requirement to declare the TLCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater. This delay period is permitted to allow performance of the TSR. A risk evaluation shall be performed for any TSR delayed greater than 24 hours and the risk impact shall be managed.

If the TSR is not performed within the delay period, the TLCO must immediately be declared not met, and the applicable Condition(s) must be entered.

When the TSR is performed within the delay period and the TSR is not met, the TLCO must immediately be declared not met, and the applicable Condition(s) must be entered.

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) SURVEILLANCE REQUIREMENT (TSR) APPLICABILITY

TSR 3.0.d Entry into a MODE or other specified condition in the Applicability of a TLCO shall only be made when the TLCO's TSRs have been met within their specified Frequency, except as provided by TSR 3.0.c. When a TLCO is not met due to TSRs not having been met, entry into a MODE or other specified condition in the Applicability shall only be made in accordance with TLCO 3.0.d.

This provision shall not prevent entry into MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

TSR 3.0.e TSRs shall apply to each unit individually, unless otherwise indicated.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.a Boration Flow Path - Shutdown

TLCO 3.1.a One of the following boron injection flow paths via the Chemical & Volume Control (CV) System shall be OPERABLE and capable of being powered from an OPERABLE emergency power source:

1. A flow path via a boric acid transfer pump from the Boric Acid Storage System, which is OPERABLE as specified in TLCO 3.1.e for MODE 5 or as specified in TLCO 3.1.f for MODE 4; or

2. A flow path from the Refueling Water Storage Tank (RWST) which is OPERABLE as specified in TLCO 3.1.e for MODE 5 or as specified in LCO 3.5.4 for MODE 4.

APPLICABILITY: MODES 4 and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required flow path inoperable. <u>OR</u> Required flow path not capable of being powered from an OPERABLE emergency power source.	A.1 ---------NOTE-------- Not applicable if positive reactivity addition is the direct result of a RCS cooldown required by Technical Specifications. --------------------- Suspend positive reactivity additions.	 Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.a.1	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.a.1. --- Verify Boric Acid Storage System solution temperature is ≥ 65°F.	7 days
TSR 3.1.a.2	Verify each manual, power operated, or automatic valve in the required flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.	31 days

3.1 REACTIVITY CONTROL SYSTEMS

3.1.b Boration Flow Paths - Operating

TLCO 3.1.b One boron injection flow path via the Chemical & Volume (CV) Control System from the Refueling Water Storage Tank (RWST) shall be OPERABLE, and either:

1. One additional OPERABLE flow path from the RWST, or
2. An OPERABLE flow path via a boric acid transfer pump from the Boric Acid Storage System.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required flow path inoperable.	A.1	Restore required flow path to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	B.2 Borate to the SHUTDOWN MARGIN specified in the COLR at 200°F.	6 hours
	<u>AND</u>	
	B.3.1 Restore required flow path to OPERABLE status.	174 hours
	<u>OR</u>	
	B.3.2 Be in MODE 4.	180 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.1.b.1 -------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.b.2. -- Verify Boric Acid Storage System solution temperature is ≥ 65°F.	7 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.1.b.2	Verify each manual, power operated, or automatic valve in the required flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.	31 days
TSR 3.1.b.3	-------------------NOTE-------------------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. -- Verify each automatic valve in the required flow path actuates to its correct position on an actual or simulated safety injection actuation signal.	36 months
TSR 3.1.b.4	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.b.2. -- Verify required flow path from the Boric Acid Storage System delivers ≥ 30 gpm to the RCS.	18 months

3.1 REACTIVITY CONTROL SYSTEMS

3.1.c Charging Pump - Shutdown

TLCO 3.1.c One centrifugal charging pump in the boron injection flow path required by TLCO 3.1.a shall be OPERABLE and capable of being powered from an OPERABLE emergency power source.

APPLICABILITY: MODES 4 and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required charging pump inoperable. OR Required charging pump not capable of being powered from an OPERABLE emergency power source.	A.1 ---------NOTE-------- Not applicable if positive reactivity addition is the direct result of a RCS cooldown required by Technical Specifications. --------------------- Suspend positive reactivity additions.	 Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.1.c.1 Verify the required centrifugal charging pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.d Charging Pumps - Operating

TLCO 3.1.d Two centrifugal charging pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One charging pump inoperable.	A.1 Restore charging pump to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Borate to the SHUTDOWN MARGIN specified in the COLR at 200°F.	6 hours
	AND	
	B.3 Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.d.1	Verify each centrifugal charging pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.e Borated Water Source - Shutdown

TLCO 3.1.e One of the following borated water sources shall be OPERABLE:

1. A Boric Acid Storage System, or
2. The Refueling Water Storage Tank (RWST).

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required borated water source inoperable.	A.1 Suspend positive reactivity additions.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.e.1	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.e.2 and the outside air temperature < 35°F. --- Verify RWST solution temperature ≥ 35°F.	 24 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.1.e.2	------------------NOTE------------------ Only required to be performed when complying with TLCO 3.1.e.2. -- Verify RWST boron concentration ≥ 2300 ppm and ≤ 2500 ppm.	7 days
TSR 3.1.e.3	------------------NOTE------------------ Only required to be performed when complying with TLCO 3.1.e.2. -- Verify RWST borated water level is ≥ 9.0%.	7 days
TSR 3.1.e.4	------------------NOTE------------------ Only required to be performed when complying with TLCO 3.1.e.1. -- Verify Boric Acid Storage System solution temperature is ≥ 65°F.	7 days
TSR 3.1.e.5	------------------NOTE------------------ Only required to be performed when complying with TLCO 3.1.e.1. -- Verify Boric Acid Storage System boron concentration is ≥ 7000 ppm.	7 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.1.e.6	-------------------NOTE------------------- Only required to be performed when complying with TLCO 3.1.e.1. -- Verify Boric Acid Storage System borated water level is ≥ 12.0%.	 7 days

3.1 REACTIVITY CONTROL SYSTEMS

3.1.f Borated Water Sources - Operating

TLCO 3.1.f The Boric Acid Storage System shall be OPERABLE when required as a borated water source by TLCO 3.1.b for MODES 1, 2, and 3 or TLCO 3.1.a for MODE 4.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required Boric Acid Storage System inoperable in MODE 1, 2, or 3.	A.1 Restore the Boric Acid Storage System to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Borate to the SHUTDOWN MARGIN specified in the COLR at 200°F. AND B.3.1 Restore the required Boric Acid Storage System to OPERABLE status. OR B.3.2 Be in MODE 4.	6 hours 6 hours 174 hours 180 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Boric Acid Storage System inoperable in MODE 4.	C.1 Restore the required Boric Acid Storage System to OPERABLE status.	6 hours
	<u>OR</u>	
	C.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.1.f.1 Verify Boric Acid Storage System solution temperature is ≥ 65°F.	7 days
TSR 3.1.f.2 Verify Boric Acid Storage System boron concentration is ≥ 7000 ppm.	7 days
TSR 3.1.f.3 Verify Boric Acid Storage System borated water level is ≥ 40%.	7 days

3.1 REACTIVITY CONTROL SYSTEMS

3.1.g Position Indication System - Shutdown

TLCO 3.1.g One Digital Rod Position Indication (DRPI), excluding bank demand position indication, shall be OPERABLE and capable of determining the control rod position within 12 steps for each shutdown or control rod not fully inserted.

APPLICABILITY: MODES 3, 4, and 5 with the Rod Control System capable of rod withdrawal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more shutdown or control rods with required DRPI inoperable.	A.1 Restore required OPERABLE DRPI.	15 minutes
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to fully insert all rods.	Immediately
	<u>OR</u>	
	B.2 Initiate boration to restore RCS boron concentration to within the limits specified in the COLR.	Immediately
	<u>OR</u>	
	B.3 Open Reactor Trip Breakers (RTBs) and Reactor Trip Bypass Breakers (RTBBs).	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.g.1	Verify each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel.	18 months

3.1 REACTIVITY CONTROL SYSTEM

3.1.h Shutdown Margin (SDM) - MODE 1 and MODE 2 with $k_{eff} \geq 1.0$

TLCO 3.1.h SDM shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1, and
MODE 2 with $k_{eff} \geq 1.0$.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate and continue boration.	1 hour
	AND	
	A.2 Restore required SDM to within limits specified in the COLR.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.h.1	Verify SDM is within limit with control banks at the maximum insertion limit specified in LCO 3.1.6 and considering the following factors: a. Reactor Coolant System boron concentration, b. Control rod position, c. Reactor Coolant System average temperature, d. Fuel burnup based on gross thermal energy generation, e. Xenon concentration, and f. Samarium concentration.	Prior to operation above 5% RATED THERMAL POWER after each fuel loading

3.1 REACTIVITY CONTROL SYSTEMS

3.1.i Shutdown Margin (SDM) - MODE 5

TLCO 3.1.i SDM shall be within the limits specified in the COLR.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Declare both Boron Dilution Protection System subsystems inoperable and enter Condition C of LCO 3.3.9, "Boron Dilution Protection System (BDPS)," for "Two Boron Dilution Alert channels inoperable or no reactor coolant pump in operation or one or more RCS loop isolation valve(s) not open." <u>AND</u> A.2 Enter Condition A of LCO 3.1.1, "Shutdown Margin (SDM)," for SDM not within limit.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
NONE	

3.1 REACTIVITY CONTROL SYSTEM

3.1.j Shutdown and Control Rods

TLCO 3.1.j All shutdown and control rods not fully inserted shall be OPERABLE.

APPLICABILITY: MODES 3, 4, and 5.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more rods inoperable.	A.1	Verify SDM is within the limits specified in the COLR.	1 hour <u>AND</u> Once per 12 hours thereafter
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> SDM not within the limits specified in the COLR for Required Action A.1.	B.1	Initiate and continue boration to restore the required SDM to within limits specified in the COLR.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
NONE	

3.1 REACTIVITY CONTROL SYSTEMS

3.1.k Position Indication System - Shutdown (Special Test Exception)

TLCO 3.1.k The requirements of TLCO 3.1.g may be suspended provided either:

1. Only one shutdown or control bank is withdrawn from the fully inserted position at a time, or
2. The Reactor Coolant System (RCS) boron concentration is within the limits specified in the COLR for maintaining $k_{eff} \leq 0.987$ with all shutdown and control rods fully withdrawn.

APPLICABILITY: MODES 3, 4, and 5 during performance of rod drop time measurements and during the surveillance of Digital Rod Position Indication (DRPI) for OPERABILITY.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE-------- Only applicable when invoking TLCO 3.1.k.1. --------------------- More than one bank of rods withdrawn. <u>OR</u> ---------NOTE-------- Only applicable when invoking TLCO 3.1.k.2. --------------------- RCS boron concentration not within limit.	A.1 Restore required OPERABLE DRPI.	15 minutes

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Actions and associated Completion Times of Condition A not met.	B.1	Initiate action to fully insert all rods.	Immediately
	OR		
	B.2	Initiate boration to restore RCS boron concentration to within the limits specified in the COLR.	Immediately
	OR		
	B.3	Open Reactor Trip Breakers (RTBs) and Reactor Trip Bypass Breakers (RTBBs).	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.k.1	-------------------NOTE-------------------- Only required to be performed when invoking TLCO 3.1.k.1. --- Verify each DRPI agrees within 12 steps of the group demand position when the rods are stationary and within 24 steps of the group demand position during rod motion.	Once within 24 hours prior to the start of rod drop time measurements AND 24 hours thereafter
TSR 3.1.k.2	-------------------NOTE-------------------- Only required to be performed when invoking TLCO 3.1.k.2. --- Verify the RCS boron concentration is within the limits specified in the COLR for maintaining $k_{eff} \leq 0.987$ with all shutdown and control rods fully withdrawn.	Once within 2 hours prior to the start of either rod drop time measurements or the surveillance of DRPI for OPERABILITY AND 2 hours thereafter

3.3 INSTRUMENTATION

3.3.a Movable Incore Detectors

TLCO 3.3.a The Movable Incore Detection System shall be OPERABLE with:

1. ≥ 75% of the detector thimbles,
2. ≥ 2 detector thimbles per core quadrant, and
3. Sufficient movable detectors, drive, and readout equipment to map these thimbles.

-------------------------NOTES-------------------------

Only ≥ 50% of the detector thimbles are required for:

1. Power Distribution Monitoring System (PDMS) calibrations after the initial PDMS calibration following each refueling.
2. Monitoring normalized symmetric power distribution, i.e., Quadrant Power Tilt Ratio (QPTR) via an incore flux map, provided there are ≥ 2 detector thimbles per core quadrant and at least 2 of the detector thimbles per core quadrant have a symmetric thimble in at least one other quadrant.

APPLICABILITY: When the Movable Incore Detection System is used for:

1. Recalibration of the Excore Neutron Flux Detection System,
2. Calibration of the PDMS,
3. Monitoring normalized symmetric power distribution, or
4. Measurement of $F^N_{\Delta H}$, $F^C_Q(Z)$, and $F^W_Q(Z)$.

ACTIONS

-----------------------------------NOTE-----------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Movable Incore Detection System inoperable.	A.1	Suspend use of the Movable Incore Detection System data for applicable recalibration, measurement, or monitoring.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.a.1	Normalize each detector output when required for: a. Recalibration of the Excore Neutron Flux Detection System, b. Calibration of the PDMS, c. Monitoring normalized symmetric power distribution, or d. Measurement of $F_{\Delta H}^{N}$, $F_Q^C(Z)$, and $F_Q^W(Z)$.	24 hours

3.3 INSTRUMENTATION

3.3.b Seismic Monitoring Instrumentation

TLCO 3.3.b The seismic monitoring instrumentation in Table T3.3.b-1 shall be OPERABLE.

APPLICABILITY: At all times.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each instrument.

2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more seismic monitoring instruments inoperable.	A.1 Restore required instrument to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Prepare and submit a report to the Plant Operating Review Committee outlining the cause of the malfunction and the plans for restoring the instrument to OPERABLE status.	10 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. ---------NOTE--------- Required Actions C.2 and C.3 shall be completed whenever Condition C is entered. --------------------- One or more required seismic instruments actuated during a confirmed seismic event.	C.1	Restore required instrument to OPERABLE status.	24 hours
	AND		
	C.2	Analyze data retrieved from instrument to determine the magnitude of the vibratory ground motion.	14 days
	AND		
	C.3	Prepare and submit a report to the Plant Operating Review Committee describing the magnitude, frequency spectrum, and resultant effect upon facility features important to safety.	14 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.b.1	Verify OPERABLE status indications of the seismic monitoring instrumentation.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.3.b.2	Verify the triaxial acceleration sensors and the time-history accelerographs properly process the equipment internal test signals.	92 days
TSR 3.3.b.3	Verify the response spectrum analyzer properly executes its diagnostic routine.	92 days
TSR 3.3.b.4	-------------------NOTE-------------------- TSR 3.3.b.4 may be performed in lieu of the test required by TSR 3.3.b.2. -- Verify the triaxial acceleration sensors and the time-history accelerographs properly record the equipment internal test signals.	184 days
TSR 3.3.b.5	Verify the electronic calibration of the time-history accelerographs.	18 months
TSR 3.3.b.6	Install fresh magnetic recording plates in the triaxial peak accelerographs.	18 months

Table T3.3.b-1 (page 1 of 1)
Seismic Monitoring Instrumentation

INSTRUMENTS AND SENSOR LOCATIONS	MEASUREMENT RANGE	REQUIRED INSTRUMENTS
1. Time - History Accelerographs (Central Recorder)		
Auxiliary Electrical Equipment Room, OPA02J	NA	1
2. Triaxial Peak Accelerographs		
a. Containment/Reactor Equipment Accumulators	-2 g to +2 g	1
b. Containment/Reactor Piping	-2 g to +2 g	1
c. Auxiliary Building/Category I Piping	-2 g to +2 g	1
3. Response-Spectrum Analyzer (Computer)		
Auxiliary Electrical Equipment Room, OPA02J	None	1
4. Triaxial Acceleration Sensors		
a. Containment/10W - 377 ft	-2 g to +2 g	1
b. Containment/10W - 502 ft	-2 g to +2 g	1
c. Containment/10X - 426 ft	-2 g to +2 g	1
d. Free Field/38 + 01S, 34 + 15E	-2 g to +2 g	1
e. Auxiliary Building/18N - 426 ft	-2 g to +2 g	1
f. Auxiliary Building/18L - 335 ft	-2 g to +2 g	1

3.3 INSTRUMENTATION

3.3.c Meteorological Monitoring Instrumentation

TLCO 3.3.c The meteorological monitoring instrumentation channels in Table T3.3.c-1 shall be OPERABLE.

APPLICABILITY: At all times.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each channel.
2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more meteorological monitoring instrument channels inoperable.	A.1	Restore channel to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1	Prepare and submit a report to the Plant Operating Review Committee outlining the cause of the malfunction and the plans for restoring the channel to OPERABLE status.	10 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.c.1 Perform CHANNEL CHECK.	24 hours
TSR 3.3.c.2 Perform CHANNEL CALIBRATION.	184 days

Table T3.3.c-1 (page 1 of 1)
Meteorological Monitoring Instrumentation

	INSTRUMENT AND LOCATION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1.	Wind Speed		
	a. Nominal Elevation 34 ft	1	TSR 3.3.c.1 TSR 3.3.c.2
	b. Nominal Elevation 203 ft	1	TSR 3.3.c.1 TSR 3.3.c.2
2.	Wind Direction		
	a. Nominal Elevation 34 ft	1	TSR 3.3.c.1 TSR 3.3.c.2
	b. Nominal Elevation 203 ft	1	TSR 3.3.c.1 TSR 3.3.c.2
3.	Air Temperature - ΔT (Nominal Elevation 30 ft/199 ft)	1	TSR 3.3.c.1 TSR 3.3.c.2

3.3 INSTRUMENTATION

3.3.d Loose-Part Detection System

TLCO 3.3.d The Loose-Part Detection instrumentation in Table T3.3.d-1 shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each instrument.

2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required Loose-Part Detection System instruments inoperable.	A.1	Restore required instrument to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1	Prepare and submit a report to the Plant Operating Review Committee outlining the cause of the malfunction and the plans for restoring the instrument to OPERABLE status.	10 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.d.1	Perform CHANNEL CHECK.	24 hours
TSR 3.3.d.2	--------------------NOTE-------------------- Verification of setpoint not required. --- Perform CHANNEL OPERATIONAL TEST.	31 days
TSR 3.3.d.3	Perform CHANNEL CALIBRATION.	18 months

Table T3.3.d-1 (page 1 of 1)
Loose-Part Detection Instrumentation

---NOTE---
The Loose-Part Detection Instrumentation is considered OPERABLE if one of the two sensor channels for each instrument in Table T3.3.d-1 and the associated amplifier are OPERABLE.

INSTRUMENT AND LOCATION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1. Reactor Head a. _VE-LM001 (270°) OR b. _VE-LM002 (0°)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
2. Reactor Bottom a. _VE-LM003 (G-9) OR b. _VE-LM004 (H-13)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
3. "A" Steam Generator Channel Head a. _VE-LM005 (Hot Side) OR b. _VE-LM006 (Cold Side)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
4. "B" Steam Generator Channel Head a. _VE-LM007 (Hot Side) OR b. _VE-LM008 (Cold Side)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
5. "C" Steam Generator Channel Head a. _VE-LM009 (Hot Side) OR b. _VE-LM010 (Cold Side)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
6. "D" Steam Generator Channel Head a. _VE-LM011 (Hot Side) OR b. _VE-LM012 (Cold Side)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3

3.3 INSTRUMENTATION

3.3.e Explosive Gas Monitoring Instrumentation

TLCO 3.3.e The explosive gas monitoring instrumentation channels in Table T3.3.e-1 shall be OPERABLE with their Alarm/Trip setpoints set to ensure that the limits of the Explosive Gas and Storage Tank Radioactivity Monitoring Program are not exceeded.

APPLICABILITY: According to Table T3.3.e-1.

ACTIONS

------------------------------------NOTES------------------------------------
1. Separate Condition entry is allowed for each channel.

2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1.1 Suspend affected system operation. <u>OR</u>	Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.1.2.1 ---------NOTE-------- Only applicable during degassing operation. ---------------------	
	Take and analyze grab samples.	Once per 4 hours
	AND	
	A.1.2.2 ---------NOTE-------- Only applicable during non-degassing operations. ---------------------	
	Take and analyze grab samples.	Once per 24 hours
	AND	
	A.2.1 Restore channel to OPERABLE status.	30 days
	OR	
	A.2.2 Prepare and submit a report to the Plant Operating Review Committee explaining the reason for not correcting the inoperability in a timely manner.	60 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.e.1	Perform CHANNEL CHECK.	24 hours
TSR 3.3.e.2	Perform CHANNEL OPERATIONAL TEST.	31 days
TSR 3.3.e.3	--------------------NOTES-------------------- 1. For the Hydrogen Analyzer, the CHANNEL CALIBRATION shall include the use of standard gas samples containing hydrogen and nitrogen. 2. For the Oxygen Analyzer and the Waste Gas Compressor Discharge Oxygen Analyzer, the CHANNEL CALIBRATION shall include the use of standard gas samples containing oxygen and nitrogen. --- Perform CHANNEL CALIBRATION.	92 days

Table T3.3.e-1 (page 1 of 1)
Explosive Gas Monitoring Instrumentation

	INSTRUMENT	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1.	Hydrogen Analyzer (OAT-GW8000)	(a)	1	TSR 3.3.e.1 TSR 3.3.e.2 TSR 3.3.e.3
2.	Oxygen Analyzer (OAIT-GW8003)	(a)	1	TSR 3.3.e.1 TSR 3.3.e.2 TSR 3.3.e.3
3.	Waste Gas Compressor Discharge Oxygen Analyzer (OAIT-GW004)	(b)	1	TSR 3.3.e.1 TSR 3.3.e.2 TSR 3.3.e.3

(a) During WASTE GAS HOLDUP SYSTEM operation.

(b) During Waste Gas Compressor operation.

3.3 INSTRUMENTATION

3.3.f High Energy Line Break (HELB) Isolation Sensors

TLCO 3.3.f The HELB instrumentation channels shown in Table T3.3.f-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.f-1.

ACTIONS

------------------------------------ NOTES ------------------------------------

1. Separate Condition entry is allowed for each channel.
2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required auxiliary steam isolation instrumentation channels inoperable.	A.1	Restore the required channel to OPERABLE status.	7 days
	<u>OR</u>		
	A.2	Suspend the supply of auxiliary steam to the Auxiliary Building.	7 days
	<u>OR</u>		
	A.3	Establish a continuous watch in the affected area.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more required steam generator blowdown line isolation instrumentation channels inoperable.	B.1 Restore the required channel to OPERABLE status.	7 days
	<u>OR</u>	
	B.2 Limit the total steam generator blowdown flow rate to ≤ 60 gpm on the affected unit.	7 days
	<u>OR</u>	
	B.3 Establish a continuous watch in the affected area.	7 days

SURVEILLANCE REQUIREMENTS

-----------------------------------NOTE-----------------------------------
TSR 3.3.f.1 and TSR 3.3.f.2 apply to each HELB instrument in Table T3.3.f-1.

SURVEILLANCE	FREQUENCY
TSR 3.3.f.1 Perform CHANNEL OPERATIONAL TEST.	18 months
TSR 3.3.f.2 Perform CHANNEL CALIBRATION.	18 months

Table T3.3.f-1 (page 1 of 1)
High Energy Line Break Instrumentation

INSTRUMENT AND LOCATION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS
1. Auxiliary Steam Isolation		
a. 0TS-AS031A 0TS-AS032A	(a)	1
b. 0TS-AS031B 0TS-AS032B	(a)	1
c. 0TS-AS031C 0TS-AS032C	(b)	1
d. 0TS-AS031D 0TS-AS032D	(b)	1
e. 0TS-AS031E 0TS-AS032E	(b)	1
f. 0TS-AS031F 0TS-AS032F	(b)	1
2. Steam Generator Blowdown Line Isolation		
a. TS-SD045A TS-SD045B	1,2,3,4	1
b. TS-SD046A TS-SD046B	1,2,3,4	1
c. TS-SD045C TS-SD045D	1,2,3,4	1
d. TS-SD046C TS-SD046D	1,2,3,4	1

(a) When auxiliary steam is supplied from any source to the Auxiliary Building, except when the Recycle Evaporator Auxiliary Steam blank-off flange is installed in line 0AS96A-10".

(b) When auxiliary steam is supplied from any source to the Auxiliary Building, except when the Radwaste Evaporator Auxiliary Steam blank-off flange is installed in line 0AS03F-16".

3.3 INSTRUMENTATION

3.3.g Turbine Overspeed Protection

TLCO 3.3.g At least one Turbine Overspeed Protection System, as shown in Table T3.3.g-1, shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One throttle valve or one governor valve per high pressure turbine steam line inoperable.	A.1 Restore the valve to OPERABLE status.	72 hours
B. One reheat stop valve or one reheat intercept valve per low pressure turbine steam line inoperable.	B.1 Restore the valve to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Close at least one valve in the affected steam line. <u>OR</u> C.2 Isolate the turbine from the steam supply.	6 hours 6 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Turbine Overspeed Protection System inoperable for reasons other than Condition A or B.	D.1 ---------NOTE-------- For additional guidance, reference Tables T3.3.g-1 and T3.3.g-2. --------------------- Isolate the turbine from the steam supply.	 6 hours

SURVEILLANCE REQUIREMENTS

------------------------------------NOTE------------------------------------
TSR 3.0.d is not applicable.

SURVEILLANCE		FREQUENCY
TSR 3.3.g.1	Cycle each of the 12 extraction steam nonreturn check valves from the closed position.	Once within 7 days prior to entering MODE 3 from MODE 4.
TSR 3.3.g.2	-------------------NOTE-------------------- Only required to be performed during turbine operation. -- Verify, by direct observation, freedom of movement of each of the 12 extraction steam nonreturn check valve weight arms.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.3.g.3	-------------------NOTE-------------------- Only required to be performed during turbine operation. --- Verify, by direct observation, closure of each of the following valves from the running position. a. Six turbine reheat stop valves; and b. Six turbine reheat intercept valves.	31 days
TSR 3.3.g.4	-------------------NOTE-------------------- Only required to be performed during turbine operation. --- Verify, by direct observation, closure of each of the following valves from the running position. a. Four high pressure turbine throttle valves; and b. Four high pressure turbine governor valves.	184 days
TSR 3.3.g.5	Perform CHANNEL CALIBRATION.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.3.g.6	Disassemble at least one of each type of the following valves and perform a visual and surface inspection of valve seats, disks, and stems to verify no unacceptable flaws or corrosion: a. Four high pressure turbine throttle valves, b. Four high pressure turbine governor valves, c. Six turbine reheat stop valves, d. Six turbine reheat intercept valves; and e. Twelve extraction steam nonreturn check valves.	40 months

TABLE T3.3.g-1 (page 1 of 1)
Turbine Overspeed Protection

---NOTE---

TLCO 3.3.g requires at least one Turbine Overspeed Protection System to be OPERABLE. This TLCO is satisfied by the operability of one overspeed trip network along with the turbine throttle, governor, reheat stop, reheat intercept, and nonreturn check valves.

OVERSPEED TRIP NETWORK #1	OVERSPEED TRIP NETWORK #2	OVERSPEED TRIP NETWORK #3
Speed Probes(1/2SE-TS013_) Turbine Emergency Trip Cabinet 1/2PA38J OST-2 Turbine Overspeed Trip System Panel 1/2TG09J High Pressure Trip Manifold Solenoids 1/2FSV-EH5021A, B, C and D and 1/2FSV-EH5022A, B, C and D[(a)]	Speed Probes (1/2SE-TS011_) DEH Control Cabinet 1/2PA22J High Pressure Trip Manifold Solenoids 1/2FSV-EH5022A, B, C and D[(b)]	Speed Probes (1/2SE-TS014_) DEH Control Cabinet 1/2PA22J High Pressure Trip Manifold Solenoids 1/2FSV-EH5021A, B, C and D[(c)]

(a) The high pressure trip manifold solenoid portion of Overspeed Trip Network #1 is OPERABLE provided any one of the following combinations of solenoids are OPERABLE: 1/2FSV-EH5021A and 1/2FSV-EH5021B; 1/2FSV-EH5021A and 1/2FSV-EH5021D; 1/2FSV-EH5021B and 1/2FSV-EH5021C; 1/2FSV-EH5021C and 1/2FSV-EH5021D; 1/2FSV-EH5022A and 1/2FSV-EH5022B; 1/2FSV-EH5022A and 1/2FSV-EH5022D; 1/2FSV-EH5022B and 1/2FSV-EH5022C; or 1/2FSV-EH5022C and 1/2FSV-EH5022D.

(b) The high pressure trip manifold solenoid portion of Overspeed Trip Network #2 is OPERABLE provided any one of the following combinations of solenoids are OPERABLE: 1/2FSV-EH5022A and 1/2FSV-EH5022B; 1/2FSV-EH5022A and 1/2FSV-EH5022D; 1/2FSV-EH5022B and 1/2FSV-EH5022C; or 1/2FSV-EH5022C and 1/2FSV-EH5022D.

(c) The high pressure trip manifold solenoid portion of Overspeed Trip Network #3 is OPERABLE provided any one of the following combinations of solenoids are OPERABLE: 1/2FSV-EH5021A and 1/2FSV-EH5021B; 1/2FSV-EH5021A and 1/2FSV-EH5021D; 1/2FSV-EH5021B and 1/2FSV-EH5021C; or 1/2FSV-EH5021C and 1/2FSV-EH5021D.

Entry into TLCO 3.3.g, CONDITIONS A or B is only required when a problem exists with one of the specified valves prohibiting it from closing. The inability of the valve to close requires it to be declared inoperable.

Entry into TLCO 3.3.g, CONDITION D requires isolation of the turbine from the steam supply within 6 hours for the Turbine Overspeed Protection System being inoperable for reasons other than those identified in CONDITIONS A and B.

Examples could include:

1. <u>NO OVERSPEED TRIP NETWORK</u>

   The main turbine has three separate electrical overspeed trip networks. Overspeed Trip Network #1 is comprised of speed probes 1/2SE-TS013_, 1/2PA38J, OST-2, 1/2TG09J and High Pressure Trip Manifold Solenoids 1/2FSV-EH5021A, B, C and D and 1/2FSV-EH5022A, B, C and D. Overspeed Trip Network #2 is comprised of speed probes 1/2SE-TS011_, 1/2PA22J and High Pressure Trip Manifold Solenoids 1/2FSV-EH5022A, B, C and D. Overspeed Trip Network #3 is comprised of speed probes 1/2SE-TS014_, 1/2PA22J and High Pressure Trip Manifold Solenoids 1/2FSV-EH5021A, B, C and D. With no overspeed trip network, the turbine must be isolated from the steam supply.

2. <u>FAILURE ON A NONRETURN CHECK VALVE</u>

   Failure of a nonreturn check valve to move freely would require the valve to be declared inoperable and entry in to CONDITION D. Isolation of the steam flow path is accomplished by closing the MOV and/or manual isolation valve. Closing the MOV and/or manual isolation valve prohibits the reflux of extraction steam from the isolated steam line and satisfies Required Action of CONDITION D. Reference Table T3.3.g-2 for determining the correct valve (MOV or manual) to isolate the flow path.

TABLE T3.3.g-2 (page 1 of 1)
Extraction Steam Nonreturn Check Valves and the Associated MOV or Manual Isolation Valve

HEATER	FAILED EXTRACTION STEAM NONRETURN CHECK VALVE	MOTOR-OPERATED ISOLATION VALVE	MANUAL ISOLATION VALVES
_2A	_ES011A	_ES010A	NA
_2B	_ES011B	_ES010B	NA
_2C	_ES011C	_ES010C	NA
_3A	_ES015A	_ES013A	NA
_3B	_ES015B	_ES013B	NA
_3C	_ES015C	_ES013C	NA
_4A	_ES017A	_ES016A	NA
_4B	_ES017B	_ES016B	NA
_4C	_ES017C	_ES016C	NA
_5A	_ES008	_ES007	_ES009A
_5B	_ES008	_ES007	_ES009B
_6A	_ES002	_ES001	_ES003A
_6B	_ES002	_ES001	_ES003B
_7A	_ES005	_ES004	_ES006A
_7B	_ES005	_ES004	_ES006B

3.3 INSTRUMENTATION

3.3.h Power Distribution Monitoring System (PDMS)

TLCO 3.3.h The PDMS shall be OPERABLE with required PDMS instrumentation in Table T3.3.h-1 OPERABLE.

APPLICABILITY: MODE 1 with THERMAL POWER > 25% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Separate Condition entry is allowed for each Function. ---------------------- One or more Functions with one or more required channels inoperable.	A.1 Restore required channel to OPERABLE status.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. PDMS inoperable for reasons other than Condition A. <u>OR</u> Required Action and associated Completion Time of Condition A not met.	B.1	Apply LCO 3.1.4, "Rod Group Alignment Limits," as applicable, with PDMS inoperable.	Immediately
	<u>AND</u>		
	B.2	Apply LCO 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," as applicable, with PDMS inoperable.	Immediately
	<u>AND</u>		
	B.3	Apply LCO 3.2.2, "Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)," as applicable, with PDMS inoperable.	Immediately
	<u>AND</u>		
	B.4	Apply LCO 3.2.3, "Axial Flux Difference (AFD)," as applicable, with PDMS inoperable.	Immediately
	<u>AND</u>		
	B.5	Apply LCO 3.2.4, "Quadrant Power Tilt Ratio (QPTR)," as applicable, with PDMS inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.h.1	Perform CHANNEL CHECK for each required instrumentation channel.	7 days
TSR 3.3.h.2	-------------------NOTE-------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. --- Perform CHANNEL CALIBRATION for each required instrumentation channel.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
TSR 3.3.h.3 Perform PDMS calibration.	Prior to declaring PDMS OPERABLE after each refueling <u>AND</u> -----NOTE------ Not required to be performed until 31 Effective Full Power Days (EFPD) after the Core Exit Thermocouple (CETC) chess knight move pattern not satisfied --------------- 31 EFPD thereafter with the CETC chess knight move pattern not satisfied <u>AND</u> 180 EFPD thereafter with the CETC chess knight move pattern satisfied

Table T3.3.h-1 (Page 1 of 1)
Power Distribution Monitoring System Instrumentation

FUNCTION	REQUIRED CHANNELS
1. Power Range Neutron Flux Monitors	3
2. Reactor Coolant System (RCS) Cold Leg Temperature	2
3. Reactor Power	1[a]
4. Control Bank Position (per bank)	1[b]
5. Core Exit Temperature	17 with ≥ 2 per core quadrant

(a) Either calorimetric power, the average power of the power range neutron flux monitors, or the average power of the ΔT channels.

(b) Either the Demand Position Indication System or the Digital Rod Position Indication (DRPI) System.

3.3 INSTRUMENTATION

3.3.i Post Accident Monitoring (PAM) Instrumentation

TLCO 3.3.i The PAM instrumentation for each Function shown in Table T3.3.i-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.i-1.

ACTIONS

------------------------------------ NOTES ------------------------------------

1. Separate Condition entry is allowed for each Function.

2. TLCO 3.0.d.3 is applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channel inoperable.	A.1 Enter the Condition referenced in Table T3.3.i-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table T3.3.i-1.	B.1 Restore required channel to OPERABLE status.	30 days
C. As required by Required Action A.1 and referenced in Table T3.3.i-1.	C.1 Restore one required channel to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. ---------NOTE--------- Required Action D.2.2 shall be completed whenever Required Action D.2.1 is not met. --------------------- As required by Required Action A.1 and referenced in Table T3.3.i-1.	D.1	Initiate alternate method of monitoring the appropriate parameters.	72 hours
	AND		
	D.2.1	Restore one required channel to OPERABLE status.	7 days
	OR		
	D.2.2	Submit a report to the Plant Operating Review Committee outlining the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.	14 days
E. One or more Functions with two required channels inoperable.	E.1	Restore one required channel to OPERABLE status.	7 days
F. Required Action and associated Completion Time of Condition B, C, D or E not met.	F.1	Enter TLCO 3.0.c.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.i.1 Perform CHANNEL CHECK.	31 days
TSR 3.3.i.2 Perform CHANNEL CALIBRATION.	18 months

Table T3.3.i-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS
1.	Auxiliary Feedwater Flow Rate (per SG)	1,2,3	2	B	TSR 3.3.i.1 TSR 3.3.i.2
2.	PORV Position Indicator[(a)] (open/closed) (per valve)	1,2,3	1	C	TSR 3.3.i.1
3.	PORV Block Valve Position Indicator[(b)] (open/closed) (per valve)	1,2,3	1	C	TSR 3.3.i.1
4.	Safety Valve Position Indicator (open/closed) (per valve)	1,2,3	1	C	TSR 3.3.i.1
5.	Containment Floor Drain Sump Water Level (Narrow Range)	1,2,3	2	B	TSR 3.3.i.1 TSR 3.3.i.2
6.	Auxiliary Building Vent Stack (Wide Range Noble Gas) (per stack)	1,2,3	1	D	TSR 3.3.i.1 TSR 3.3.i.2
7.	Reactor Coolant Subcooling Margin Monitor[(c)]	1,2,3	2	B	None

(a) Not applicable if the associated block valve is in the closed position.

(b) Not applicable if the block valve is verified in the closed position and power is removed.

(c) Use monitoring channels (10 highest average core exit temperatures) in conjunction with RCS pressure to determine the subcooling margin.

3.3 INSTRUMENTATION

3.3.j Hydrogen Monitor

TLCO 3.3.j One containment hydrogen monitor channel shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

------------------------------------ NOTE ------------------------------------
TLCO 3.0.d.3 is applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTES-------- 1. The monitor must be in standby mode to meet the requirement in NUREG-0737, Item II.F.1.6. 2. Not applicable if hydrogen monitor is in operation. ---------------------- Required hydrogen monitor not in the standby mode.	A.1 Place the hydrogen monitor in the standby mode. <u>OR</u> A.2 Declare the hydrogen monitor inoperable.	Immediately Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required hydrogen monitor channel inoperable.	B.1 Confirm readiness for utilizing alternate method of monitoring. <u>AND</u> B.2 Restore required hydrogen monitor channel to OPERABLE status.	Immediately 72 hours
C. Required Action and associated Completion Time of Condition B not met.	C.1 Submit a report to the Plant Operating Review Committee outlining the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the hydrogen monitor channel to OPERABLE status.	14 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.j.1 Verify hydrogen monitor is in standby mode.	12 hours
TSR 3.3.j.2 Perform CHANNEL CHECK.	31 days
TSR 3.3.j.3 Perform CHANNEL OPERATIONAL TEST.	92 days
TSR 3.3.j.4 Perform CHANNEL CALIBRATION.	18 months

3.3 INSTRUMENTATION

3.3.k Feedwater Flow

TLCO 3.3.k The Leading Edge Flow Meter system shall be OPERABLE.

APPLICABILITY: MODE 1, with THERMAL POWER > 98.3% RTP.

ACTIONS

------------------------------------ NOTE ------------------------------------
TLCO 3.0.d.2 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LEFM system inoperable.	A.1 Restore LEFM system to OPERABLE status.	72 hours
B. REQUIRED ACTION and associated COMPLETION TIME of CONDITION A not met.	B.1 Reduce power to ≤ 98.3% RTP.	Immediately

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.k.1 Perform CHANNEL CHECK.	Prior to exceeding 98.3% RTP AND Once per 24 hours thereafter
TSR 3.3.k.2 Perform CHANNEL CALIBRATION.	Once per 24 months

3.3 INSTRUMENTATION

3.3.o Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System Actuation Instrumentation

TLCO 3.3.o The FHB Ventilation System actuation instrumentation in Table T3.3.o-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.o-1.

ACTIONS

-----------------------------------NOTE-----------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Restore channel to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time for Condition A not met. OR Two channels inoperable.	B.1.1 Place in emergency mode one FHB Ventilation System train capable of being powered by an OPERABLE emergency power source.	Immediately
	AND	
	B.1.2 Take actions to provide an appropriate portable continuous monitor with the same alarm setpoint in the fuel pool area.	Immediately
	OR	
	B.2 Suspend crane operations with loads, including new fuel assemblies, over or within the spent fuel storage pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.o.1 Perform CHANNEL CHECK.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
TSR 3.3.o.2 Perform CHANNEL OPERATIONAL TEST.	92 days
TSR 3.3.o.3 Perform CHANNEL CALIBRATION.	18 months

TABLE T3.3.o-1 (page 1 of 1)
FHB Ventilation System Actuation Instrumentation

FUNCTIONAL UNIT	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	ALARM/TRIP SETPOINT	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
Fuel Building Isolation Radioactivity-High and Criticality (ORE-AR055/56)	(a)	≤ 5 mR/h	2	TSR 3.3.o.1 TSR 3.3.o.2 TSR 3.3.o.3

(a) During crane operations with loads, including new fuel assemblies, over or within the spent fuel storage pool.

3.3 INSTRUMENTATION

3.3.p Radiation Monitoring Instrumentation

TLCO 3.3.p The Radiation Monitoring instrumentation Alarm/Trip Setpoints for each Function in Table T3.3.p-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.p-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 Alarm/Trip Setpoint(s) not within limits specified in Table T3.3.p-1.	A.1 Adjust the Setpoint to within limit.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1	Declare the channel inoperable and enter applicable Condition and Required Actions of LCO 3.3.6, "Containment Ventilation Isolation Instrumentation," LCO 3.3.7, "VC Filtration System Actuation Instrumentation," LCO 3.3.8, "FHB Ventilation System Actuation Instrumentation," TLCO 3.3.o, "FHB Ventilation System Actuation Instrumentation," and TLCO 3.7.i, "FHB Ventilation Systems," for one or more radiation monitors inoperable, as applicable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.p.1	Perform CHANNEL CHECK.	12 hours
TSR 3.3.p.2	Perform CHANNEL OPERATIONAL TEST.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
TSR 3.3.p.3 Perform CHANNEL CALIBRATION.	18 months

TABLE T3.3.p-1 (page 1 of 1)
Radiation Monitoring Instrumentation for Plant Operations

FUNCTIONAL UNIT	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	ALARM/TRIP SETPOINT	REQUIRED CHANNELS	CHANNELS TO TRIP/ALARM	SURVEILLANCE REQUIREMENTS
1. Fuel Building Isolation Radioactivity-High and Criticality (0RE-AR055/56)	(a)	≤ 5 mR/hr	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3
2. Containment Isolation Containment Radioactivity-High					
a) U-1 (1RE-AR011/12)	All	(b)	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3
b) U-2 (2RE-AR011/12)	All	(b)	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3
3. Main Control Room Isolation-Outside Air Intake-Gaseous Radioactivity-High					
a) Train A (0RE-PR031B/32B)	All	≤ 2 mR/hr	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3
b) Train B (0RE-PR033B/34B)	All	≤ 2 mR/hr	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3

(a) During crane operations with loads, including new fuel assemblies, over or within the spent fuel storage pool.

(b) Trip Setpoint shall be established at ≤ 2 x background in the Containment Building at RTP.

3.3 INSTRUMENTATION

3.3.y Engineered Safety Feature Actuation System (ESFAS) Instrumentation

TLCO 3.3.y The ESFAS Instrumentation in Table T3.3.y-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.y-1.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required channel(s) inoperable.	A.1	Enter the Condition referenced in Table T3.3.y-1 for the channel.	Immediately
B. One Auxiliary Feedwater - Manual Initiation channel inoperable.	B.1	Restore channel to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition B not met. <u>OR</u> Two Auxiliary Feedwater - Manual Initiation channels inoperable.	C.1	Enter TLCO 3.0.c.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.y.1 Perform TRIP ACTUATING DEVICE OPERATIONAL TEST.	18 months

Table T3.3.y-1 (page 1 of 1)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
Auxiliary Feedwater - Manual Initiation	1,2,3	B, C	2	TSR 3.3.y.1

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.b RCS Chemistry

TLCO 3.4.b RCS Chemistry shall be maintained within the limits of Table T3.4.b-1.

APPLICABILITY: According to Table T3.4.b-1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more chemistry parameters in excess of its Steady-State Limit but within its Transient Limit.	A.1 Restore parameter to within its Steady-State Limit.	24 hours
B. Dissolved Oxygen concentration in excess of its Steady-State Limit for > 24 hours. OR Dissolved Oxygen concentration in excess of its Transient Limit.	B.1 Be in MODE 3. AND B.2 Be in MODE 4 with $T_{avg} \leq 250°F$.	6 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Chloride or Fluoride concentration in excess of its Steady-State Limit for > 24 hours. OR Chloride or Fluoride concentration in excess of its Transient Limit.	C.1	Initiate action to reduce pressurizer pressure ≤ 500 psig.	Immediately
	AND		
	C.2	Be in MODE 3.	6 hours
	AND		
	C.3	Be in MODE 5.	36 hours
	AND		
	C.4	Perform an engineering evaluation to determine the effects of the out-of-limit condition on the structural integrity of the RCS and to determine that the RCS remains acceptable for continued operation.	Prior to increasing pressurizer pressure above 500 psig OR Prior to proceeding to MODE 4 from MODE 5

SURVEILLANCE REQUIREMENTS

--------------------------------------NOTE--------------------------------------
TSR 3.4.b.1 applies to each RCS Chemistry parameter in Table T3.4.b-1.

SURVEILLANCE		FREQUENCY
TSR 3.4.b.1	------------------NOTES-------------------- 1. Not required to be performed for Dissolved Oxygen if RCS $T_{avg} \leq 250°F$. 2. Not required to be performed for Dissolved Oxygen in Mode 1 if Dissolved Hydrogen concentration is $\geq$ 15 cc/kg and is sampled at the same frequency as Dissolved Oxygen. --- Verify RCS chemistry parameters within limits specified in Table T3.4.b-1.	In accordance with EPRI PWR Primary Water Chemistry Guidelines

Table T3.4.b-1
RCS Chemistry Limits

	PARAMETER	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	STEADY STATE LIMIT	TRANSIENT LIMIT
1.	Dissolved Oxygen	MODES 1,2,3, and MODE 4 with $T_{avg} > 250°F$	≤ 100 ppb	≤ 1000 ppb
2.	Chloride	At All Times	≤ 150 ppb	≤ 1500 ppb
3.	Fluoride	At All Times	≤ 150 ppb	≤ 1500 ppb

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.c Pressurizer Temperature Limits

TLCO 3.4.c The pressurizer temperature shall be limited to:

1. ≤ 100°F heatup in any 1 hour period;
2. ≤ 200°F cooldown in any 1 hour period; and
3. ≤ 320°F spray water temperature differential.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Actions A.2 and A.3 shall be completed whenever this Condition is entered. ---------------------- Pressurizer temperature not within limits.	A.1 Restore pressurizer temperature to within limits.	30 minutes
	AND	
	A.2 Perform an engineering evaluation to determine the effects of the out-of-limit condition on the structural integrity of the pressurizer.	72 hours
	AND	
	A.3 Determine that the pressurizer remains acceptable for continued operation.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Actions and associated Completion Times of Condition A not met.	B.1	---------NOTE-------- Required Action B.1 is only applicable when in MODES 1 and 2. --------------------- Be in MODE 3.	6 hours
	AND		
	B.2	Reduce pressurizer pressure to < 500 psig.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.4.c.1	-------------------NOTE-------------------- Only required to be performed during system heatup and cooldown. --- Verify pressurizer heatup or cooldown rates are within limits.	30 minutes
TSR 3.4.c.2	-------------------NOTE-------------------- Only required to be performed during auxiliary spray operation. --- Verify auxiliary spray water temperature differential is within limit.	12 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.d Pressurizer Power Operated Relief Valves (PORVs)

TLCO 3.4.d One PORV shall be unisolated and capable of responding in automatic to relieve pressurizer pressure.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Both PORVs unable to automatically perform a pressure relief actuation.	A.1 Restore the automatic pressure relief function to at least one PORV.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.4.d.1 Perform CHANNEL CALIBRATION on the actuation instrumentation.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.e Reactor Vessel Head Vents

TLCO 3.4.e Two reactor vessel head vent paths, each consisting of two valves in series powered from emergency buses, shall be OPERABLE and closed.

----------------------------- NOTE -----------------------------

The reactor vessel head vent valves may be cycled for the purposes of re-seating to eliminate identified seat leakage, correcting indication problems, or Inservice Inspection in MODES 3 and 4 provided:

1. Only one valve in each train is cycled at a time; and

2. The same train redundant valve is verified closed and de-energized.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One reactor vessel head vent path inoperable.	A.1 Initiate action to maintain the inoperable vent path closed.	Immediately
	AND	
	A.2 Initiate action to remove power from the valve actuators of the valves in the inoperable vent path.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. ---------NOTE--------- TLCO 3.0.d.3 is applicable in MODES 1 and 2 provided Required Actions B.1 and B.2 are complete. --------------------- Both reactor vessel head vent paths inoperable.	B.1	Initiate action to maintain the inoperable vent paths closed.	Immediately
	<u>AND</u>		
	B.2	Initiate action to remove power from the valve actuators of the valves in the inoperable vent paths.	Immediately
	<u>AND</u>		
	B.3	Restore one vent path to OPERABLE status.	30 days
C. Required Actions and associated Completion Times of Condition B not met.	C.1	Enter TLCO 3.0.c.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.4.e.1	Verify all manual isolation valves in each vent path are locked in the open position.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.4.e.2	--------------------NOTE-------------------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4 except as allowed by TLCO Note. --- Perform a complete cycle of each valve in the vent path from the control room.	18 months
TSR 3.4.e.3	------------------- NOTE-------------------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. --- Verify flow through the reactor vessel head vent paths during venting operation.	18 months

3.4 Reactor Coolant System (RCS)

3.4.f Structural Integrity

TLCO 3.4.f The structural integrity of all ASME Code Class 1, 2, and 3 plant components shall be maintained in accordance with the Inservice Inspection and Testing Programs.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each component.

2. TLCO 3.0.d.3 is applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Only applicable to ASME Code Class 1 and 2 components. ---------------------- Structural integrity of one or more ASME component(s) not in conformance.	A.1 Restore the structural integrity of the affected component to within its limits. <u>OR</u> A.2 Isolate the affected component.	Prior to increasing the RCS temperature to > 200°F Prior to increasing the RCS temperature to > 200°F

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. ---------NOTE--------- Only applicable to ASME Code Class 3 components. ---------------------- Structural integrity of one or more ASME component(s) not in conformance.	B.1	Restore the structural integrity of the affected component to within its limits.	Immediately
	<u>OR</u>		
	B.2	Isolate the affected component.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.4.f.1	Perform an inspection of each RCP flywheel.	In accordance with the RCP Flywheel Inspection Program.
TSR 3.4.f.2	Verify the structural integrity of ASME Code Class 1, 2, and 3 components.	In accordance with the Inservice Inspection and Testing Programs.

3.5 EMERGENCY CORE COOLING SYSTEM (ECCS)

3.5.a ECCS Subsystems - T_{avg} ≤ 200°F and Pressurizer Level ≤ 5%

TLCO 3.5.a One of the following means of decay heat removal shall be available:

1. One Safety Injection (SI) pump and flow path, or

2. A flow path to permit gravity feed from the RWST to the Reactor Coolant System (RCS) with the reactor vessel head removed.

APPLICABILITY: MODES 5 and 6 with pressurizer level ≤ 5%.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. No means of decay heat removal available.	A.1 Initiate action to restore an available means of decay heat removal.	Immediately
	<u>OR</u>	
	A.2 Initiate action to establish pressurizer level > 5%.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.5.a.1	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.5.a.1. --- Verify the required SI pump motor circuit breaker is racked in.	12 hours
TSR 3.5.a.2	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.5.a.1. --- Verify an OPERABLE flow path available from the RWST to the RCS.	12 hours
TSR 3.5.a.3	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.5.a.2. --- Verify the reactor vessel head is removed.	12 hours
TSR 3.5.a.4	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.5.a.2. --- Verify an OPERABLE flow path available to permit gravity feed from the RWST to the RCS.	12 hours

3.7 PLANT SYSTEMS

3.7.a Steam Generator Pressure/Temperature Limitations

TLCO 3.7.a Reactor and Secondary coolant pressure shall be ≤ 200 psig.

APPLICABILITY: When either Reactor or Secondary coolant temperature in the steam generator is ≤ 70°F.

ACTIONS

-------------------------------------NOTE-------------------------------------
Separate Condition entry is allowed for each side (Primary or Secondary) of each steam generator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Actions A.2 and A.3 shall be completed whenever this Condition is entered. ---------------------- Reactor coolant pressure > 200 psig. <u>OR</u> Secondary coolant pressure > 200 psig.	A.1 Reduce the steam generator pressure of the applicable side to ≤ 200 psig.	30 minutes
	<u>AND</u>	
	A.2 Perform an engineering evaluation to determine the effect of the overpressurization on the structural integrity of the steam generator.	Prior to increasing temperature to > 200°F
	<u>AND</u>	
	A.3 Determine that the steam generator remains acceptable for continued operation.	Prior to increasing temperature to > 200°F

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.7.a.1	-------------------NOTE-------------------- Only required to be performed when the temperature of either Reactor or Secondary coolant ≤ 70°F. --- Verify pressure in each side of the steam generator is ≤ 200 psig.	1 hour

3.7 PLANT SYSTEMS

3.7.b Snubbers

TLCO 3.7.b All required snubbers shall be OPERABLE.

----------------------------NOTES----------------------------

1. Not applicable to snubbers installed on nonsafety related systems unless their failure, or failure of the associated system(s), would adversely affect any safety related system.
2. Required snubber(s) are those installed in a system, subsystem, or train required to be OPERABLE.
3. Verification of Steam Generator snubber fluid levels shall be through local examination of reservoirs and snubbers, not based on remote panel lighting indication.

APPLICABILITY: MODES 1, 2, 3, 4, and
MODES 5, and 6 for snubbers located on systems required OPERABLE in those MODES.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required snubber(s) removed or inoperable.	A.1 Declare the applicable portion of the attached system inoperable.	Immediately
	AND	
	A.2 Follow the appropriate Required Actions for that system.	Immediately

SURVEILLANCE REQUIREMENTS

------------------------------------ NOTE ------------------------------------
The provisions of TSR 3.0.b are applicable for all inspection intervals up to and including 48 months.

SURVEILLANCE		FREQUENCY
TSR 3.7.b.1	Perform required inservice examinations and testing of snubbers in accordance with the Inservice Inspection Program.	In accordance with the Inservice Inspection Program

Table T3.7.b-1 (page 1 of 1)
Snubber Inservice Inspection Program Elements

A. Transient Event Inspection

An inspection shall be performed of all snubbers attached to sections of systems that have experienced unexpected, potentially damaging transients as determined from a review of operational data and a visual inspection of the systems within 6 months following such an event. In addition to satisfying the visual inspection acceptance criteria, freedom of motion of mechanical snubbers shall be verified using at least one of the following: (1) manually induced snubber movement; or (2) evaluation of in-place snubber piston setting; or (3) stroking the mechanical snubber through its full range of travel.

B. Inoperable Snubbers Discovered During Functional Tests

When the acceptance criteria as specified in the snubber functional test program and procedures is exceeded, an Engineering Evaluation shall be performed to determine if the attached system and/or component is acceptable for continued operation.

C. Removal of Required Snubber(s) for Testing or Maintenance

When required snubber(s) are to be removed for the purpose of functional testing or maintenance from operable systems or components, an evaluation shall be performed demonstrating seismic operability with the snubber(s) removed prior to removing the snubber(s) or the applicable portion of the attached system shall be declared inoperable.

D. Locations with Two Snubbers

Configurations that utilize two snubbers at the same location shall be considered as one required snubber.

3.7 PLANT SYSTEMS

3.7.c Sealed Source Contamination

TLCO 3.7.c Each sealed source containing radioactive material either in excess of 100 μCi of beta and/or gamma emitting material or 5 μCi of alpha emitting material shall be free of ≥ 0.005 μCi of removable contamination.

APPLICABILITY: At all times.

ACTIONS

------------------------------------NOTES------------------------------------
1. Separate Condition entry is allowed for each source.

2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Actions A.2 and A.3 shall be completed whenever Condition A is entered. ---------------------- One or more sealed sources with removable contamination not within limits.	A.1 Withdraw the sealed source from use.	Immediately
	AND	
	A.2.1 Decontaminate and repair the sealed source.	Prior to use or transfer to another licensee
	OR	
	A.2.2 Dispose of the sealed source in accordance with Commission Regulations.	Immediately
	AND	
	A.3 Submit report to the Plant Operating Review Committee.	12 months

SURVEILLANCE REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Each sealed source shall be tested for leakage and/or contamination by the licensee, or other persons specifically authorized by the Commission or Agreement State.

2. The test method shall have a detection sensitivity of at least 0.005 μCi per test sample.

3. Startup sources and fission detectors previously subjected to core flux are exempted from the TSRs. Startup sources do not include "secondary startup sources" which do not contain radioactive material.

4. Sealed sources which are continuously enclosed within a shielded mechanism (i.e., sealed sources within radiation monitoring or boron measuring devices) are considered to be stored and need not be tested unless they are removed from the shielded mechanism.

SURVEILLANCE		FREQUENCY
TSR 3.7.c.1	--------------------NOTE-------------------- Only required to be performed on sources in use. --- Perform leakage testing for all sealed sources containing radioactive materials with a half-life > 30 days (excluding Hydrogen 3) and in any form other than gas.	6 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.7.c.2	------------------NOTES------------------ 1. Only required to be performed on stored sources not in use. 2. Only required to be performed if not tested within the previous 6 months. --- Perform leakage testing for each sealed source and fission detector.	Prior to use or transfer to another licensee
TSR 3.7.c.3	------------------NOTE------------------ Only required to be performed on stored sources not in use. --- Perform leakage testing on sealed sources and fission detectors transferred without a certificate indicating the last test date.	Prior to use or transfer to another licensee
TSR 3.7.c.4	------------------NOTE------------------ Only required to be performed on sealed startup sources and fission detectors not previously subjected to core flux. --- Perform leakage testing for each sealed startup source and fission detector.	Once within 31 days prior to being subjected to core flux or installed in the core or following repair or maintenance to sources

3.7 PLANT SYSTEMS

3.7.d Area Temperature Monitoring

TLCO 3.7.d The temperature limit of each area in Table T3.7.d-1 shall not be exceeded for > 8 hours, or by > 30° F.

APPLICABILITY: Whenever the equipment in the affected area is required to be OPERABLE.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Actions A.2 and A.3 shall be completed whenever Condition A is entered. ---------------------- One or more area temperatures exceeding the temperature limit by > 30°F.	A.1.1 Restore area temperature to within limit.	4 hours
	<u>OR</u>	
	A.1.2 Declare the equipment in the affected area inoperable.	4 hours
	<u>AND</u>	
	A.2 Submit a report to the Plant Operating Review Committee outlining the cumulative time and the amount by which the temperature in the affected area exceeded the limit.	30 days
	<u>AND</u>	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.3	Perform an analysis to demonstrate the continued OPERABILITY of the affected equipment.	30 days
B. One or more area temperatures exceeding the temperature limit for > 8 hours.	B.1	Submit a report to the Plant Operating Review Committee outlining the cumulative time and the amount by which the temperature in the affected area exceeded the limit.	30 days
	<u>AND</u>		
	B.2	Perform an analysis to demonstrate the continued OPERABILITY of the affected equipment.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.7.d.1	Verify each area temperature is within limits in accordance with Table T3.7.d-1.	12 hours

Table T3.7.d-1 (page 1 of 1)
Area Temperature Monitoring

	AREA	TEMPERATURE LIMIT (°F)
1.	Miscellaneous Electrical Equipment and Battery Rooms	108
2.	ESF Switchgear Rooms	108
3.	Division 12 (Division 22) Cable Spreading Room	108
4.	Upper Cable Spreading Rooms	90
5.	Diesel Generator Rooms	132
6.	Diesel Oil Storage Rooms	132
7.	Auxiliary Building Vent Exhaust Filter Cubicle	105
8.	Centrifugal Charging Pump Rooms	122
9.	Containment Spray Pump Rooms	130
10.	RHR Pump Rooms	130
11.	Safety Injection Pump Rooms	130
12.	Control Room	90
13.	Lower Cable Spreading Rooms	108

3.7 PLANT SYSTEMS

3.7.i Fuel Handling Building (FHB) Ventilation Systems

TLCO 3.7.i Two FHB Ventilation System trains shall be OPERABLE.

---------------------------NOTE---------------------------
The TLCO requirements do not apply when the main hoist/load block travels over the spent fuel pool without a load due to the design of the load block.

APPLICABILITY: During crane operation with loads, including new fuel assemblies, over or within the spent fuel storage pool.

ACTIONS

-----------------------------------NOTE-----------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One FHB Ventilation System train inoperable.	A.1 Restore FHB Ventilation System train to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Place in emergency mode one OPERABLE FHB Ventilation System train capable of being powered by an OPERABLE emergency power source.	Immediately
	<u>OR</u>	
	B.2 Suspend crane operation with loads, including new fuel assemblies, over or within the spent fuel storage pool.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Two FHB Ventilation System trains inoperable.	C.1	Suspend crane operation with loads, including new fuel assemblies, over or within the spent fuel storage pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.7.i.1	For FHB Ventilation Systems required to be OPERABLE, the following SRs are applicable: SR 3.7.13.1 SR 3.7.13.4 SR 3.7.13.2 SR 3.7.13.5	In accordance with applicable SRs

3.7 PLANT SYSTEMS

3.7.j Spent Fuel Pool Water Level

TLCO 3.7.j The spent fuel pool water level shall be ≥ 23 ft over the top of irradiated fuel assemblies seated in the storage racks.

APPLICABILITY: During movement of loads, including new fuel assemblies, over or within the spent fuel pool.

ACTIONS

------------------------------------NOTE------------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Spent fuel pool water level not within limit.	A.1 Suspend movement of loads, including new fuel assemblies, over or within the spent fuel pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.7.j.1 Verify spent fuel pool water level is ≥ 23 ft above the top of the irradiated fuel assemblies seated in the storage racks.	7 days

3.7 PLANT SYSTEMS

3.7.k Spent Fuel Pool Boron Concentration

TLCO 3.7.k The spent fuel pool boron concentration shall be ≥ 2000 ppm.

APPLICABILITY: Whenever fuel assemblies are stored in the spent fuel pool.

ACTIONS

-------------------------------------NOTE-------------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Spent fuel pool boron concentration not within limit.	A.1 Suspend movement of loads, including new fuel assemblies, over or within the spent fuel pool.	Immediately
	<u>AND</u>	
	A.2 Initiate action to restore spent fuel pool boron concentration to within limit.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.7.k.1 Verify the spent fuel pool boron concentration is within limit.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.a Containment Penetration Conductor Overcurrent Protective Devices

TLCO 3.8.a The containment penetration conductor overcurrent protective devices in Table T3.8.a-1 for Unit 1 (Table T3.8.a-2 for Unit 2) shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each device.

2. TLCO 3.0.d.3 is applicable to overcurrent devices in circuits which have the circuit breakers tripped, inoperable circuit breakers racked out or removed.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment penetration conductor overcurrent protective devices inoperable.	A.1 Restore the protective device to OPERABLE status. <u>OR</u>	72 hours (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2.1	Verify the circuit is de-energized with the associated circuit breaker tripped.	72 hours <u>AND</u> 7 days thereafter
	<u>AND</u>		
	A.2.2	Determine operability status of the affected system or component.	Immediately following initial performance of Required Action A.2.1
	<u>OR</u>		
	A.3.1	Verify the circuit is de-energized with the associated circuit breaker racked out or removed.	72 hours <u>AND</u> 7 days thereafter
	<u>AND</u>		
	A.3.2	Determine operability status of the affected system or component.	Immediately following initial performance of Required Action A.3.1
B. Required Actions and associated Completion Times of Condition A not met.	B.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	B.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.8.a.1	-------------------NOTES------------------- 1. A representative sample shall consist of ≥ 10% of the circuit breakers selected, on a rotating basis, from 6.9 kV and 4.16 kV circuit breakers. 2. For each circuit breaker found inoperable during these functional tests, an additional representative sample of ≥ 10% of all circuit breakers of the inoperable type shall be functionally tested until no more failures are found or all circuit breakers of the inoperable type have been functionally tested. --- Perform CHANNEL CALIBRATION on the associated protective relays of the sampled circuit breakers.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.a.2	-------------------NOTES------------------- 1. A representative sample shall consist of ≥ 10% of the circuit breakers selected, on a rotating basis, from 6.9 kV and 4.16 kV circuit breakers. 2. For each circuit breaker found inoperable during these functional tests, an additional representative sample of ≥ 10% of all circuit breakers of the inoperable type shall be functionally tested until no more failures are found or all circuit breakers of the inoperable type have been functionally tested. --- Perform an integrated system functional test on a representative sample of each circuit breaker type, which includes simulated automatic actuation of the system to demonstrate that the overall penetration design remains within operable limits.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.a.3	-------------------NOTES------------------- 1. A representative sample shall consist of ≥ 10% of the circuit breakers selected, on a rotating basis, from each type of 480 V circuit breakers. 2. Testing of these circuit breakers shall consist of injecting a current in excess of the breakers nominal setpoint and measuring the response time. The measured response time will be compared to the manufacturers data to ensure that it is ≤ a value specified by the manufacturer. 3. Circuit breakers found inoperable during functional tests shall be restored to OPERABLE or replaced with OPERABLE circuit breakers prior to resuming operation. 4. For each circuit breaker found inoperable during these functional tests, an additional representative sample of ≥ 10% of all circuit breakers of the inoperable type shall be functionally tested until no more failures are found or all circuit breakers of the inoperable type have been functionally tested. --- Functionally test a representative sample of each 480 V circuit breaker type.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.a.4	-------------------NOTES------------------- 1. A representative sample shall consist of ≥ 10% of the fuses selected, on a rotating basis, from each type of fuse. 2. Testing of these fuses shall consist of a nondestructive resistance measurement test which demonstrates that the fuse meets the manufacturer's design criteria. 3. Fuses found inoperable during functional tests shall be replaced with OPERABLE fuses prior to resuming operation. 4. For each fuse found inoperable during these functional tests, an additional representative sample of ≥ 10% of all fuses of the inoperable type shall be functionally tested until no more failures are found or all fuses of the inoperable type have been functionally tested. --- Functionally test a representative sample of each fuse type.	18 months
TSR 3.8.a.5	-------------------NOTE-------------------- Only applicable to 6.9 kV and 4.16 kV circuit breakers. --- Perform an inspection and preventative maintenance for each breaker in accordance with the manufacturer's recommendation.	60 months

Table T3.8.a-1 (page 1 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION		DEVICE
1. 6.9 kV Switchgear		
1RC01PA - RCP A Bus 157 Cub 1		Primary
Bus 157 Normal (UAT) Feed ACB 1571		Backup
Bus 157 Emergency (SAT) Feed ACB 1572		Backup
1RC01PB - RCP B Bus 156 Cub 2		Primary
Bus 156 Normal (UAT) Feed ACB 1561		Backup
Bus 156 Emergency (SAT) Feed ACB 1562		Backup
1RC01PC - RCP C Bus 158 Cub 5		Primary
Bus 158 Normal (SAT) Feed ACB 1582		Backup
Bus 158 Emergency (UAT) Feed ACB 1581		Backup
1RC01PD - RCP D Bus 159 Cub 5		Primary
Bus 159 Normal (SAT) Feed ACB 1592		Backup
Bus 159 Emergency (UAT) Feed ACB 1591		Backup
2. 480 V Pressurizer Heater Switchgear		
1RY03EA - Pressurizer Heater Backup Group A,	Compt. A1A-A6A, B1A	Primary
	Compt. A1B-A6B, B1B	Backup
1RY03EB - Pressurizer Heater Backup Group B,	Compt. B1A-B6A, A1A	Primary
	Compt. B1B-B6B, A1B	Backup
1RY03EC - Pressurizer Heater Backup Group C,	Compt. A1A-A6A	Primary
	Compt. A1B-A6B	Backup
1RY03ED - Pressurizer Heater Backup Group D,	Compt. B1A-B6A	Primary
	Compt. B1B-B6B	Backup

(continued)

Table T3.8.a-1 (page 2 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
3. 480 V A.C. Switchgear Circuit Breakers	
1VP01CA - RCFC Fan 1A	
1A Low Speed Feed Breaker Switchgear 131X Cub 4C	Primary
1A Hi Speed Feed Breaker Switchgear 131X Cub 5C	Primary
Bus 131X Normal Feed 141 Switchgear Cub 19 ACB 1415X	Backup
1VP01CC - RCFC Fan 1C	
1C Low Speed Feed Breaker Switchgear 131X Cub 2C	Primary
1C Hi Speed Feed Breaker Switchgear 131X Cub 3C	Primary
Bus 131X Normal Feed 141 Switchgear Cub 19 ACB 1415X	Backup
1VP01CB - RCFC Fan 1B	
1B Low Speed Feed Breaker Switchgear 132X Cub 4C	Primary
1B Hi Speed Feed Breaker Switchgear 132X Cub 5C	Primary
Bus 132X Normal Feed 142 Switchgear Cub 14 ACB 1425X	Backup
1VP01CD - RCFC Fan 1D	
1D Low Speed Feed Breaker Switchgear 132X Cub 2C	Primary
1D Hi Speed Feed Breaker Switchgear 132X Cub 3C	Primary
Bus 132X Normal Feed 142 Switchgear Cub 14 ACB 1425X	Backup
1EW39E - Containment Stinger Bus Rectifier	
Containment Stinger Bus 134Y Cub 2C	Primary
Fuses in Bus 134Y Cub 2C	Backup
1AP200EA/ED Containment Outage Pwr Distr Panels - Unit 1	
Circuit Breaker in Bus 233X Cub 2C	Primary
Fuses in Bus 233X Cub 2C	Backup
1AP200EB/EC Containment Outage Pwr Distr Panels - Unit 1	
Circuit Breakers in Bus 234X Cub 5D	Primary
Fuses in Bus 234X Cub 5D	Backup

(continued)

Table T3.8.a-1 (page 3 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION		DEVICE
4. 480 V Molded Case Circuit Breakers (MCCB)		MCC 133X4
1RC01PA-A -	Cub B1 Front	Primary
	Cub B1 Rear	Backup
1RC01PA-B -	Cub B2 Front	Primary
	Cub B2 Rear	Backup
1HC22G -	Cub B3 Front	Primary
	Cub B3 Rear	Backup
1FH03G -	Cub B4 Front	Primary
	Cub B4 Rear	Backup
1VP05CA -	Cub C1 Front	Primary
	Cub C1 Rear	Backup
1RF03P -	Cub C2 Front	Primary
	Cub C2 Rear	Backup
1RC01PD-A -	Cub D1 Front	Primary
	Cub D1 Rear	Backup
1RC01PD-B -	Cub D2 Front	Primary
	Cub D2 Rear	Backup
1RF02PB -	Cub D4 Front	Primary
	Cub D4 Rear	Backup
1RF01P -	Cub D5 Front	Primary
	Cub D5 Rear	Backup
1RE01PA -	Cub D6 Front	Primary
	Cub D6 Rear	Backup
1VP02CA -	Cub E1 Front	Primary
	Cub E1 Rear	Backup
1VP04CA -	Cub E2 Front	Primary
	Cub E2 Rear	Backup
1VP04CC -	Cub F1 Front	Primary
	Cub F1 Rear	Backup
1EW11EA,B,C -	Cub F3 Front	Primary
	Cub F3 Rear	Backup
1IC02EA -	Cub F5 Front	Primary
	Cub F5 Rear	Backup
1IC02EB -	Cub G1 Front	Primary
	Cub G1 Rear	Backup
1IC02EC -	Cub G2 Front	Primary
	Cub G2 Rear	Backup

(continued)

Table T3.8.a-1 (page 4 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION		DEVICE
5. 480 V Molded Case Circuit Breakers (MCCB)		MCC 134X5
1IC02EF -	Cub A1 Front	Primary
	Cub A1 Rear	Backup
1IC02EE -	Cub A2 Front	Primary
	Cub A2 Rear	Backup
1IC02ED -	Cub A3 Front	Primary
	Cub A3 Rear	Backup
1FH02J -	Cub G1 Front	Primary
	Cub G1 Rear	Backup
1FH03J -	Cub G2 Front	Primary
	Cub G2 Rear	Backup
1RC01PB-B -	Cub B1 Front	Primary
	Cub B1 Rear	Backup
1RE01PB -	Cub B3 Front	Primary
	Cub B3 Rear	Backup
1RC01PC-A -	Cub C1 Front	Primary
	Cub C1 Rear	Backup
1RC01PC-B -	Cub C2 Front	Primary
	Cub C2 Rear	Backup
1VP05CB -	Cub J1 Front	Primary
	Cub J1 Rear	Backup
1RC01PB-A -	Cub C3 Front	Primary
	Cub C3 Rear	Backup
1HC65G-A -	Cub D3 Front	Primary
	Cub D3 Rear	Backup
1VP02CB -	Cub F1 Front	Primary
	Cub F1 Rear	Backup
1RC01R-A –	Cub F2-A	Primary
	Cub F2-B	Backup
1RF02PA -	Cub G3 Front	Primary
	Cub G3 Rear	Backup
1EW12EA,B,C –	Cub F3-A	Primary
	Cub F3-B	Backup
1VP04CB -	Cub F4 Front	Primary
	Cub F4 Rear	Backup
1VP04CD -	Cub F5 Front	Primary
	Cub F5 Rear	Backup

(continued)

Table T3.8.a-1 (page 5 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION			DEVICE
6.	480 V Molded Case Circuit Breakers (MCCB)		MCC 132X2A
	1SI8808C -	Cub A2	Primary
		MCC 132X2 Cub B2	Backup
	1SI8808B -	Cub A3	Primary
		MCC 132X2 Cub B2	Backup
7.	480 V Molded Case Circuit Breakers (MCCB)		MCC 132X2
	1RH8702B -	Cub B1 Front	Primary
		Cub B1 Rear	Backup
	1RH8701B -	Cub B3 Front	Primary
		Cub B3 Rear	Backup
	1CV8112 -	Cub B4 Front	Primary
		Cub B4 Rear	Backup
	1OG079 -	Cub C1 Front	Primary
		Cub C1 Rear	Backup
	1WO056A -	Cub C2 Front	Primary
		Cub C2 Rear	Backup
	1OG080-	Cub C3 Front	Primary
		Cub C3 Rear	Backup
	1RY8000B -	Cub C4 Front	Primary
		Cub C4 Rear	Backup
	1RC8003C -	Cub D5 Front	Primary
		Cub D5 Rear	Backup
	1RC8003B -	Cub D4 Front	Primary
		Cub D4 Rear	Backup
	1RC8002A -	Cub G1 Front	Primary
		Cub G1 Rear	Backup
	1RC8002B -	Cub G2 Front	Primary
		Cub G2 Rear	Backup
	1RC8002C -	Cub G3 Front	Primary
		Cub G3 Rear	Backup
	1RC8002D -	Cub G4 Front	Primary
		Cub G4 Rear	Backup

(continued)

Table T3.8.a-1 (page 6 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION			DEVICE
8.	480 V Molded Case Circuit Breakers (MCCB)		MCC 131X2A
	1SI8808D -	Cub A2	Primary
		MCC 131X2 Cub B2	Backup
	1SI8808A -	Cub A3	Primary
		MCC 131X2 Cub B2	Backup
9.	480 V Molded Case Circuit Breakers (MCCB)		MCC 131X2
	1RC8001A -	Cub G1 Front	Primary
		Cub G1 Rear	Backup
	1RC8001B -	Cub G2 Front	Primary
		Cub G2 Rear	Backup
	1RC8001C -	Cub G3 Front	Primary
		Cub G3 Rear	Backup
	1RC8001D -	Cub G4 Front	Primary
		Cub G4 Rear	Backup
	1RH8701A -	Cub B1 Front	Primary
		Cub B1 Rear	Backup
	1RH8702A -	Cub B4 Front	Primary
		Cub B4 Rear	Backup
	1LL42J -	Cub C1 Front	Primary
		Cub C1 Rear	Backup
	1VQ001A -	Cub C3 Front	Primary
		Cub C3 Rear	Backup
	1VQ002A -	Cub F1 Front	Primary
		Cub F1 Rear	Backup
	1RC8003D -	Cub C4 Front	Primary
		Cub C4 Rear	Backup
	1RC8003A -	Cub C5 Front	Primary
		Cub C5 Rear	Backup
	1OG057A -	Cub D1 Front	Primary
		Cub D1 Rear	Backup
	1CC9416 -	Cub D3 Front	Primary
		Cub D3 Rear	Backup
	1CC9438 -	Cub D4 Front	Primary
		Cub D4 Rear	Backup
	1OG081 -	Cub E2 Front	Primary
		Cub E2 Rear	Backup

(continued)

Table T3.8.a-1 (page 7 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

	PROTECTIVE DEVICE NUMBER AND LOCATION		DEVICE
10.	480 V Molded Case Circuit Breakers (MCCB)		MCC 133X6
	1HC01G -	Cub B2	Primary
		Cub B1	Backup
	1LL04E -	Cub C2	Primary
		Cub C1	Backup
	1VP03CA -	Cub A3 Front	Primary
		Cub A3 Rear	Backup
	1VP03CD -	Cub C4 Front	Primary
		Cub C4 Rear	Backup
11.	480 V Molded Case Circuit Breakers (MCCB)		MCC 134X7
	1LL05E -	Cub B2	Primary
		Cub B1	Backup
	1VP03CB -	Cub A3 Front	Primary
		Cub A3 Rear	Backup
	1VP03CC -	Cub B4 Front	Primary
		Cub B4 Rear	Backup
12.	480 V Molded Case Circuit Breakers (MCCB)		MCC 131X2B
	1WO056B -	Cub A4 Front	Primary
		Cub A4 Rear	Backup
	1RY8000A -	Cub A5 Front	Primary
		Cub A5 Rear	Backup
13.	260 VAC RCD Power (53 rods, 5 panels)		
	Stationary Gripper Coils fuse (all panels)		Primary
	Stationary Gripper Coils fuse (all panels)		Backup
	Lift Coils fuse (all panels)		Primary
	Lift Coils fuse (all panels)		Backup
	Movable Gripper Coils fuse (all panels)		Primary
	Movable Gripper Coils fuse (all panels)		Backup

Table T3.8.a-2 (page 1 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION		DEVICE
1. 6.9 kV Switchgear		
2RC01PA - RCP A Bus 257 Cub 7		Primary
Bus 257 Normal (UAT) Feed ACB 2571		Backup
Bus 257 Emergency (SAT) Feed ACB 2572		Backup
2RC01PB - RCP B Bus 256 Cub 5		Primary
Bus 256 Normal (UAT) Feed ACB 2561		Backup
Bus 256 Emergency (SAT) Feed ACB 2562		Backup
2RC01PC - RCP C Bus 258 Cub 3		Primary
Bus 258 Normal (SAT) Feed ACB 2582		Backup
Bus 258 Emergency (UAT) Feed ACB 2581		Backup
2RC01PD - RCP D Bus 259 Cub 3		Primary
Bus 259 Normal (SAT) Feed ACB 2592		Backup
Bus 259 Emergency (UAT) Feed ACB 2591		Backup
2. 480 V Pressurizer Heater Switchgear		
2RY03EA - Pressurizer Heater Backup Group A,	Compt. B1A-B6A, A1A	Primary
	Compt. B1B-B6B, A1B	Backup
2RY03EB - Pressurizer Heater Backup Group B,	Compt. A1A-A6A, B1A	Primary
	Compt. A1B-A6B, B1B	Backup
2RY03EC - Pressurizer Heater Backup Group C,	Compt. B1A-B6A	Primary
	Compt. B1B-B6B	Backup
2RY03ED - Pressurizer Heater Backup Group D,	Compt. A1A-A6A	Primary
	Compt. A1B-A6B	Backup

(continued)

Table T3.8.a-2 (page 2 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
3. 480 V A.C. Switchgear Circuit Breakers	
2VP01CA - RCFC Fan 2A	
2A Low Speed Feed Breaker Switchgear 231X Cub 4C	Primary
2A Hi Speed Feed Breaker Switchgear 231X Cub 5C	Primary
Bus 231X Normal Feed 241 Switchgear Cub 4 ACB 2415X	Backup
2VP01CC - RCFC Fan 2C	
2C Low Speed Feed Breaker Switchgear 231X Cub 2C	Primary
2C Hi Speed Feed Breaker Switchgear 231X Cub 3C	Primary
Bus 231X Normal Feed 241 Switchgear Cub 4 ACB 2415X	Backup
2VP01CB - RCFC Fan 2B	
2B Low Speed Feed Breaker Switchgear 232X Cub 4C	Primary
2B Hi Speed Feed Breaker Switchgear 232X Cub 5C	Primary
Bus 232X Normal Feed 242 Switchgear Cub 8 ACB 2425X	Backup
2VP01CD - RCFC Fan 2D	
2D Low Speed Feed Breaker Switchgear 232X Cub 2C	Primary
2D Hi Speed Feed Breaker Switchgear 232X Cub 3C	Primary
Bus 232X Normal Feed 242 Switchgear Cub 8 ACB 2425X	Backup
2EW39E - Containment Stinger Bus Rectifier	
Containment Stinger Bus 234Y Cub 2C	Primary
Fuses in Bus 234Y Cub 2C	Backup
2AP200EA/ED Containment Outage Pwr Distr Panels – Unit 2	
Circuit Breaker in Bus 133X Cub 2C	Primary
Fuses in Bus 133X Cub 2C	Backup
2AP200EB/EC Containment Outage Pwr Distr Panels – Unit 2	
Circuit Breaker in Bus 134X Cub 5D	Primary
Fuses in Bus 134X Cub 5D	Backup

(continued)

Table T3.8.a-2 (page 3 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION		DEVICE
4. 480 V Molded Case Circuit Breakers (MCCB)		MCC 233X4
2RC01PA-A -	Cub B1 Front	Primary
	Cub B1 Rear	Backup
2RC01PA-B -	Cub B2 Front	Primary
	Cub B2 Rear	Backup
2HC22G -	Cub B3 Front	Primary
	Cub B3 Rear	Backup
2FH03G -	Cub B4 Front	Primary
	Cub B4 Rear	Backup
2VP05CA -	Cub C1 Front	Primary
	Cub C1 Rear	Backup
2RF03P -	Cub C2 Front	Primary
	Cub C2 Rear	Backup
2RC01PD-A -	Cub D1 Front	Primary
	Cub D1 Rear	Backup
2RC01PD-B -	Cub D2 Front	Primary
	Cub D2 Rear	Backup
2RF02PB -	Cub D4 Front	Primary
	Cub D4 Rear	Backup
2RF01P -	Cub D5 Front	Primary
	Cub D5 Rear	Backup
2RE01PA -	Cub D6 Front	Primary
	Cub D6 Rear	Backup
2VP02CA -	Cub E1 Front	Primary
	Cub E1 Rear	Backup
2VP04CA -	Cub E2 Front	Primary
	Cub E2 Rear	Backup
2VP04CC -	Cub F1 Front	Primary
	Cub F1 Rear	Backup
2EW11EA,B,C -	Cub F3 Front	Primary
	Cub F3 Rear	Backup
2IC02EA -	Cub F5 Front	Primary
	Cub F5 Rear	Backup
2IC02EB -	Cub G1 Front	Primary
	Cub G1 Rear	Backup
2IC02EC -	Cub G2 Front	Primary
	Cub G2 Rear	Backup

(continued)

Table T3.8.a-2 (page 4 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION		DEVICE
5. 480 V Molded Case Circuit Breakers (MCCB)		MCC 234X5
2IC02EF -	Cub A1 Front	Primary
	Cub A1 Rear	Backup
2IC02EE -	Cub A2 Front	Primary
	Cub A2 Rear	Backup
2IC02ED -	Cub A3 Front	Primary
	Cub A3 Rear	Backup
2FH02J -	Cub G1 Front	Primary
	Cub G1 Rear	Backup
2FH03J -	Cub G2 Front	Primary
	Cub G2 Rear	Backup
2RC01PB-B -	Cub B1 Front	Primary
	Cub B1 Rear	Backup
2RE01PB -	Cub B3 Front	Primary
	Cub B3 Rear	Backup
2RC01PC-A -	Cub C1 Front	Primary
	Cub C1 Rear	Backup
2RC01PC-B -	Cub C2 Front	Primary
	Cub C2 Rear	Backup
2VP05CB -	Cub J1 Front	Primary
	Cub J1 Rear	Backup
2RC01PB-A -	Cub C3 Front	Primary
	Cub C3 Rear	Backup
2HC65G-A -	Cub D3 Front	Primary
	Cub D3 Rear	Backup
2VP02CB -	Cub F1 Front	Primary
	Cub F1 Rear	Backup
2RC01R-A –	Cub F2-A	Primary
	Cub F2-B	Backup
2RF02PA -	Cub G3 Front	Primary
	Cub G3 Rear	Backup
2EW12EA,B,C –	Cub F3-A	Primary
	Cub F3-B	Backup
2VP04CB -	Cub F4 Front	Primary
	Cub F4 Rear	Backup
2VP04CD -	Cub F5 Front	Primary
	Cub F5 Rear	Backup

(continued)

Table T3.8.a-2 (page 5 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION			DEVICE
6.	480 V Molded Case Circuit Breakers (MCCB)		MCC 232X2A
	2SI8808C -	Cub A2	Primary
		MCC 232X2 Cub B2	Backup
	2SI8808B -	Cub A3	Primary
		MCC 232X2 Cub B2	Backup
7.	480 V Molded Case Circuit Breakers (MCCB)		MCC 232X2
	2RH8702B -	Cub B1 Front	Primary
		Cub B1 Rear	Backup
	2RH8701B -	Cub B3 Front	Primary
		Cub B3 Rear	Backup
	2CV8112 -	Cub B4 Front	Primary
		Cub B4 Rear	Backup
	2OG079 -	Cub C1 Front	Primary
		Cub C1 Rear	Backup
	2WO056A -	Cub C2 Front	Primary
		Cub C2 Rear	Backup
	2OG080 -	Cub C3 Front	Primary
		Cub C3 Rear	Backup
	2RY8000B -	Cub C4 Front	Primary
		Cub C4 Rear	Backup
	2RC8003C -	Cub D5 Front	Primary
		Cub D5 Rear	Backup
	2RC8003B -	Cub D4 Front	Primary
		Cub D4 Rear	Backup
	2RC8002A -	Cub G1 Front	Primary
		Cub G1 Rear	Backup
	2RC8002B -	Cub G2 Front	Primary
		Cub G2 Rear	Backup
	2RC8002C -	Cub G3 Front	Primary
		Cub G3 Rear	Backup
	2RC8002D -	Cub G4 Front	Primary
		Cub G4 Rear	Backup

(continued)

Table T3.8.a-2 (page 6 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION			DEVICE
8.	480 V Molded Case Circuit Breakers (MCCB)		MCC 231X2A
	2SI8808D -	Cub A2 MCC 231X2 Cub B2	Primary Backup
	2SI8808A -	Cub A3 MCC 231X2 Cub B2	Primary Backup
9.	480 V Molded Case Circuit Breakers (MCCB)		MCC 231X2
	2RC8001A -	Cub G1 Front Cub G1 Rear	Primary Backup
	2RC8001B -	Cub G2 Front Cub G2 Rear	Primary Backup
	2RC8001C -	Cub G3 Front Cub G3 Rear	Primary Backup
	2RC8001D -	Cub G4 Front Cub G4 Rear	Primary Backup
	2RH8701A -	Cub B1 Front Cub B1 Rear	Primary Backup
	2RH8702A -	Cub B4 Front Cub B4 Rear	Primary Backup
	2LL42J -	Cub C1 Front Cub C1 Rear	Primary Backup
	2VQ001A -	Cub C3 Front Cub C3 Rear	Primary Backup
	2VQ002A -	Cub F1 Front Cub F1 Rear	Primary Backup
	2RC8003D -	Cub C4 Front Cub C4 Rear	Primary Backup
	2RC8003A -	Cub C5 Front Cub C5 Rear	Primary Backup
	2OG057A -	Cub D1 Front Cub D1 Rear	Primary Backup
	2CC9416 -	Cub D3 Front Cub D3 Rear	Primary Backup
	2CC9438 -	Cub D4 Front Cub D4 Rear	Primary Backup
	2OG081 -	Cub E2 Front Cub E2 Rear	Primary Backup

(continued)

Table T3.8.a-2 (page 7 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

	PROTECTIVE DEVICE NUMBER AND LOCATION		DEVICE
10.	480 V Molded Case Circuit Breakers (MCCB)		MCC 233X6
	2HC01G -	Cub B2	Primary
		Cub B1	Backup
	2LL04E -	Cub C2	Primary
		Cub C1	Backup
	2VP03CA -	Cub A3 Front	Primary
		Cub A3 Rear	Backup
	2VP03CD -	Cub C4 Front	Primary
		Cub C4 Rear	Backup
11.	480 V Molded Case Circuit Breakers (MCCB)		MCC 234X7
	2LL05E -	Cub B2	Primary
		Cub B1	Backup
	2VP03CB -	Cub A3 Front	Primary
		Cub A3 Rear	Backup
	2VP03CC -	Cub B4 Front	Primary
		Cub B4 Rear	Backup
12.	480 V Molded Case Circuit Breakers (MCCB)		MCC 231X2B
	2WO056B -	Cub A4 Front	Primary
		Cub A4 Rear	Backup
	2RY8000A -	Cub A5 Front	Primary
		Cub A5 Rear	Backup
13.	260 VAC RCD Power (53 rods, 5 panels)		
	Stationary Gripper Coils fuse (all panels)		Primary
	Stationary Gripper Coils fuse (all panels)		Backup
	Lift Coils fuse (all panels)		Primary
	Lift Coils fuse (all panels)		Backup
	Movable Gripper Coils fuse (all panels)		Primary
	Movable Gripper Coils fuse (all panels)		Backup

3.8 ELECTRICAL POWER SYSTEMS

3.8.b Motor Operated Valves Thermal Overload Protection Devices

TLCO 3.8.b The thermal overload protection devices integral with the motor starter of each valve listed in Table T3.8.b-1 for Unit 1 (Table T3.8.b-2 for Unit 2) shall be OPERABLE.

APPLICABILITY: Whenever the motor operated valve is required to be OPERABLE.

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each thermal overload protection device.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more thermal overload protection devices inoperable.	A.1 Declare the affected valve inoperable.	Immediately
	<u>AND</u>	
	A.2 Enter the applicable Conditions and Required Actions for the affected valve.	Immediately

SURVEILLANCE REQUIREMENTS

------------------------------------NOTE------------------------------------
TSR 3.8.b.1 applies to each thermal overload protection device in Table T3.8.b-1 (Table T3.8.b-2).

SURVEILLANCE		FREQUENCY
TSR 3.8.b.1	-------------------NOTES------------------- A representative sample shall consist of ≥ 25% of all thermal overload protection devices such that: 1. Each device is calibrated at least once per 6 years, and 2. Each thermal overload is calibrated and each valve is cycled through at least one complete cycle of full travel with the motor operator when the thermal overload is OPERABLE at least once per 6 years. -- Perform CHANNEL CALIBRATION of a representative sample of thermal overload devices.	18 months

Table T3.8.b-1 (page 1 of 3)
Thermal Overload Protection Devices - Unit 1

VALVE NUMBER	FUNCTION
1OG057A	OA H_2 Recombiner Discharge Isolation Valve
1OG079	H_2 Recombiner Discharge Containment Isolation Valve
1OG080	H_2 Recombiner Suction Containment Isolation Valve
1OG081	H_2 Recombiner Suction Containment Isolation Valve
1OG082	OA H_2 Recombiner Discharge Containment Isolation Valve
1OG083	OA H_2 Recombiner Discharge Containment Isolation Valve
1OG084	OA H_2 Recombiner Containment Outlet Isolation Valve
1OG085	H_2 Recombiner Containment Outlet Isolation Valve
1AF006A	1A AF Pump SX Suction Isolation Valve
1AF006B	1B AF Pump SX Suction Downstream Isolation Valve
1AF013A	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
1AF013B	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
1AF013C	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
1AF013D	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
1AF013E	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
1AF013F	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
1AF013G	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
1AF013H	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
1AF017A	1A AF Pump SX Suction Upstream Isolation Valve
1AF017B	1B AF Pump SX Suction Upstream Isolation Valve
1CC201A	1A SX to CC Makeup Isolation Valve
1CC201B	1B SX to CC Makeup Isolation Valve
1CC202A	1A SX to CC Makeup Isolation Valve
1CC202B	1B SX to CC Makeup Isolation Valve
1CC685	RCP Thermal Barrier Outlet Header Containment Isolation Valve
1CC9412A	CC to RHR HX 1A Isolation Valve
1CC9412B	CC to RHR HX 1B Isolation Valve
1CC9413A	RCPs CC Supply Downstream Containment Isolation Valve
1CC9413B	RCPs CC Supply Upstream Containment Isolation Valve
1CC9414	CC Water from RCPs Isolation Valve
1CC9415	Service Loop Isolation Valve
1CC9416	CC Water from RCPs Isolation Valve
1CC9438	CC Water from RCPs Thermal Barrier Isolation Valve
1CC9473A	Discharge Header X-tie Isolation Valve
1CC9473B	Discharge Header X-tie Isolation Valve
1CS001A	1A CS Pump Suction from RWST
1CS001B	1B CS Pump Suction from RWST
1CS007A	1A CS Pump Discharge Line Downstream Isolation Valve
1CS007B	1B CS Pump Discharge Line Downstream Isolation Valve
1CS009A	1A CS Pump Suction from 1A Recirc Sump
1CS009B	1B CS Pump Suction from 1B Recirc Sump
1CS019A	CS Eductor 1A Suction Conn Isolation Valve
1CS019B	CS Eductor 1B Suction Conn Isolation Valve

(continued)

Table T3.8.b-1 (page 2 of 3)
Thermal Overload Protection Devices - Unit 1

VALVE NUMBER	FUNCTION
1CV112B	MOV VCT Outlet Upstream Isolation VCT Valve
1CV112C	MOV VCT Outlet Downstream Isolation VCT Valve
1CV112D	MOV RWST to Charging Pump Suction Header
1CV112E	MOV RWST to Charging Pump Suction Header
1CV8100	MOV RCP Seal Leakoff Header Isolation
1CV8104	MOV Emergency Boration Valve
1CV8105	MOV Charging Pumps Discharge Header Isolation Valve
1CV8106	MOV Charging Pumps Discharge Header Isolation Valve
1CV8110	MOV A & B Charging Pump Recirc Downstream Isolation
1CV8111	MOV A & B Charging Pump Recirc Upstream Isolation
1CV8112	RCP Seal Water Return Isolation Valve
1CV8355A	MOV RCP 1A Seal Injection Inlet to Containment Isolation
1CV8355B	MOV RCP 1B Seal Injection Inlet Isolation
1CV8355C	MOV RCP 1C Seal Injection Isolation
1CV8355D	MOV RCP 1D Seal Injection Isolation
1CV8804A	MOV RHR System X-Tie Valve to Charging Pump Suction Header A/B
1RH610	1A RHR Pump Recirc Line Isolation Valve
1RH611	1B RHR Pump Recirc Line Isolation Valve
1RH8701A	RC Loop 1A to RHR Pump Isolation Valve
1RH8702A	RC Loop 1C to RHR Pump Isolation Valve
1RH8701B	RC Loop 1A to RHR Pump Isolation Valve
1RH8702B	RC Loop 1C to RHR Pump Isolation Valve
1RH8716A	RHR HX 1RH02AA Downstream Isolation Valve
1RH8716B	RHR HX 1RH02AB Downstream Isolation Valve
1RY8000A	Pressurizer Relief Isolation Valve 1A
1RY8000B	Pressurizer Relief Isolation Valve 1B
1SI8801A	SI Charging Pump Discharge Isolation Valve
1SI8801B	SI Charging Pump Discharge Isolation Valve
1SI8802A	1A SI Pump Discharge Line Downstream Containment Isolation Valve
1SI8802B	1B SI Pump Discharge Line Downstream Isolation Valve
1SI8804B	1B SI Pump Suction X-tie from RHR HX
1SI8806	SI Pumps Upstream Suction Isolation Valve
1SI8807A	SI to Charging Pump Suction X-tie Isolation Valve
1SI8807B	SI to Charging Pump Suction X-tie Isolation Valve
1SI8808A	Accumulator 1A Discharge Isolation Valve
1SI8808B	Accumulator 1B Discharge Isolation Valve
1SI8808C	Accumulator 1C Discharge Isolation Valve
1SI8808D	Accumulator 1D Discharge Isolation Valve
1SI8809A	SI RHR HX 1A Discharge Line Downstream Isolation Valve
1SI8809B	SI RHR HX 1B Discharge Line Downstream Isolation Valve
1SI8811A	SI Containment Sump A Outlet Isolation Valve
1SI8811B	SI Containment Sump B Outlet Isolation Valve
1SI8812A	SI RWST to RH Pump 1A Outlet Isolation Valve
1SI8812B	SI RWST to RH Pump 1B Outlet Isolation Valve
1SI8813	SI Pumps 1A-1B Recirc Line Downstream Isolation Valve
1SI8814	SI Pump 1A Recirc Line Isolation Valve
1SI8835	SI Pumps X-tie Discharge Isolation Valve
1SI8840	SI RHR HX Discharge Line Upstream Containment Penetration Isolation Valve
1SI8821A	1A SI Pump Discharge Line X-tie Isolation Valve
1SI8821B	1B SI Pump Discharge Line X-tie Isolation Valve
1SI8920	1B SI Pump Recirc Line Isolation Valve
1SI8923A	1A SI Pump Suction Isolation Valve
1SI8923B	1B SI Pump Suction Isolation Valve
1SI8924	1A SI Pump Suction X-tie Downstream Isolation Valve

(continued)

Table T3.8.b-1 (page 3 of 3)
Thermal Overload Protection Devices - Unit 1

VALVE NUMBER	FUNCTION
1SX016B	RCFC B&D SX Supply MOV
1SX016A	RCFC A&C SX Supply MOV
1SX027A	RCFC A&C SX Return MOV
1SX027B	RCFC B&D SX Return MOV
0SX007	CC HX Outlet Valve
0SX063A	SX to Control Room Refrig Condenser 0A
0SX063B	SX to Control Room Refrig Condenser 0B
0SX146	CC HX "0" Outlet Valve
0SX147	CC HX "0" Outlet Valve
1SX001A	1A SX Pump Suction Valve MOV
1SX001B	1B SX Pump Suction Valve MOV
1SX004	Unit 1 SX Supply to Unit 1 CCW HX MOV
1SX005	1B SX Pump Supply to CCW HX "0" MOV
1SX007	CC HX Outlet Valve
1SX010	Unit 1 Train A Return Valve AB
1SX011	Train A Train B Unit 1 Return X-tie Valve AB
1SX033	1A SX Pump Discharge X-tie MOV
1SX034	1B SX Pump Discharge X-tie MOV
1SX136	Unit 1 Train B Return Valve AB
1SX150A	SX Strainer 1A Backwash to Waste Treatment Building MOV
1SX150B	SX Strainer 1B Backwash to Waste Treatment Building MOV
1WO006A	Chilled Water Coils 1A & 1C Supply Isolation Valve
1WO006B	Chilled Water Coils 1B & 1D Supply Isolation Valve
1WO020A	Chilled Water Coils 1A & 1C Return Isolation Valve
1WO020B	Chilled Water Coils 1B & 1D Return Isolation Valve
1WO056A	Chilled Water Containment Isolation Valve
1WO056B	Chilled Water Containment Isolation Valve

Table T3.8.b-2 (page 1 of 3)
Thermal Overload Protection Devices - Unit 2

VALVE NUMBER	FUNCTION
2OG057A	OB H_2 Recombiner Discharge Isolation Valve
2OG079	H_2 Recombiner Discharge Containment Isolation Valve
2OG080	H_2 Recombiner Suction Containment Isolation Valve
2OG081	H_2 Recombiner Suction Containment Isolation Valve
2OG082	OB H_2 Recombiner Discharge Containment Isolation Valve
2OG083	OB H_2 Recombiner Discharge Containment Isolation Valve
2OG084	OB H_2 Recombiner Containment Outlet Isolation Valve
2OG085	H_2 Recombiner Containment Outlet Isolation Valve
2AF006A	2A AF Pump SX Suction Isolation Valve
2AF006B	2B AF Pump SX Suction Downstream Isolation Valve
2AF013A	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
2AF013B	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
2AF013C	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
2AF013D	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
2AF013E	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
2AF013F	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
2AF013G	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
2AF013H	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
2AF017A	2A AF Pump SX Suction Upstream Isolation Valve
2AF017B	2B AF Pump SX Suction Upstream Isolation Valve
2CC201A	2A SX to CC Makeup Isolation Valve
2CC201B	2B SX to CC Makeup Isolation Valve
2CC202A	2A SX to CC Makeup Isolation Valve
2CC202B	2B SX to CC Makeup Isolation Valve
2CC685	RCP Thermal Barrier Outlet Header Containment Isolation Valve
2CC9412A	CC to RHR HX 2A Isolation Valve
2CC9412B	CC to RHR HX 2B Isolation Valve
2CC9413A	RCP CC Supply Downstream Containment Isolation
2CC9413B	RCPs CC Supply Upstream Containment Isolation
2CC9414	CC Water from RCPs Isolation Valve
2CC9415	Service Loop Isolation Valve
2CC9416	CC Water from RCPs Isolation Valve
2CC9438	CC Water from RCPs Thermal Barrier Isolation Valve
2CC9473A	Discharge Header X-tie Isolation Valve
2CC9473B	Discharge Header X-tie Isolation Valve
2CS001A	2A CS Pump Suction from RWST
2CS001B	2B CS Pump Suction from RWST
2CS007A	2A CS Pump Discharge Line Downstream Isolation Valve
2CS007B	2B CS Pump Discharge Line Downstream Isolation Valve
2CS009A	2A CS Pump Suction from 2A Recirc Sump
2CS009B	2B CS Pump Suction from 2B Recirc Sump
2CS019A	CS Eductor 2A Suction Conn Isolation Valve
2CS019B	CS Eductor 2B Suction Conn Isolation Valve

(continued)

Table T3.8.b-2 (page 2 of 3)
Thermal Overload Protection Devices - Unit 2

VALVE NUMBER	FUNCTION
2CV112B	MOV VCT Outlet Upstream Isolation VCT Valve
2CV112C	MOV VCT Outlet Downstream Isolation VCT Valve
2CV112D	MOV RWST to Charging Pump Suction Header
2CV112E	MOV RWST to Charging Pump Suction Header
2CV8100	MOV RCP Seal Leakoff Header Isolation
2CV8104	MOV Emergency Boration Valve
2CV8105	MOV Charging Pumps Discharge Header Isolation Valve
2CV8106	MOV Charging Pumps Discharge Header Isolation Valve
2CV8110	MOV A & B Charging Pump Recirc Downstream Isolation
2CV8111	MOV A & B Charging Pump Recirc Upstream Isolation
2CV8112	RCP Seal Water Return Isolation Valve
2CV8355A	MOV RCP 2A Seal Injection Inlet to Containment Isolation
2CV8355B	MOV RCP 2B Seal Injection Inlet Isolation
2CV8355C	MOV RCP 2C Seal Injection Isolation
2CV8355D	MOV RCP 2D Seal Injection Isolation
2CV8804A	MOV RHR System X-Tie Valve to Charging Pump Suction Header A/B
2RH610	2A RHR Pump Recirc Line Isolation Valve
2RH611	2B RHR Pump Recirc Line Isolation Valve
2RH8701A	RC Loop 2A to RHR Pump Isolation Valve
2RH8702A	RC Loop 2C to RHR Pump Isolation Valve
2RH8701B	RC Loop 2A to RHR Pump Isolation Valve
2RH8702B	RC Loop 2C to RHR Pump Isolation Valve
2RH8716A	RHR HX 2RH02AA Downstream Isolation Valve
2RH8716B	RHR HX 2RH02AB Downstream Isolation Valve
2RY8000A	Pressurizer Relief Isolation Valve 2A
2RY8000B	Pressurizer Relief Isolation Valve 2B
2SI8801A	SI Charging Pump Discharge Isolation Valve
2SI8801B	SI Charging Pump Discharge Isolation Valve
2SI8802A	2A SI Pump Discharge Line Downstream Containment Isolation Valve
2SI8802B	2B SI Pump Discharge Line Downstream Isolation Valve
2SI8804B	2B SI Pump Suction X-tie from RHR HX
2SI8806	SI Pumps Upstream Suction Isolation Valve
2SI8807A	SI to Charging Pump Suction X-tie Isolation Valve
2SI8807B	SI to Charging Pump Suction X-tie Isolation Valve
2SI8808A	Accumulator 2A Discharge Isolation Valve
2SI8808B	Accumulator 2B Discharge Isolation Valve
2SI8808C	Accumulator 2C Discharge Isolation Valve
2SI8808D	Accumulator 2D Discharge Isolation Valve
2SI8809A	SI RHR HX 2A Discharge Line Downstream Isolation Valve
2SI8809B	SI RHR HX 2B Discharge Line Downstream Isolation Valve
2SI8811A	SI Containment Sump A Outlet Isolation Valve
2SI8811B	SI Containment Sump B Outlet Isolation Valve
2SI8812A	SI RWST to RHR Pump 2A Outlet Isolation Valve
2SI8812B	SI RWST to RHR Pump 2B Outlet Isolation Valve
2SI8813	SI Pumps 2A-2B Recirc Line Downstream Isolation Valve
2SI8814	SI Pump 2A Recirc Line Isolation Valve
2SI8835	SI Pumps X-tie Discharge Isolation Valve
2SI8840	SI RHR HX Discharge Line Upstream Containment Penetration Isolation Valve
2SI8821A	2A SI Pump Discharge Line X-tie Isolation Valve
2SI8821B	2B SI Pump Discharge Line X-tie Isolation Valve
2SI8920	2B SI Pump Recirc Line Isolation Valve
2SI8923A	2A SI Pump Suction Isolation Valve
2SI8923B	2B SI Pump Suction Isolation Valve
2SI8924	2A SI Pump Suction X-tie Downstream Isolation Valve

(continued)

Table T3.8.b-2 (page 3 of 3)
Thermal Overload Protection Devices - Unit 2

VALVE NUMBER	FUNCTION
2SX016B	RCFC B&D SX Supply MOV
2SX016A	RCFC A&C SX Supply MOV
2SX027A	RCFC A&C SX Return MOV
2SX027B	RCFC B&D SX Return MOV
0SX007	CC HX Outlet Valve
0SX063A	SX to Control Room Refrig Condenser 0A
0SX063B	SX to Control Room Refrig Condenser 0B
0SX146	CC HX "0" Outlet Valve
0SX147	CC HX "0" Outlet Valve
2SX001A	2A SX Pump Suction Valve MOV
2SX001B	2B SX Pump Suction Valve MOV
2SX004	Unit 2 SX Supply to Unit 2 CCW HX MOV
2SX005	2B SX Pump Supply to CCW HX "0" MOV
2SX007	CC HX Outlet Valve
2SX010	Unit 2 Train A Return Valve AB
2SX011	Train A Train B Unit 2 Return X-tie Valve AB
2SX033	2A SX Pump Discharge X-tie MOV
2SX034	2B SX Pump Discharge X-tie MOV
2SX136	Unit 2 Train B Return Valve AB
2SX150A	SX Strainer 2A Backwash to Waste Treatment Building MOV
2SX150B	SX Strainer 2B Backwash to Waste Treatment Building MOV
2WO006A	Chilled Water Coils 2A & 2C Supply Isolation Valve
2WO006B	Chilled Water Coils 2B & 2D Supply Isolation Valve
2WO020A	Chilled Water Coils 2A & 2C Return Isolation Valve
2WO020B	Chilled Water Coils 2B & 2D Return Isolation Valve
2WO056A	Chilled Water Containment Isolation Valve
2WO056B	Chilled Water Containment Isolation Valve

3.8 ELECTRICAL POWER SYSTEMS

3.8.c Battery Monitoring and Maintenance

TLCO 3.8.c Battery cell parameters for Division 11(21) and Division 12(22) batteries shall be within limits of Table T3.8.c-1.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

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

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One battery with one or more battery cell parameters not within Category A or B limits.	A.1	Verify pilot cell electrolyte level and float voltage meet Table T3.8.c-1 Category C limits.	1 hour
	<u>AND</u>		
	A.2	Verify battery cell parameters meet Table T3.8.c-1 Category C limits.	24 hours <u>AND</u> Once per 7 days thereafter
	<u>AND</u>		
	A.3	Restore battery cell parameters to Category A and B limits of Table T3.8.c-1.	31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ---------NOTE--------- Required Actions B.1 and B.2 must be completed after LCO 3.8.6, "Battery Parameters," Required Action C.3 is completed. ---------------------- One battery with one or more cells with electrolyte level less than the minimum established design limit.	B.1 Conduct an equalizing charge of the affected battery cell(s).	31 days
	AND	
	B.2 Verify successful completion of appropriate testing for the affected cell(s).	31 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.8.c.1	Verify battery cell parameters meet Table T3.8.c-1 Category A limits.	7 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.c.2	Verify battery cell parameters meet Table T3.8.c-1 Category B limits.	92 days AND Once within 7 days after a battery discharge < 110 V AND Once within 7 days after a battery overcharge > 145 V
TSR 3.8.c.3	Verify no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤ 150 micro-ohms for inter-cell connections, ≤ 150 micro-ohms for inter-rack connections, ≤ 150 micro-ohms for inter-tier connections, and ≤ 150 micro-ohms for terminal connections. AND Verify total battery connection resistance is ≤ 3245 micro-ohms.	92 days
TSR 3.8.c.4	Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could degrade battery performance.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.c.5	Remove visible terminal corrosion, verify battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	18 months
TSR 3.8.c.6	Verify battery connection resistance is ≤ 150 micro-ohms for inter-cell connections, ≤ 150 micro-ohms for inter-rack connections, ≤ 150 micro-ohms for inter-tier connections, and ≤ 150 micro-ohms for terminal connections. <u>AND</u> Verify total battery connection resistance is ≤ 3245 micro-ohms.	18 months

Table T3.8.c-1 (page 1 of 1)
Battery Cell Parameters Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	≥ Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	≥ Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V[b]	> 2.07 V
Specific Gravity[c][d]	≥ 1.200	≥ 1.195 AND Average of all connected cells > 1.205	Not more than 0.020 below average of all connected cells AND Average of all connected cells ≥ 1.195

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing.

(b) Corrected for average electrolyte temperature.

(c) Corrected for electrolyte temperature.

(d) A battery charging current of < 3 amps when on float charge is acceptable for meeting specific gravity limits following a battery recharge, for a maximum of 7 days. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

3.9 REFUELING OPERATIONS

3.9.a Decay Time

TLCO 3.9.a The reactor shall be subcritical for ≥ 113 hours

<u>OR</u>

The reactor shall be subcritical for ≥ 65 hours <u>AND</u> the core offload shall be within the limits of the appropriate figure (Figure 3.9.a-1 through 3.9.a-9, as applicable).

APPLICABILITY: During movement of irradiated fuel in the reactor vessel.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Reactor subcritical for < 65 hours. <u>OR</u> Reactor subcritical for < 113 hours <u>AND</u> the core offload not within the limits of the appropriate figure (Figure 3.9.a-1 through 3.9.a-9, as applicable).	A.1 Suspend movement of irradiated fuel in the reactor vessel.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.a.1	-------------------NOTE-------------------- Not required to be performed once Acceptable Region II in Figure 3.9.a-1 through 3.9.a-9 is entered. --- Verify the reactor subcritical ≥ 113 hours by confirming the date and time of subcriticality. OR Verify the reactor subcritical ≥ 65 hours by confirming the date and time of subcriticality AND verify the core offload remains within the limits of the appropriate figure (Figure 3.9.a-1 through 3.9.a-9, as applicable) determined by TSR 3.9.a.2 during movement of irradiated fuel.	Prior to initial movement of irradiated fuel in the reactor vessel each outage
TSR 3.9.a.2	-------------------NOTE-------------------- Only required to be performed if cycle-specific Spent Fuel Pool (SFP) Heat Load Margin figures are used in TSR 3.9.a.1. --- Determine the SFP Heat Load Margin for the specific cycle for use in TSR 3.9.a.1. Round the margin down to the next MBTU/hr value to determine the applicable SFP Heat Load Margin Figure (Figure 3.9.a-1 through 3.9.a-9).	Prior to initial movement of irradiated fuel in the reactor vessel each outage.

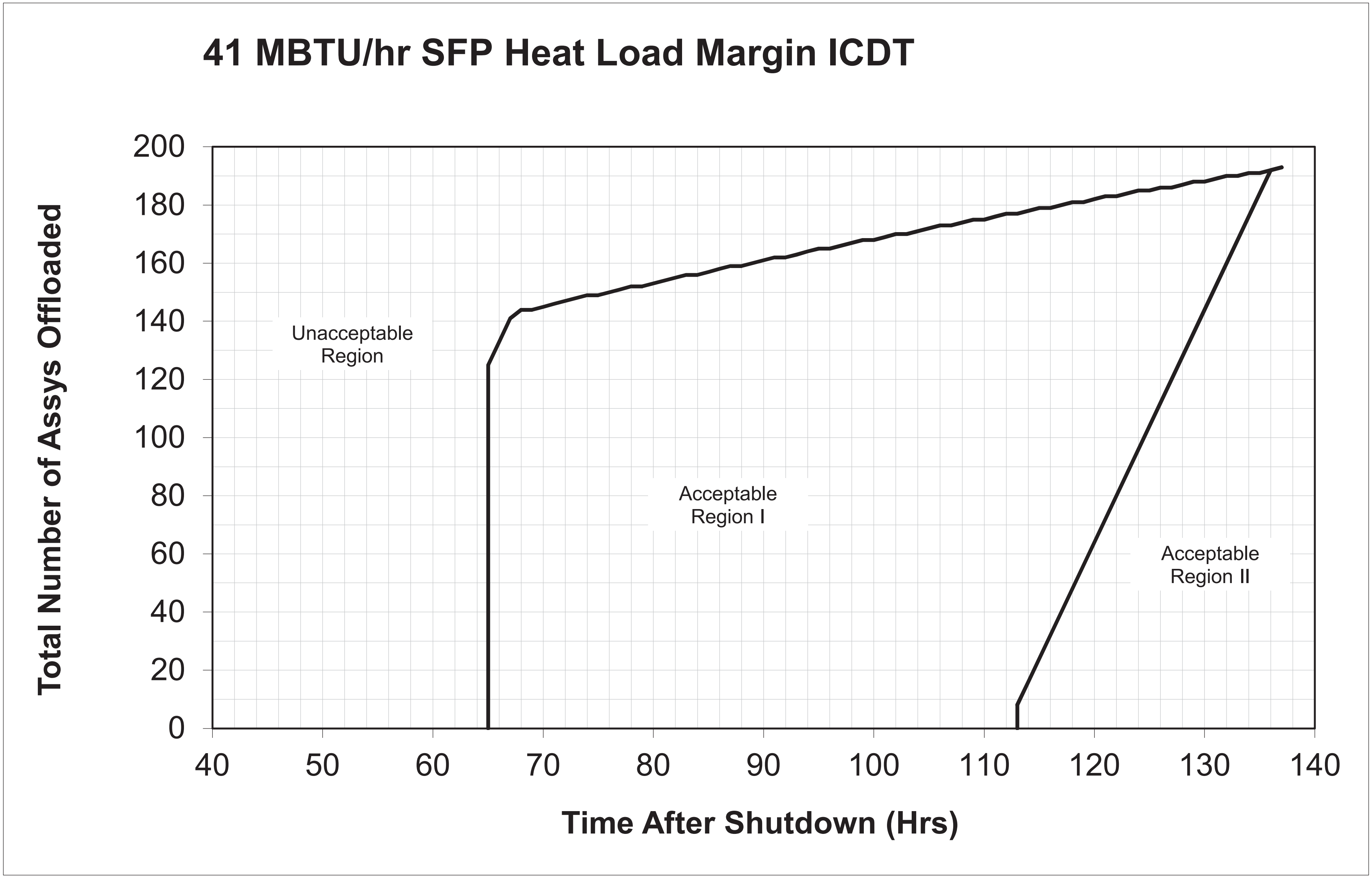


Figure 3.9.a-1, "41 MBTU/hr SFP Heat Load Margin"

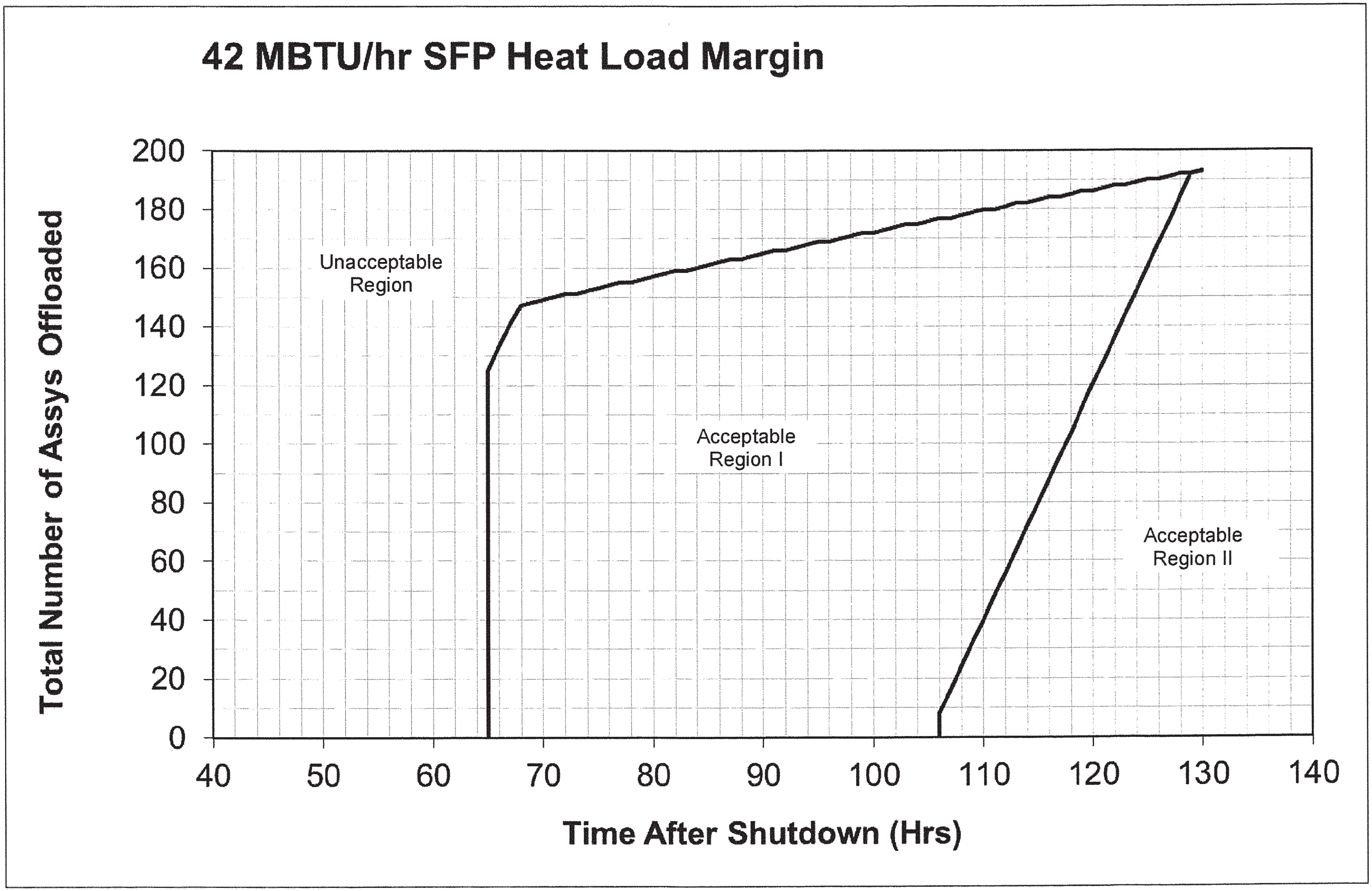


Figure 3.9.a-2, “42 MBTU/hr SFP Heat Load Margin”

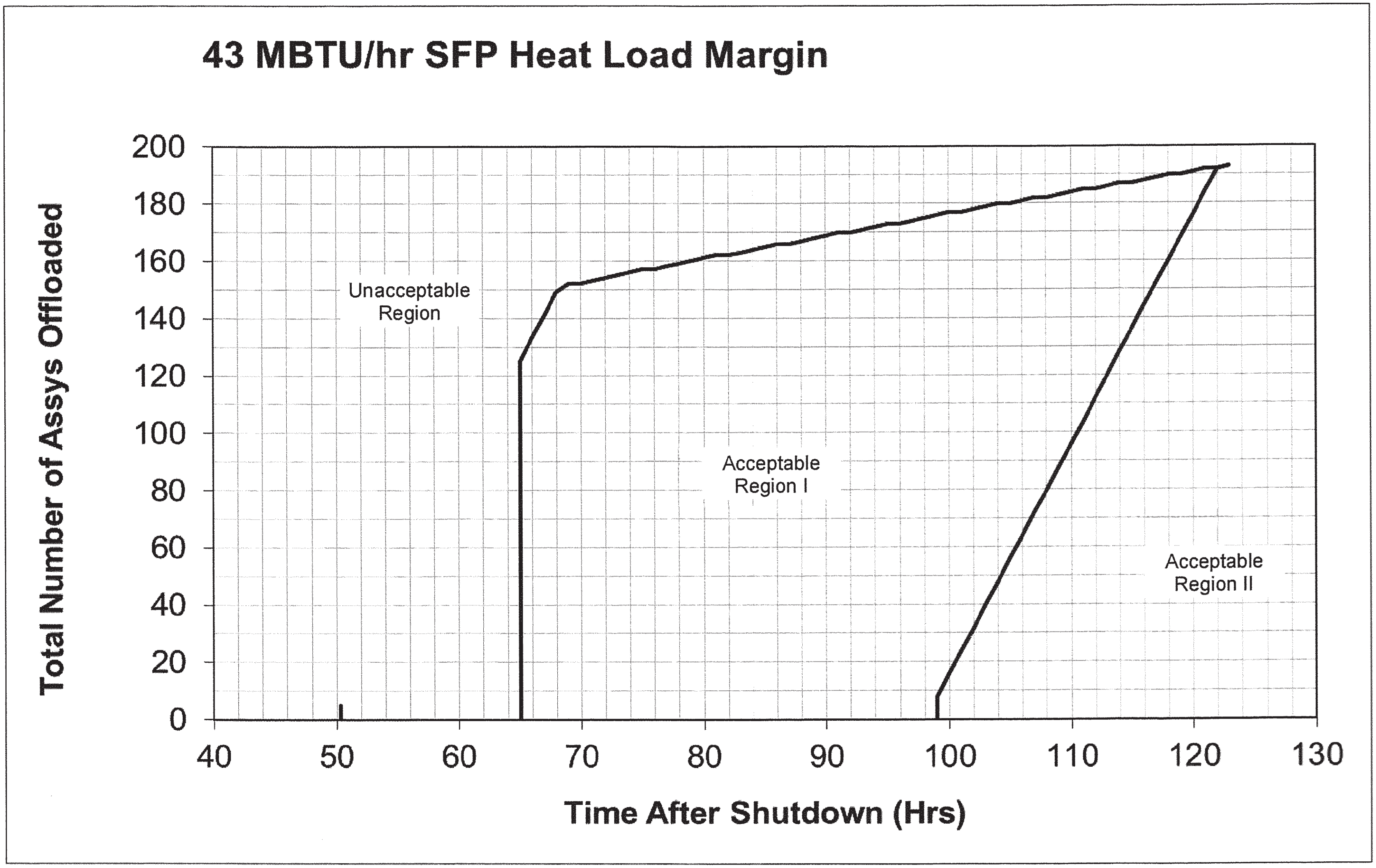


Figure 3.9.a-3, "43 MBTU/hr SFP Heat Load Margin"

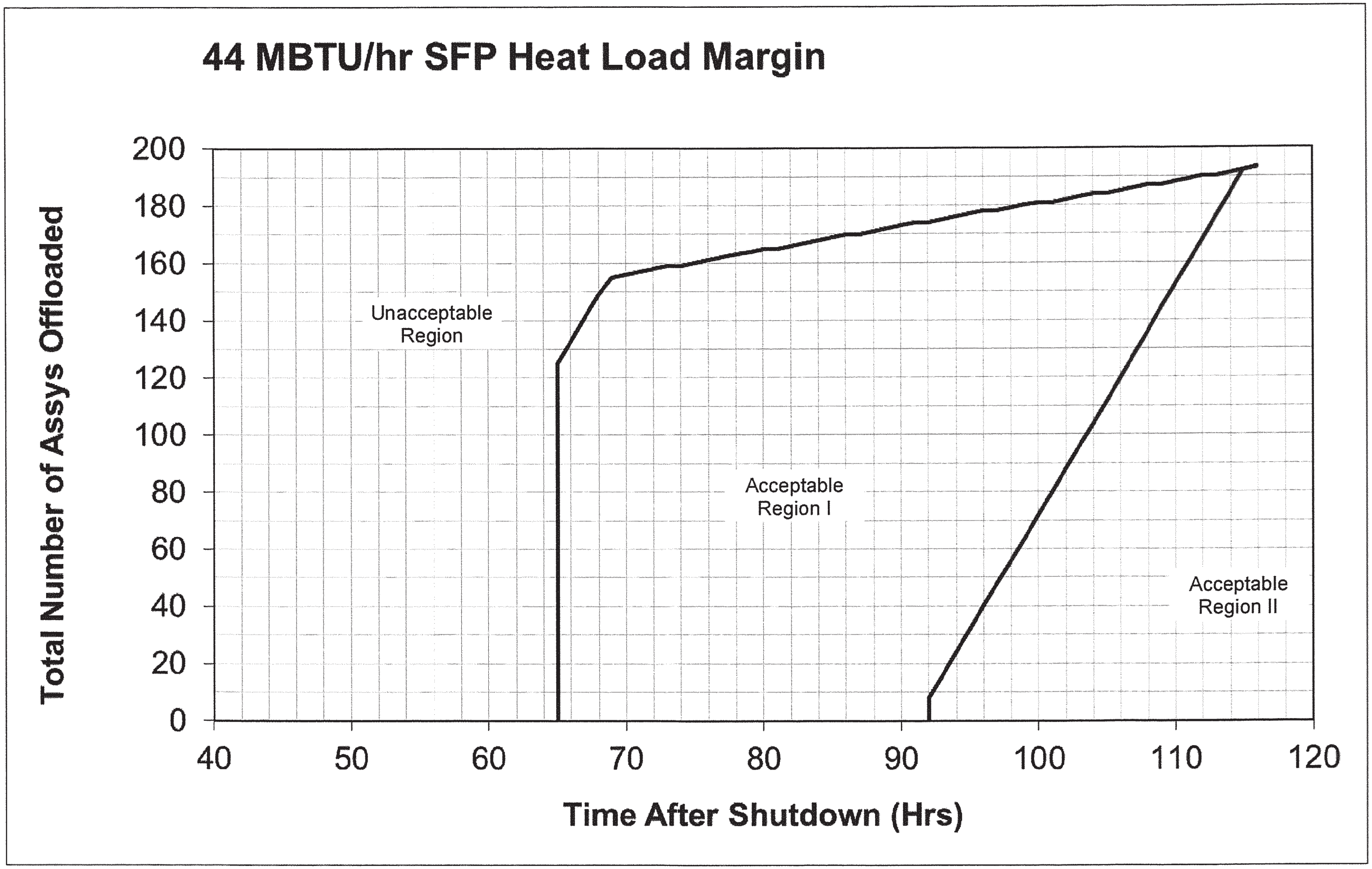


Figure 3.9.a-4, "44 MBTU/hr SFP Heat Load Margin"

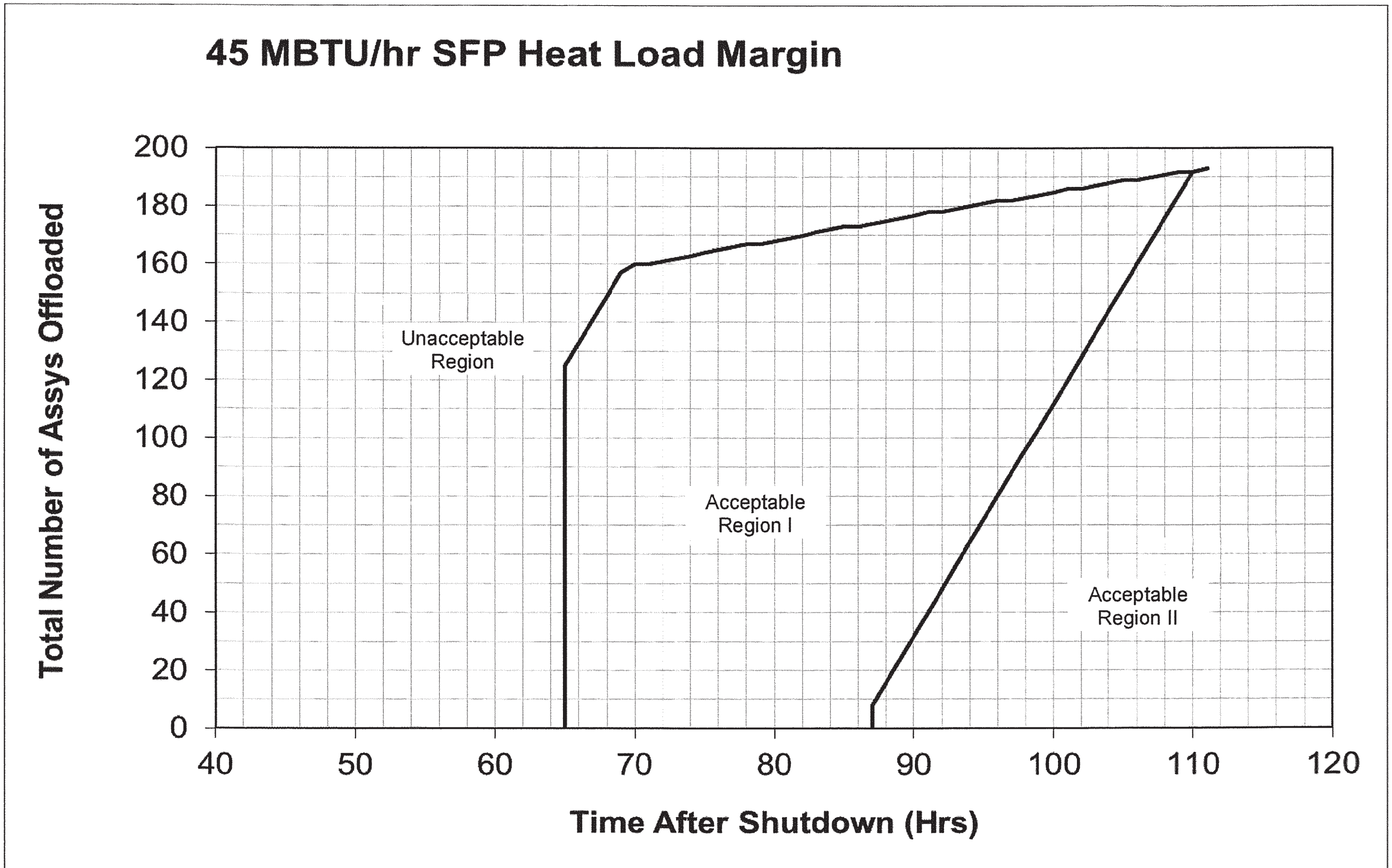


Figure 3.9.a-5, “45 MBTU/hr SFP Heat Load Margin”

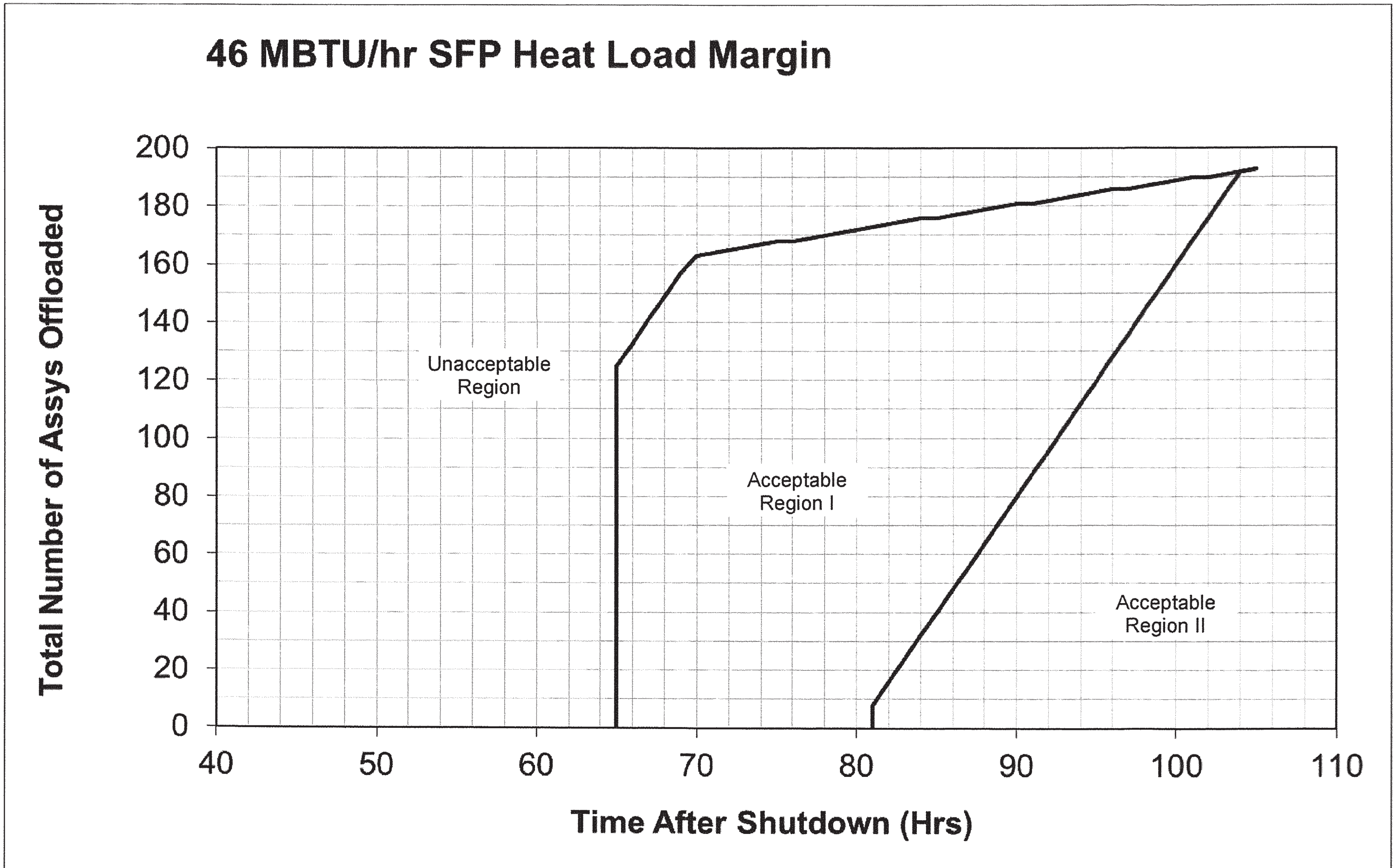


Figure 3.9.a-6, "46 MBTU/hr SFP Heat Load Margin"

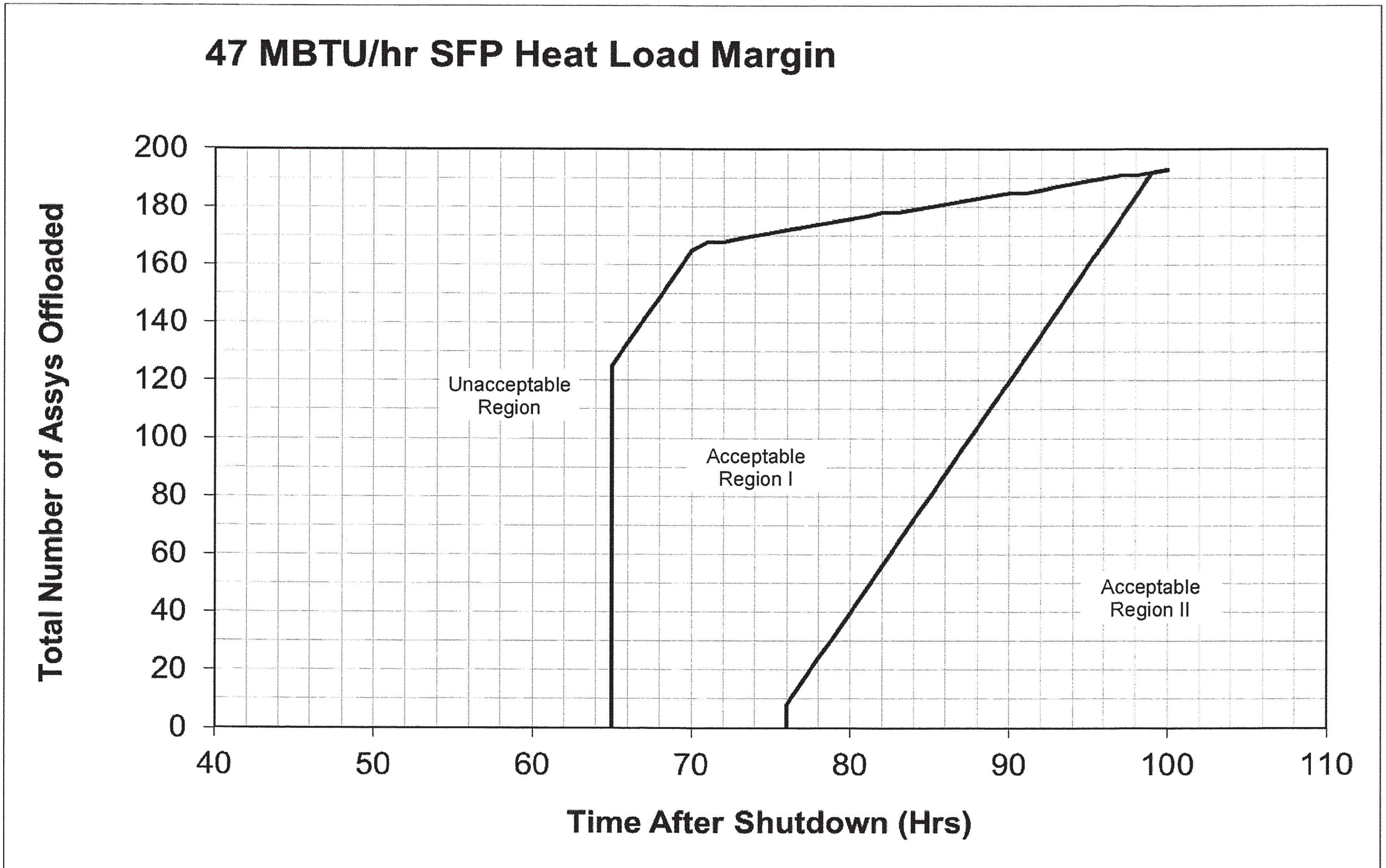


Figure 3.9.a-7, “47 MBTU/hr SFP Heat Load Margin”

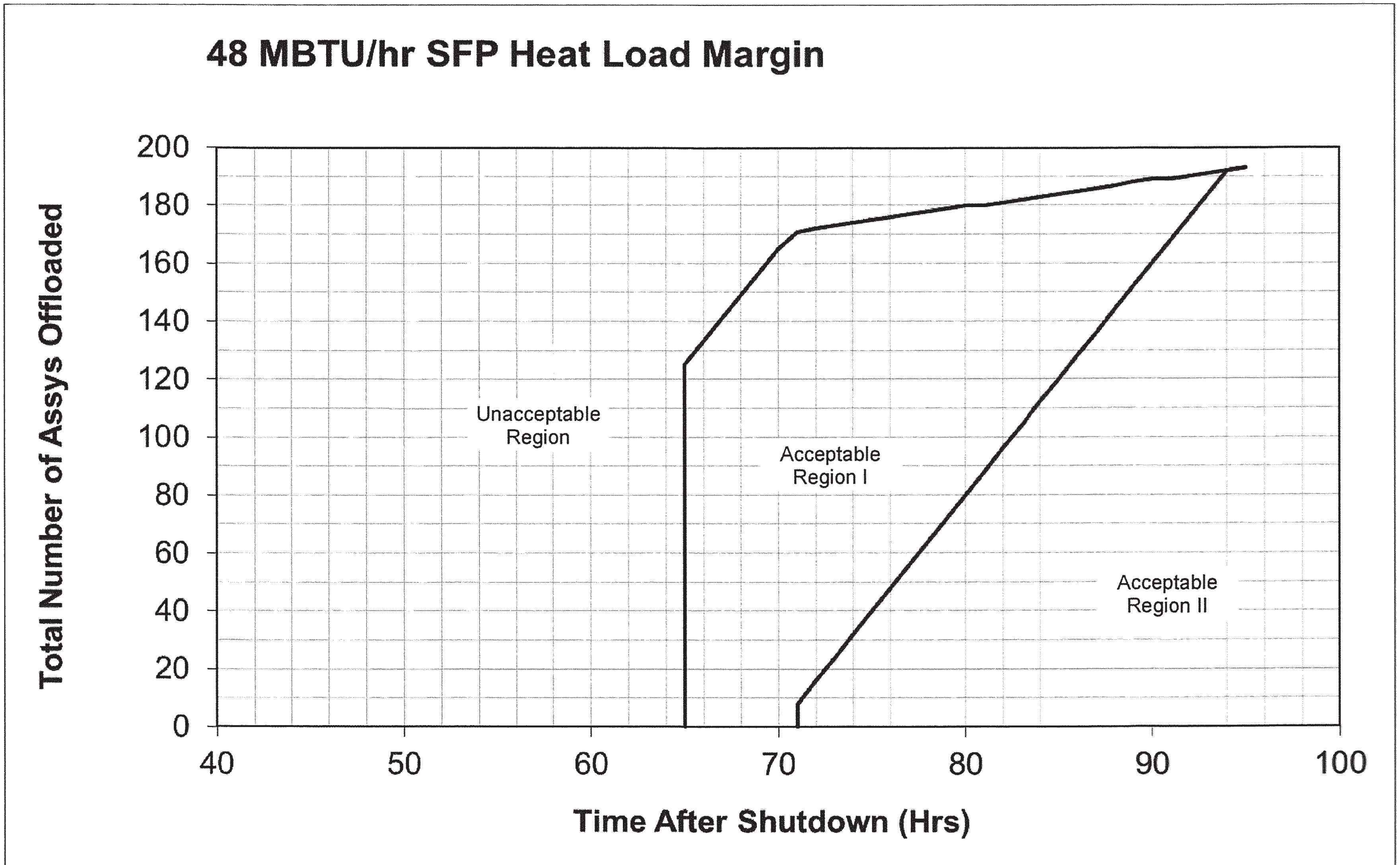


Figure 3.9.a-8, "48 MBTU/hr SFP Heat Load Margin"

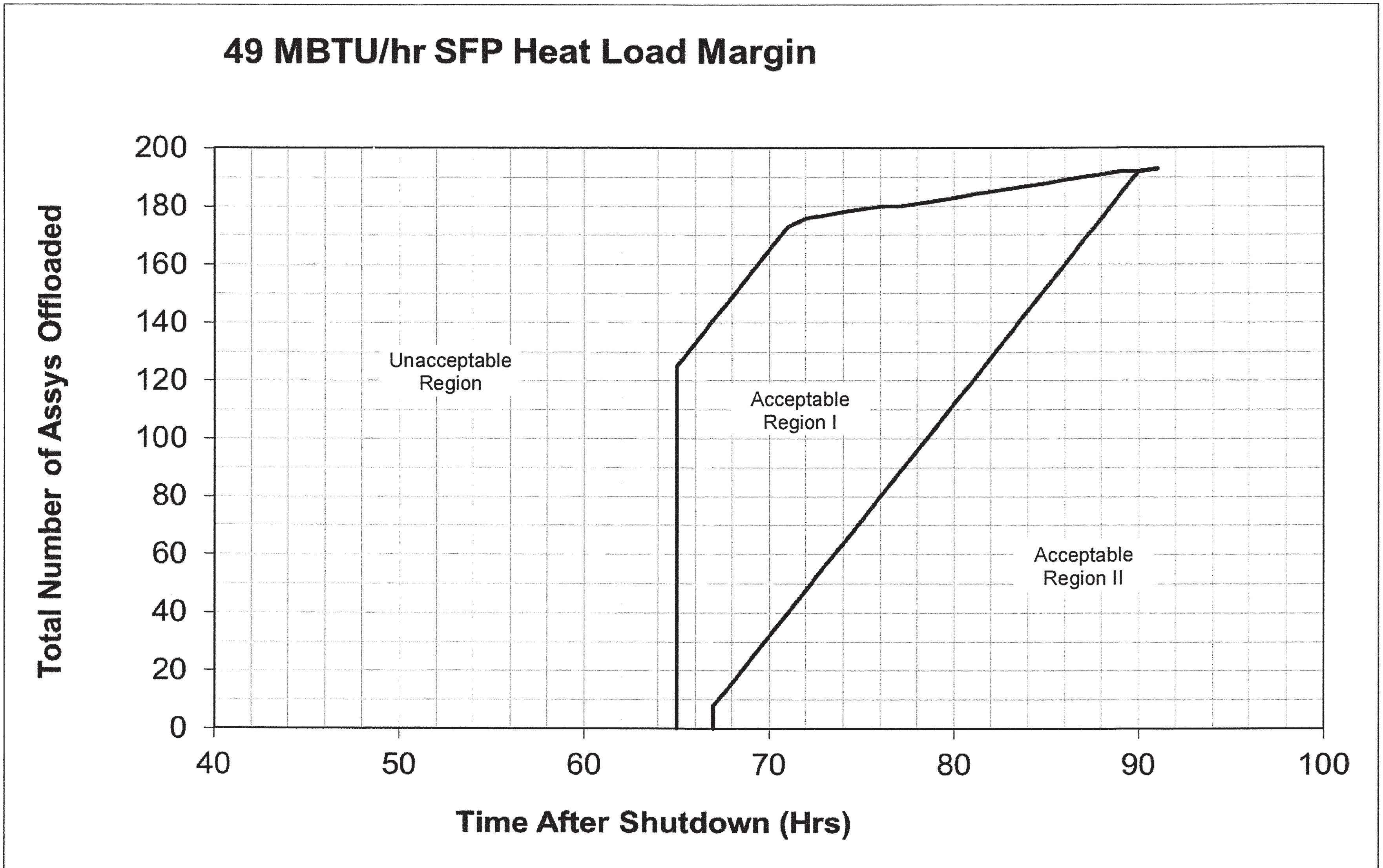


Figure 3.9.a-9, "49 MBTU/hr SFP Heat Load Margin"

3.9 REFUELING OPERATIONS

3.9.b Communications

TLCO 3.9.b Direct communications shall be maintained between the control room and personnel at the containment refueling station.

APPLICABILITY: During CORE ALTERATIONS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Direct communications not maintained.	A.1 Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.b.1	Demonstrate direct communications between the control room and personnel at the containment refueling station.	Once within 1 hour prior to the start of CORE ALTERATIONS AND Once per 12 hours thereafter

3.9 REFUELING OPERATIONS

3.9.c Refueling Equipment

TLCO 3.9.c The following refueling equipment shall be OPERABLE:

1. The refueling machine used for movement of fuel assemblies, and
2. The auxiliary hoist or reactor cavity maintenance crane used for latching and unlatching drive rods.

APPLICABILITY: During movement of drive rods or fuel assemblies within the reactor vessel.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Refueling machine inoperable.	A.1	Suspend use of the inoperable refueling machine from operations involving the movement of fuel assemblies within the reactor vessel.	Immediately
B. Required auxiliary hoist inoperable. <u>OR</u> Required reactor cavity maintenance crane inoperable.	B.1	Suspend use of the inoperable required auxiliary hoist or inoperable required reactor cavity maintenance crane from operations involving the movement of drive rods within the reactor vessel.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.c.1	Verify refueling machine operability by: a. Performing a load test of ≥ 3563 pounds; and b. Demonstrating an automatic load cutoff when the crane load > 2850 pounds.	Once within 100 hours prior to the start of movement of fuel assemblies within the reactor vessel
TSR 3.9.c.2	Verify required auxiliary hoist or required reactor cavity maintenance crane and associated load indicator operability by performing a load test ≥ 2500 pounds.	Once within 100 hours prior to the start of movement of drive rods within the reactor vessel

3.9 REFUELING OPERATIONS

3.9.d Crane Travel – Spent Fuel Pool

TLCO 3.9.d Loads shall be limited to ≤ 2000 pounds when traveling over fuel assemblies in the spent fuel pool.

---------------------------NOTES---------------------------

1. Based on the design of the load block, the main hoist/load block is allowed to travel over the spent fuel pool.
2. Loads > 2000 pounds may be carried over the cask loading area provided they are carried by a SINGLE-FAILURE PROOF LOAD HANDLING SYSTEM.
3. Deviations from defined safe load paths for heavy loads require Plant Operations Review Committee approval.

APPLICABILITY: With fuel assemblies in the spent fuel pool.

ACTIONS

-----------------------------------NOTE-----------------------------------

TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Load not within limit.	A.1 Place the crane load in a safe condition.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.d.1	Verify crane interlocks prevent crane travel with loads > 2000 pounds over fuel assemblies in the spent fuel pool, with the exception of the cask loading area.	Once within 7 days prior to crane use AND Once per 7 days thereafter during crane operation

3.9 REFUELING OPERATIONS

3.9.e Refueling Cavity Water Level

TLCO 3.9.e Refueling cavity water level shall be maintained ≥ 23 ft above the top of the reactor vessel flange.

APPLICABILITY: During movement of new fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Refueling cavity water level not within limit.	A.1 Suspend movement of new fuel assemblies within containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.e.1	Verify refueling cavity water level is ≥ 23 ft above the top of reactor vessel flange.	24 hours

5.0 ADMINISTRATIVE CONTROLS

5.1 Safety Limit Violation

5.1 The following actions shall be taken in the event a Safety Limit (Technical Specification 2.1.1 or 2.1.2) is violated:

a. The NRC Operations Center shall be notified by telephone as soon as possible and in all cases within 1 hour,

b. The Site Vice President and the Offsite Review and Investigative Function shall be notified within 24 hours,

c. A Safety Limit Violation Report shall be prepared. The report shall be reviewed by the Onsite Review and Investigative Function. This report shall describe: (1) applicable circumstances preceding the violation, (2) effects of the violation upon facility components, systems or structures, and (3) corrective action to prevent recurrence,

d. The Safety Limit Violation Report shall be submitted to the Commission, the Offsite Review and Investigative Function and the Site Vice President within 14 days of the violation, and

e. Critical operation of the Unit shall not be resumed until authorized by the Commission.

5.0 ADMINISTRATIVE CONTROLS

5.2 Procedures and Programs

5.2.a <u>Process Control Program (PCP)</u>

Written procedures shall be established, implemented, and maintained covering the activities of the PCP implementation.

The PCP shall contain the current formulas, sampling, analyses, tests, and determinations to be made to ensure that processing and packaging of solid radioactive wastes based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure compliance with 10 CFR Parts 20, 61, and 71, State regulations, burial ground requirements, and other requirements governing the disposal of solid radioactive waste.

Changes to the PCP:

1. Shall be documented and records of reviews performed shall be retained for the duration of the unit Operating License. This documentation shall contain:

    a. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change(s) and,

    b. A determination that the change will maintain the overall conformance of the solidified waste product to existing requirements of Federal, State, and other applicable regulations.

2. Shall become effective after review and acceptance by the Onsite Review and Investigative Function (Onsite Review) and the approval of the Station Manager.

5.2 Procedures and Programs

5.2.b In-Plant Radiation Monitoring

A program shall be established, implemented and maintained which will ensure the capability to accurately determine the airborne iodine concentration in vital areas under accident conditions. This program shall include the following:

1. Training of personnel,

2. Procedures for monitoring, and

3. Provisions for maintenance of sampling and analysis equipment.

5.2.c Radiological Environmental Monitoring Program

A program shall be established, implemented and maintained which will monitor the radiation and radionuclides in the environs of the plant. The program shall provide (1) representative measurements of radioactivity in the highest potential exposure pathways, and (2) verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways. The program shall (1) be contained in the Offsite Dose Calculation Manual (ODCM), (2) conform to the guidance of Appendix I to 10 CFR Part 50, and (3) include the following:

1. Monitoring, sampling, analysis, and reporting of radiation and radionuclides in the environment in accordance with the methodology and parameters in the ODCM,

2. A Land Use Census to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the monitoring program are made if required by the results of this census, and

3. Participation in an Interlaboratory Comparison Program to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices are performed as part of the Quality Assurance Program for environmental monitoring.

5.2 Procedures and Programs

5.2.d **Radiation Protection Program**

Procedures for personnel radiation protection shall be prepared consistent with the requirements of 10 CFR Part 20 and shall be approved, maintained and adhered to for all operations involving personnel radiation exposure.

5.2.e **Offsite Dose Calculation Manual (ODCM)**

The requirement for an ODCM program is contained in Technical Specification 5.5.1.

Changes to the ODCM shall become effective after review and acceptance by the Onsite Review and Investigative Function and the approval of the Station Manager on the date specified by the Onsite Review and Investigative Function.

5.0 ADMINISTRATIVE CONTROLS

5.3 Reporting Requirements

The following reports shall be submitted in accordance with 10 CFR 50.4.

5.3.a Startup Report

1. A summary report of plant startup and power escalation testing shall be submitted to the Commission following: (1) receipt of an Operating License, (2) amendment to the license involving a planned increase in power level, (3) installation of fuel that has a different design or has been manufactured by a different fuel supplier, and (4) modifications that may have significantly altered the nuclear, thermal, or hydraulic performance of the plant.

2. The Startup Report shall address each of the tests identified in the Updated Final Safety Analysis Report (UFSAR) and shall include a description of the measured values of the operating conditions or characteristics obtained during the test program and a comparison of these values with design predictions and specifications. Any corrective actions that were required to obtain satisfactory operation shall also be described. Any additional specific details required in license conditions based on other commitments shall be included in this report.

3. Startup Reports shall be submitted within: (1) 90 days following completion of the Startup Test Program, (2) 90 days following resumption or commencement of commercial power operation, or (3) 9 months following initial criticality, whichever is earliest. If the Startup Report does not cover all three events (i.e., initial criticality, completion of Startup Test Program, and resumption or commencement of commercial operation) supplementary reports shall be submitted at least every 3 months until all three events have been completed.

5.3 Reporting Requirements

5.3.b Annual Specific Activity Report

An Annual Report covering the activity of the facility for the previous calendar year shall be submitted to the Commission prior to March 1 of each year.

The results of specific activity analysis in which the primary coolant exceeded the limits of Specification 3.4.16. The following information shall be included: (1) Reactor power history starting 48 hours prior to the first sample in which the limit was exceeded; (2) Results of the last isotopic analysis for radioiodine performed prior to exceeding the limit, results of analysis while limit was exceeded and results of one analysis after radioiodine activity was reduced to less than limit. Each result should include date and time of sampling and the radioiodine concentrations; (3) Clean-up system flow history starting 48 hours prior to the first sample in which the limit was exceeded; (4) Graph of the I-131 concentration and one other radioiodine isotope concentration in microcuries per gram as a function of time for the duration of the specific activity above the steady-state level; and (5) The time duration when the specific activity of the primary coolant exceeded the radioiodine limit.

5.3.c Special Reports

1. In the event the unit is in MODE 1 or 2 with $K_{eff} \geq 1$ and with the Moderator Temperature Coefficient (MTC) more positive than the beginning of life limit specified in the COLR, a Special Report shall be prepared and submitted to the Commission within 10 days. The Special Report shall describe the value of the measured MTC, the interim control rod withdrawal limits, and the predicted average core burnup necessary for restoring the positive MTC to within its limit for the all rods withdrawn condition.

2. In the event an inoperable Main Control Room Radiation Outside Air Intake Monitor (ORE-PR031B/32B or ORE-PR033B/34B) is not restored to OPERABLE within 30 days, a Special Report shall be prepared and submitted to the Commission within the following 30 days. The Special Report shall describe the cause of the inoperability and the plans for restoration.

5.3 Reporting Requirements

5.3.c Special Reports (continued)

3. In the event the unit is in MODE 4, 5, or 6 with the reactor head on and either the PORVs, RHR suction relief valves, or the RCS vents are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission within 30 days. The Special Report shall describe the circumstances initiating the transient, the effect of the PORVs, RHR suction relief valves, or RCS vents on the transient, and any corrective action necessary to prevent recurrence.

4. In the event the unit is in MODE 1, 2, 3, or 4 and the ECCS is actuated and injects water into the RCS, a Special Report shall be prepared and submitted to the Commission within 90 days. The Special Report shall describe the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected Safety Injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

   (NOTE: If a Licensee Event Report (LER) has been provided to the NRC documenting the event and that report includes all of the requirements of the Special Report, no additional actions are required.)

ODCM AND RADIOLOGICAL CONTROLS REPORTS AND PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTIONS	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

This Program provides guidance for the implementation of Technical Specification (TS) 5.5.1, "Offsite Dose Calculation Manual (ODCM)", 5.6.2, "Annual Radiological Environmental Operating Report", and 5.6.3, "Radioactive Effluent Release Report."

The ODCM contains the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, the calculation of gaseous and liquid effluent monitoring alarm and trip setpoints, and the conduct of the Radiological Environmental Monitoring Program. In addition, the ODCM contains the radioactive effluent controls, radiological environmental monitoring activities, and descriptions of the information that is included in the Annual Radiological Environmental Operating, and Radioactive Effluent Release Reports.

1.2 REFERENCES

1. Technical Specifications:
   a. 5.5.1, "Offsite Dose Calculation Manual (ODCM)"
   b. 5.6.2, "Annual Radiological Environmental Operating Report"
   c. 5.6.3, "Radioactive Effluent Release Report"
2. US NRC 10CFR20.1302
3. US NRC 40CFR190
4. US NRC 10CFR50, Appendix I

1.3 DEFINITIONS AND/OR ACRONYMS

Offsite Dose Calculation Manual - ODCM

1.4 PROGRAM DESCRIPTION

The purpose of this Program is to ensure that methodologies, parameters, effluent controls, radiological monitoring, and reporting requirements are properly implemented by the ODCM or other approved plant procedures.

1.5 PROGRAM IMPLEMENTATION

1. The ODCM shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring alarm and trip setpoints, and in the conduct of the Radiological Environmental Monitoring Program.

2. The ODCM shall also contain the radioactive effluent controls and radiological environmental monitoring activities, and descriptions of the information that should be included in the Annual Radiological Environmental Operating, and Radioactive Effluent Release Reports required in Reference 1.

The Chemistry Department shall have responsibility for the implementation, performance, completion and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria is contained in the ODCM, plant implementing or surveillance procedures.

1.7 LCOARS/COMPENSATORY MEASURES

No LCOARs will be entered as a result of exceeding any acceptance criteria. Any corrective measures are contained in the ODCM or plant procedures. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

1. Annual Radiological Environmental Operating Report covering the operation of the facility during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and analyses of trends of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided shall be consistent with the objectives outlined in the ODCM, and Reference 4.

2. The Radioactive Effluent Release Report covering the operation of the facility during the previous year shall be submitted prior to May 1 of each year in accordance with 10CFR50.36a. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the facility. The material provided shall be consistent with the objectives outlined in the ODCM and Process Control Program and in conformance with 10CFR50.36a and Reference 4.

A single submittal may be made for the facility. The submittal should combine sections common to both units.

The Chemistry Department is responsible for preparing and submitting the subject reports.

1.9 CHANGE CONTROL

Changes to the ODCM shall be documented and records of reviews performed shall be retained. As a minimum, the documentation shall contain:

1. sufficient information to support the change(s) together with the appropriate analyses or evaluations justifying the change(s); and

2. a determination that the change(s) maintain the levels of radioactive effluent control required by References 2, 3, 4, and 10CFR50.36a and do not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations.

Changes to the ODCM are effective upon approval of the Plant Manager or designee.

Changes to the ODCM shall be submitted to the NRC in the form of a complete, legible copy of the entire ODCM as a part of or concurrent with the Radioactive Effluent Release Report for the period of the report in which any change in the ODCM was made. Each change shall be identified by markings in the margin of the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (i.e., month and year) the change was implemented.

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

PRIMARY COOLANT SOURCES OUTSIDE CONTAINMENT
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to verify leakage tests are performed on each system or portion of systems outside containment that could potentially contain highly radioactive fluids or gases, pursuant to Technical Specification (TS) 5.5.2, "Primary Coolant Sources Outside Containment". This Program provides controls to minimize leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident to level as low as practicable.

1.2 References

1. Technical Specifications 5.5.2, "Primary Coolant Sources Outside Containment"

2. UFSAR Appendix E.77 (UFSAR), "Primary Coolant Sources Outside Containment (III.D.1.1)"

3. NUREG 0737.III.D.1.1, "Integrity of Systems Outside Containment Likely to Contain Radioactive Material for Pressurized-Water Reactors and Boiling-Water Reactors"

4. NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants"

1.3 DEFINITIONS AND ACRONYMS

1. INDICATION - The response from the application of a visual examination (VT-2).

2. VT-2 (Visual Examination) - An inspection of an ASME/NUREG System component at normal system operating pressure.

1.4 PROGRAM DESCRIPTION

This Program provides controls to minimize leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident to levels as low as practicable. The systems include the recirculation portions of the Containment Spray, Safety Injection, Chemical and Volume Control, and Residual Heat Removal.

1.5 PROGRAM IMPLEMENTATION

This Program determines, through the associated implementing procedures, that leakage sources outside containment will be accounted for to insure the total amount will not exceed the UFSAR acceptable limits for Braidwood Station. The bases for this Program were established per References 2 and 3 that provide for the following:

1. Monitor the leak testing of piping so that the appropriate lines are examined at least once per 18 months on each System or portions of Systems;
2. Direct leak test examinations such that systems are tested at approximate operating pressure or higher;
3. Align systems such that all piping tested is properly pressurized;
4. Identify lines that contain gases that require pressure decay and/or metered makeup testing;
5. Quantify results of leakage examinations;
6. Initiate corrective action; and
7. Preventive maintenance in accordance with approved plant procedures consistent with the Braidwood Maintenance Rule.

The Engineering Programs Group shall have responsibility for the completion of this Program.

1.6 ACCEPTANCE CRITERIA

1. All examinations required by this Program are completed at least once per 18 months. The provisions of SR 3.0.2 are applicable.
2. Cumulative leakage shall be within the acceptable range specified per UFSAR Table 15.6-13.

1.7 LCOARS/COMPENSATORY MEASURES

Any examinations exceeding acceptance criteria shall be immediately conveyed to the Shift Manager. The Shift Manager shall determine the OPERABILITY status and implement a LCOAR if applicable. In addition, an Issue Report may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Any examinations exceeding acceptance criteria will be coordinated/reported in accordance with the requirements of the Maintenance Rule Program.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and determined not to be applicable to Byron.

RADIOACTIVE EFFLUENT CONTROLS PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITION AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

This Program is in compliance with Technical Specification (TS) 5.5.4, "Radioactive Effluent Controls Program." This Program provides controls for radioactive effluents and for maintaining the doses to members of the public from radioactive effluents as low as reasonably achievable. The Program shall be contained in the Offsite Dose Calculation Manual (ODCM) which is implemented by plant procedures which also include remedial actions taken whenever the acceptance criteria is exceeded.

1.2 REFERENCES

1. Technical Specifications 5.5.4, "Radioactive Effluent Controls Program"
2. Offsite Dose Calculation Manual (ODCM)
3. US NRC 10CFR20, Appendix B, Table 2, Column 2
4. US NRC 10CFR20.1302
5. US NRC 10CFR50, Appendix I
6. US NRC 40CFR190

1.3 DEFINITIONS AND/OR ACRONYMS

Offsite Dose Calculation Manual - ODCM

1.4 PROGRAM DESCRIPTION

This Program ensures that appropriate plant procedures, along with the ODCM are implemented for radioactive effluent controls. These controls are to be maintained in accordance with the guidance provided by referenced NRC requirements. This Program provides the general guidance for surveillance testing, monitoring, setpoint determination, exposure limits, and reporting requirements.

1.5 PROGRAM IMPLEMENTATION

This Program shall be implemented by plant procedures or the ODCM which will include at least the following:

1. Limitations on the functional capability of radioactive liquid and gaseous monitoring instrumentation including surveillance tests and setpoint determination in accordance with the methodology in Reference 2;

2. Limitations on the concentrations of radioactive material released in liquid effluents to unrestricted areas, conforming to 10 times the concentrations stated in Reference 3;

3. Monitoring, sampling, and analysis of radioactive liquid and gaseous effluents in accordance with Reference 4 and with the methodology and parameters per Reference 2;

4. Limitations on the quarterly and annual doses or dose commitment to a member of the public from radioactive materials in liquid effluents released from each unit to unrestricted areas, conforming to Reference 5;

5. Determination of cumulative and projected dose contributions from radioactive effluents for the current calendar quarter and current calendar year in accordance with the methodology and parameters in Reference 2, Section 12 at least every 31 days;

6. Limitations on the functional capability and use of the liquid and gaseous effluent treatment systems to ensure that appropriate portions of these systems are used to reduce releases of radioactivity when the projected doses in a period of 31 days would exceed 2% of the guidelines for the annual dose or dose commitment, conforming to Reference 5;

7. Limitations on the dose rate resulting from radioactive material released in gaseous effluents to areas beyond the site boundary conforming to the acceptance criteria.

8. Limitations on the quarterly and annual air doses resulting from noble gases released in gaseous effluents from each unit to areas beyond the site boundary, conforming to Reference 5.

9. Limitations on the quarterly and annual doses to a member of the public from Iodine-131, Iodine-133, Tritium, and all radionuclides in particulate form with half lives > 8 days in gaseous effluents released from each unit to areas beyond the site boundary, conforming to Reference 5; and

10. Limitations on the annual dose or dose commitment to any member of the public due to releases of radioactivity and to radiation from uranium fuel cycle sources, conforming to Reference 6.

The Chemistry Department shall have responsibility for the implementation, performance, completion, and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

All acceptance criteria pertaining to this Program is located in the ODCM, implementing, or surveillance procedures.

1.7 LCOARS/COMPENSATORY MEASURES

An Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program..

1.8 REPORTING REQUIREMENTS

Any reporting requirements are listed in the ODCM and implementing procedures.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

TRANSIENT MONITORING PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to provide guidance for tracking the number of cycles of specific transients and to ensure operation within the Braidwood Plant Design Basis is in accordance with Technical Specifications (TS) 5.5.5, "Component Cyclic or Transient Limit."

The minimum requirements for cyclic or transient tracking are those transients listed in Attachment 1 of this Program. These items, in addition to various other monitored parameters or transients, will be tracked periodically in accordance with appropriate Plant Procedures.

Components affected by the transients monitored are typically ASME Section III Code Class 1 vessels. The design of such components includes cyclic/fatigue assumptions which must be tracked to ensure that the unit is operating within its design basis. Piping and components designed to ANSI B31.1, Power piping does not generally require fatigue monitoring as those considerations are inherent to the safety margins applied by that Code.

1.2 REFERENCES

1. TS Specification 5.5.5, "Component Cyclic or Transient Limit"
2. Updated Final Safety Analysis Report, (UFSAR), Section 3.9 and 5.2
3. 10CFR50, Appendix A
4. "WCAP-12235, General Guidelines for Nuclear Power Plant Transient and Fatigue Monitoring", March, 1989

1.3 DEFINITION AND/OR ACRONYMS

Not applicable.

1.4 PROGRAM DESCRIPTION

This Program ensures that appropriate plant procedures are implemented to monitor transients that may have an affect on ASME Section III Code Class 1 vessels/components as specified in Reference 2.

Attachment 1 provides component cyclic or transient limits as well as design cycle or transient parameters for specific plant components. Monitoring of additional equipment/parameters not listed in Attachment 1 may be performed as a good practice on an as needed basis, and are not considered within the scope of this Program though they may be tracked using appropriate Plant Procedures, Implementing procedures shall have adequate measures to identify cumulative cyclic/transient conditions requiring further analysis prior to the design basis limits being reached. In the event any of the limits are approached or exceeded, required actions or reporting requirements are specified in this Program or appropriate Plant Procedures.

1.5 PROGRAM IMPLEMENTATION

Specific plant procedures have been developed and implemented in order to perform the following:

1. Provide a tracking program for the relevant transient cycles/trips for those ASME Section III Code Class 1 components specified in Reference 2.

2. Periodically monitor components identified in Attachment 1 for code compliance relative to parameters such as, transient limits and usage factors.

System Engineering Department shall have responsibility for the implementation, performance, completion, and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

1. Attachment 1 provides cyclic or transient limit acceptance criteria for each component within the scope of this Program.

2. Should the design basis limits be approached or exceeded, an evaluation and recommended operating restrictions (if any) will be provided by Site Engineering - Mechanical. Any recommendations to modify design limits shall be accompanied by a safety evaluation.

1.7 LCOARS/COMPENSATORY MEASURES

In the event that a component has reached its administrative cyclic or transient limit, the Shift Manager shall be notified immediately. The Shift Manager shall determine OPERABILITY status and implement a LCOAR if applicable. In addition, a Problem Identification Form (PIF) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

1. A special report will be generated whenever cyclic or transient limits are being approached or exceeded. This report shall be generated and distributed, as a minimum to the following:

   PORC (Plant Operations Review Committee)
   Site V.P. - Braidwood
   Plant Manager
   Operations Manager
   Engineering Manager

2. Any violations of the cyclic or transient limits shall be reported to the NRC in accordance with 10CFR50.71 and 10CFR50.72.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial, shall include a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include Regulatory Assurance Department in all cases. As a part of the ITR, for a change to this Program, concurrence from Byron Station and Braidwood Plant Operations Review Committee (PORC) approval is required. The concurrence shall be that Byron Station is implementing the same change or that the change has been reviewed and determined not to be applicable to Byron Station.

ATTACHMENT 1

COMPONENT CYCLIC OR TRANSIENT LIMITS

COMPONENT	CYCLIC OR TRANSIENT LIMIT	DESIGN CYCLE OR TRANSIENT
Reactor Coolant System	200 heatup cycles at ≤ 100°F/h and 200 cool-down cycles at < 100 °F/h.	Heatup cycle - T_{avg} from ≤ 200°F to ≥ 550°F. Cooldown cycle - T_{avg} from ≥ 550°F to ≤ 200°F.
	200 pressurizer cooldown cycles at ≤ 200°F/h.	Pressurizer cooldown cycle temperature from ≥ 650°F to ≤ 100°F.
	80 loss of load cycles, without immediate Turbine or Reactor Trip.	≥ 15% of RATED THERMAL POWER to 0% of RATED THERMAL POWER.
	40 cycles of loss-of-offsite A.C. electrical power.	Loss-of-Offsite A.C. electrical ESF Electrical System.
	80 cycles of loss of flow in one reactor coolant loop.	Loss of only one reactor coolant pump.
	400 Reactor trip cycles.	100% to 0% of RATED THERMAL POWER.
	10 auxiliary spray actuation cycles.	Spray water temperature differential > 320°F.
	200 leak tests.	Pressurized to ≥ 2485 psig.
	10 hydrostatic pressure tests.	Pressurized to ≥ 3107 psig.
Secondary Coolant System	1 large steam line break.	Break in a > 6 inch steam line.
	10 hydrostatic pressure tests.	Pressurized to ≥ 1481 psig.

PRE-STRESSED CONCRETE CONTAINMENT
TENDON SURVEILLANCE PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOAR/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

This Program provides controls for monitoring any tendon degradation in the pre-stressed concrete containments and is pursuant to Technical Specifications (TS) 5.5.6 and 5.6.8.

1.2 REFERENCES

1. Technical Specifications:

   a. 5.5.6, “Pre-Stressed Concrete Containment Tendon Surveillance Program”

   b. 5.6.8, “Tendon Surveillance Report”

2. USFAR Section 3.8.1.7.3.2, “Inservice Tendon Surveillance Program”

3. U.S. NRC 10 CFR 50.55a

4. U.S. NRC Regulatory Guide 1.35.1, “Determining Pre-Stressing Forces For Inspection of Pre-Stressed Concrete Containments,” dated July 1990

5. ASME Boiler and Pressure Vessel Code, Section XI, Sub Section IWL

6. Drawings:

   a. S884: Containment Building Tendon Location Plans and Sections

   b. Inland Ryerson Company Drawings 781 / 782 through 781 / 782-23

   c. Braidwood Station In Service Inspection Drawings for Containment Tendons

7. Braidwood SER Section 3.8.1

8. Braidwood Maintenance Rule 10 CFR 50.65

1.3 DEFINITIONS AND/OR ACRONYMS

1. TENDON - The bundle of wire assemblies and anchorages that maintain pre-stressed forces within the containment structure.

2. ANCHORAGE - The components at each end of the wire bundle that are used to maintain the required pre-stressed forces and distribute the forces within the tendon.

3. LIFT OFF FORCE - The force required to lift the containment tendon anchorage from the shim stack or structure.

4. SHEATHING FILLER GREASE - The corrosion protection medium that encases the tendon and anchorage.

1.4 PROGRAM DESCRIPTION

The Pre-Stressed Concrete Containment Tendon Surveillance Program provides a standardized methodology to ensure that aging and degradation issues are identified early and monitored through the following activities:

1. Measuring, recording, and evaluating the lift off force for tendons included in the test sample population;

2. Ensuring the containment vessel, tendon anchorages, and tendon wires do not exhibit signs of abnormal degradation;

3. Ensuring the tendon wires continue to maintain the required integrity through physical testing; and

4. Ensuring the sheathing filler grease continues to protect the tendon components from corrosion by identification of free water and chemical analysis of the sheathing filler grease.

1.5 PROGRAM IMPLEMENTATION

Inspection schedules, examination and testing methods, personnel qualification requirements, and reporting requirements shall be established, implemented, and maintained in accordance with Section XI, Subsection IWL of the ASME Boiler and Pressure Vessel Code and applicable addenda as required by 10 CFR 50.55(a) except where alternative, exemption or relief has been authorized by the NRC. The Engineering Programs Group shall have the responsibility for all aspects of the Program.

The detection of degradation of the containment structure or trending shall be coordinated with the requirements of the Maintenance Rule.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria for the Braidwood Pre-Stressed Concrete Containment Tendon Surveillance Program is contained in appropriate Plant Procedures as described in the Braidwood Containment Inservice Inspection (CISI) Program Plan.

1.7 LCOARS / COMPENSATORY MEASURES

In the event the acceptance criteria is exceeded, immediately notify the Shift Manager. In addition, the issue shall be entered into the Corrective Action Program to provide proper tracking and resolution of noted problems associated with the implementation of this Program. Engineering shall determine if the condition that exceeded the acceptance criteria renders the containment inoperable. In the event the containment is found to be inoperable, the Shift Manager shall be immediately notified and the Shift Manager shall implement the applicable LCOAR.

1.8 REPORTING REQUIREMENTS

1. Items which do not meet the acceptance criteria shall be evaluated by Engineering and an Engineering Evaluation Report shall be prepared. The Engineering Evaluation Report(s) shall be maintained at the site and are subject to review by the regulatory and enforcement authorities.

    a. The Engineering Evaluation Report shall be in accordance with the ASME Code Section XI, IWL Subsection.

2. The following conditions shall also be reported in the ISI Summary Report required by ASME Section XI, IWA6000 when:

   a. The elongation corresponding to a specific load (adjusted for effective wires or strands) during re-tensioning of the tendons differs by more than 10 percent from that recorded during the last measurement;

   b. The Sheathing Filler Grease Analysis contains chemically combined water exceeding 10 percent by weight;

   c. The presence of free water is identified in the sheathing filler grease;

   d. The absolute difference between the amount of sheathing filler grease removed during inspection and testing and the amount replaced thereafter exceeds 10 percent of the tendon duct volume; or

   e. Grease leakage is detected during general visual examination of the containment surface.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

REACTOR COOLANT PUMP FLYWHEEL INSPECTION PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to verify the structural integrity of each Reactor Coolant Pump Flywheel pursuant to Technical Specification (TS) 5.5.7, "Reactor Coolant Pump Flywheel Inspection Program." This Program provides for the inspection of each reactor coolant pump flywheel in general conformance with Reference 5 as modified by References 12 and 13.

1.2 REFERENCES

1. Technical Specification 5.5.7, "Reactor Coolant Pump Flywheel Inspection Program"
2. UFSAR:
   a. Section 5.4.1.5.2
   b. Appendix A
3. 10CFR50 Appendix A and B
4. NUREG-0800, Section 5.4.1.1, "Pump Flywheel Integrity"
5. Regulatory Guide 1.14, "Reactor Coolant Pump Flywheel Integrity"
6. Braidwood Station Units 1 and 2 Inservice Inspection Program Plan
7. Westinghouse WCAP-8163, "Topical Report on Reactor Coolant Pump Integrity in LOCA"
8. Westinghouse Vendor Manual F-198, "Reactor Coolant Pump"

9. Braidwood SER Sections:

   a. 2.2.4

   b. 3.5.1.2

   c. 5.4.1

10. Braidwood Station Maintenance Rule Program

11. Westinghouse WCAP-14535A, "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination"

12. Mahesh Chawla to O.D. Kingsley, "Issuance of Amendments - Byron Station, Units 1 and 2 and Braidwood Station, Units 1 and 2 - Request for Technical Specifications Change - Revision to the Reactor Coolant Pump Flywheel Inspection Program," dated September 21, 2001.

13. Marshall David to M.J. Pacilio, "Braidwood Station, Units 1 and 2, and Byron Station, Unit Nos. 1 and 2 – Issuance of Amendments RE: Extension of Inspection Interval for Reactor Coolant Flywheels (TAC Nos. ME3640, ME3641, ME3642, and ME3643), dated September 16, 2010.

1.3 DEFINITIONS AND/OR ACRONYMS

1. UT – Ultrasonic Testing

2. SURFACE EXAMINATION – Examination method using liquid penetrant (PT) or magnetic particle (MT) techniques.

3. INDICATION - The response from the application of a nondestructive examination (NDE).

4. RELEVANT INDICATION OR FLAW - An imperfection or unintentional discontinuity that is detectable by NDE.

5. DEFECT - A flaw of such size, shape, orientation, location, or properties as to be rejectable.

1.4 PROGRAM DESCRIPTIONS

One of the following examinations shall be performed on each reactor coolant pump flywheel at the specified frequency:

1. A qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of half the outer radius <u>or</u>

2. A surface examination (MT or PT) of the bore and keyway area whenever the flywheels are removed for maintenance purposes. Since the exposed surfaces, other than the bore and keyway areas, of the flywheels are coated with corrosion preventative primer paint, a surface examination of these surfaces is not practicable.

3. For reactor coolant pump motor serial numbers 4S88P961 and 1S88P961, in lieu of Regulatory Position c.4.b(1) and c.4.b(2), a qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination (MT and/or PT) of exposed surfaces of the removed flywheel may be conducted at approximately 10 year intervals coinciding with the Inservice Inspection schedule as required by ASME Section XI.

   For all other reactor coolant pump motors, in lieu of Regulatory Position c.4.b(1) and c.4.b(2), a qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination (MT and/or PT) of exposed surfaces of the removed flywheel may be conducted at an interval not to exceed 20 years.

1.5 <u>PROGRAM IMPLEMENTATION</u>

Inspection schedules, personnel, equipment and material certifications, applicable examination methods, and examination reports shall be initiated and maintained in accordance with Braidwood Unit 1 and 2 Inservice Inspection Program Plan and associated procedures.

The Engineering Programs Group shall have responsibility for the implementation, performance, completion, and reporting of this Program.

1.6 <u>ACCEPTANCE CRITERIA</u>

1. All relevant indications shall be recorded on the appropriate examination form.

2. Final disposition of flaws shall be based on engineering analysis.

1.7 LCOARS/COMPENSATORY MEASURES

In the event indication(s) exceed allowable length, the Shift Manager shall be notified immediately. The Shift Manager shall determine OPERABILITY status and implement a LCOAR if applicable. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

1. If the examination and evaluation indicate an increase in flaw size or growth rate greater than predicted for the service life of the flywheel, the results of the examination and evaluation should be submitted to the NRC for evaluation.

2. The detection of flaws that exceed the acceptance criteria standards shall be coordinated with the requirements of the Maintenance Rule Program.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

INSERVICE TESTING PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to perform Inservice Testing of ASME Code Class 1, 2, and 3 pumps and valves, pursuant to Technical Specifications 5.5.8, "Inservice Testing Program."

1.2 REFERENCES

1. Technical Specifications Section 5.5.8, "Inservice Testing Program"
2. Updated Final Analysis Report (UFSAR) Section, 3.9.6, "Inservice Testing of Pumps and Valves"
3. USNRC Generic Letter GL 89-04, "Guidance on Developing Acceptable IST Programs"
4. USNRC Regulatory Guides
5. USNRC Bulletins (IEB)
6. 10CFR Part 50.55a Codes and Standards
7. ASME OM Code
8. Braidwood Inservice Testing Program Plan Pumps and Valves

   Additional references and descriptions of the Codes along with the Addenda applicable to the Inservice Testing Program for pumps and valves are provided in the Braidwood Inservice Testing Program Plan Pumps and Valves.

1.3 DEFINITIONS AND/OR ACRONYMS

American Society of Mechanical Engineers - ASME

1.4 PROGRAM DESCRIPTION

Inservice Testing of ASME Code Class 1, 2, and 3 pumps and valves shall be performed in accordance with the ASME OM Code and applicable addenda as required by 10CFR Part 50, Section 50.55a(f), except where specific written relief has been granted by the Commission pursuant to 10CFR Part 50, Section 55a(f)(6)(i) or Section 55a(a)(3).

The Braidwood Inservice Testing Program Plan Pumps and Valves contains the list of pumps and valves in the Program and the tests and test frequencies associated with each pump and valve. The Program Plan also contains justifications for testing at frequencies other than the ASME Code required frequencies, technical positions, and relief requests from ASME Code requirements which are determined to be impractical. The Program Plan also describes the Codes and Addenda applicable to the Braidwood Inservice Testing Program. The Program Plan is submitted to the NRC.

Surveillance intervals for Inservice Testing activities shall be as applicable as identified in Reference 1.

1.5 PROGRAM IMPLEMENTATION

The pump and valve testing described in the Inservice Testing Program Plan are implemented through station surveillance procedures. Administrative procedures are also used to implement Program requirements. The Engineering Department is responsible for the Inservice Testing Program Plan Pumps and Valves. The Departments who own the specific station surveillance procedures are responsible for scheduling and implementing those surveillances.

1.6 ACCEPTANCE CRITERIA

The acceptance criteria for the Inservice Testing pump and valve tests is contained in the implementing surveillance procedures.

1.7 LCOARS/COMPENSATORY MEASURES

In the event a surveillance is failed, the Shift Manager shall be notified immediately. The Shift Manager shall determine the OPERABILITY status and implement a LCOAR if applicable. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Pump and valve test records shall be maintained at the plant.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same changes to Appendix H unless the change being implemented at Braidwood has been reviewed and determined no to be applicable to Byron.

STEAM GENERATOR PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

This Program verifies the tube integrity of the Steam Generators (SGs) by performing inspections and tube plugging in accordance with Technical Specification (TS) 3.4.19, “Steam Generator (SG) Tube Integrity,” and the Steam Generator Program. The Steam Generator Program is defined by TS 5.5.9, NEI 97-06 and its associated EPRI Steam Generator Management Program Guidelines. TS 5.6.9, “Steam Generator (SG) Tube Inspection Reports,” provides the SG reporting requirements.

1.2 REFERENCES

1. Technical Specifications:
    a. 5.5.9, "Steam Generator (SG) Program"
    b. 5.6.9, "Steam Generator (SG) Tube Inspection Reports"
    c. 3.4.13, "RCS Operational LEAKAGE"
    d. 3.4.19, “Steam Generator (SG) Tube Integrity”
2. Update Final Safety Analysis Report Sections:
    a. 5.4.2, "Steam Generators"
    b. 15.1.5, "Steam System Piping Failure"
    c. 15.6.3, "Steam Generator Tube Rupture"
3. Exelon Generation Company, LLC, Quality Assurance Topical Report
4. ASME Boiler and Pressure Vessel Code:
    a. Section V, Nondestructive Examination, 2001 Edition through 2003 Addenda
    b. Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 2001 Edition through 2003 Addenda
5. American Society for Nondestructive Testing (ASNT): "Standard for Qualification and Certification of Nondestructive Testing Personnel, CP-189, 1995 Edition"

6. General Design Criteria (GDC) of Appendix A to 10CFR50:

   a. GDC-14

   b. GDC-15

   c. GDC-30

   d. GDC-31

   e. GDC-32

7. Nuclear Energy Institute (NEI) Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler:

   a. TSTF-449, Revision 4
   b. TSTF-510, Revision 2

8. Draft Regulatory Guide 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes"

9. Maintenance Rule Performance Criteria RC-2, “Remove Heat from Reactor to Steam Generators Including Steam Generator Integrity”

10. NEI 97-06 Steam Generator Program Guidelines

11. EPRI PWR Steam Generator Examination Guidelines

12. EPRI Primary to Secondary Leak Guidelines

13. EPRI Steam Generator Integrity Guidelines

14. EPRI Steam Generator In Situ Pressure Test Guidelines

15. EPRI Steam Generator Secondary Water Chemistry Guidelines

16. EPRI Steam Generator Primary Water Chemistry Guidelines

1.3 DEFINITIONS AND/OR ACRONYMS

1. IMPERFECTION - An exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy current testing indications <20% of the nominal wall thickness, if detectable, may be considered as imperfections.

2. DEGRADATION - A service induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.

3. DEGRADED TUBE - A tube containing imperfections ≥20% of the nominal tube wall thickness caused by degradation.

4. DEFECT - An imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.

5. PLUGGING LIMIT- The imperfection depth at or beyond which the tube shall be removed from service by plugging. The plugging limit imperfection depth for the tubing is equal to 40% of the nominal wall thickness.

   For Unit 2 only, this definition does not apply to service-induced flaws identified in the portion of the tube below 14.01 inches from the top of the tubesheet. Service-induced flaws found in the portion of the tube below 14.01 inches from the top of the tubesheet do not require plugging.

   For Unit 2 only, service-induced flaws identified in the portion of the tube from the top of the tubesheet to 14.01 inches below the top of the tubesheet shall be plugged upon detection.

6. Deleted.

7. DEGRADATION ASSESSMENT - An assessment of degradation performed prior to an upcoming outage to determine the type and location of flaws to which the tubes may be susceptible and to determine which inspection methods need to be employed and at what locations. The assessment includes appropriate inspection plans, inspection methods and inspection intervals for the applicable degradation mechanisms identified.

8. CONDITION MONITORING – An evaluation of the "as found" condition of the tubing during a SG inspection outage with respect to the performance criteria for structural integrity and accident induced leakage prior to the plugging of tubes.

9. OPERATIONAL ASSESSMENT – An evaluation that projects the condition of the tubes from the "as-left" condition exiting a SG inspection outage to the next SG inspection with respect to the performance criteria for structural integrity and accident induced leakage following plugging of tubes.

1.4 PROGRAM DESCRIPTION

This Program verifies the tube integrity of the SGs through periodic eddy current inspections. The Bases for this Program and TS Section were established by NEI TSTF-449 & TSTF-510 (References 7.a & 7.b) and NEI 97-06 (Reference 10) and its referenced EPRI Guidelines (References 11 through 16). The SG Program provides a means to detect and plug degradation of SG tubes in order to maintain the steam generator performance criteria for tube structural integrity, accident induced leakage, and operational leakage as delineated in TS 5.5.9 and NEI 97-06.

1.5 PROGRAM IMPLEMENTATION

A SG Program has been established and implemented to ensure that SG tube integrity is maintained. The SG Program is implemented through Exelon SG Program administrative and surveillance procedures to ensure compliance with the requirements of TS 3.4.19, TS 5.5.9, NEI 97-06 and its associated EPRI Guidelines. The SG Program includes the following provisions:

1. Condition monitoring assessments are performed during each SG inspection to evaluate the “as-found” condition of the tubes with respect to the SG performance criteria for structural integrity and accident induced leakage as determined from the inservice inspection results.

2. SG integrity is maintained by meeting the performance criteria for tube structural integrity, accident induced leakage and operational leakage. The SG Program procedures implement the performance criteria that are delineated in TS 5.5.9.b and NEI 97-06. Meeting the SG performance criteria provides reasonable assurance of maintaining tube integrity at normal and accident conditions.

3. Tubes found by inservice inspection that contain flaws that are equal to or greater than 40% of the nominal tube wall thickness are plugged. For Unit 2 only, service-induced flaws identified in the portion of the tube from the top of the tubesheet to 14.01 inches below the top of the tubesheet are plugged upon detection. For Unit 2 only, service-induced flaws found in the portion of the tube below 14.01 inches from the top of the tubesheet do not require plugging.

4. Periodic SG tube inspections are performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube plugging criteria. For Unit 2 only, the portion of the tube below 14.01 inches from the top of tubesheet is excluded. The tube-to-tubesheet weld is not part of the tube. The inspection scope, inspection methods and inspection intervals are determined by a degradation assessment that is performed in accordance with TS 5.5.9.d and NEI 97-06 to ensure that SG integrity is maintained until the next SG inspection.

5. Operational primary-to-secondary leakage monitoring is performed in accordance with TS 3.4.13, NEI 97-06 and EPRI Primary to Secondary Leak Guidelines (Reference 12).

6. There are no approved tube repair methods for the Units 1 and 2 SGs.

The Engineering Programs Department is the owner of the SG Program. The site Chemistry and Operations Departments are responsible for monitoring and responding to operational primary to secondary leakage. The site Chemistry Department is responsible for implementing the primary water and secondary water chemistry programs as described in References 15 and 16.

1.6 ACCEPTANCE CRITERIA

1. A tube with an imperfection depth greater than or equal to 40% of the nominal tube wall thickness shall be plugged.

   For Unit 2 only, service-induced flaws found in the portion of the tube below 14.01 inches from the top of the tubesheet do not require plugging.

   For Unit 2 only, service induced flaws identified in the portion of the tube from the top of the tubesheet to 14.01 inches below the top of the tubesheet shall be plugged upon detection.

2. Deleted.

3. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage and operational leakage as delineated in TS 5.5.9.b.

4. For Unit 1, the maximum equivalent plugging level is 5% per SG.

5. For Unit 2, the maximum equivalent plugging level is 5% per SG.

1.7 LCOARS/COMPENSATORY MEASURES

1. If a SG performance criterion is exceeded, reports shall be submitted to the NRC as required by 10 CFR 50.72 and 50.73, including a root cause evaluation identifying the performance criterion exceeded and an Operational Assessment establishing the basis for the next operating cycle.

2. The Shift Manager shall be notified immediately for any of the conditions identified below. The Shift Manager shall determine OPERABILITY status and implement a LCOAR as applicable. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

   a. Primary-to-secondary leakage not within limit.

   b. One or more SG tubes satisfying the tube plugging criteria and not plugged in accordance with the SG Program.

   c. A SG performance criterion is exceeded.

   d. SG Tube integrity is not maintained.

1.8 REPORTING REQUIREMENTS

1. Following each inservice inspection of SG tubes performed in accordance with TS 5.5.9, a report of inspection results shall be submitted to the NRC within 180 days after initial entry into MODE 4 in accordance with TS 5.6.9.

2. An inservice summary report shall be submitted to the NRC and IEMA within 90 days of the completion of each refueling outage when SG inspections are performed, as required by ASME Section XI IWA-6000.

3. The Steam Generator Surveillance Program effectiveness is monitored by Maintenance Rule Criteria RC-2.

The Engineering Programs Department is responsible for preparing and submitting the above reports.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

SECONDARY WATER CHEMISTRY PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

In accordance with Technical Specification (TS) 5.5.10, "Secondary Water Chemistry Program." This Program provides controls for monitoring secondary water chemistry in order to inhibit steam generator tube degradation.

1.2 REFERENCES

1. Technical Specification 5.5.10, "Secondary Water Chemistry Program"
2. UFSAR Section 5.4.2.1.3, and 10.3.3
3. Electric Power Research Institute, PWR Secondary Water Chemistry Guidelines
4. Westinghouse Guidelines for Secondary Water Chemistry, February, 1985

1.3 DEFINITIONS AND/OR ACRONYMS

1. SECONDARY SYSTEM CHEMISTRY PARAMETERS - Chemical impurities in the secondary system have the potential to create conditions harmful to steam generator materials. Carefully controlling steam generator chemistry parameters minimizes material degradation.

   Parameters that cause rapid corrosion cannot be exceeded for more than brief periods at power. Power reductions or shutdown is required within set times of exceeding limits on these critical parameters.

2. Pressurized Water Reactor - PWR

3, Electric Power Research Institute - EPRI

4. Institute of Nuclear Power Operations - INPO

1.4 PROGRAM DESCRIPTION

The Secondary Chemistry Monitoring Program states chemical parameters which can indicate corrosive conditions and provides concentration limits for each parameter. These secondary chemistry guidelines were derived from Reference 3. Station procedures outline who is responsible for what actions and describes how other documents interact with this Program.

This Program provides controls for monitoring secondary water chemistry to inhibit Steam Generator tube degradation. The Program includes:

1. identification of a sampling schedule for critical variables and control points for these variables;
2. identification of the procedures used to measure the values of the critical variables;
3. identification of process sampling points which shall include monitoring the discharge of the condensate pumps for evidence of condenser inleakage;
4. procedures for the recording and management of data;
5. procedures defining corrective actions for all out of specification chemistry conditions; and
6. procedures identifying the authority responsible for the interpretation of the data and the sequence and timing of corrective actions.

1.5 PROGRAM IMPLEMENTATION

The requirements of the Program apply at all times.

1. The sampling schedule for the critical variables and control points for these variables is located in appropriate station procedures. The department responsible for this action is the Chemistry Department.
2. A means to measure the values of the critical variables will be located in appropriate station procedures. The Chemistry Department is responsible for revising and implementing these procedures.

3. Process sampling points are identified in appropriate station procedures and include the condensate pump discharge for evidence of a condenser leak. The Chemistry Department maintains a sample point book which contains additional sampling points. The Chemistry Department is responsible for this action.

4. The recording and management of the data is controlled by appropriate station procedures and is the responsibility of the Chemistry Department.

5. The definitions for corrective actions for all out of specification chemistry conditions are in appropriate station procedures and are the responsibility of the Chemistry Department with support from the Operations and Radiation Protection Departments.

6. The Chemistry Department shall be responsible for the interpretation of the data and the sequence and timing of corrective actions. This shall be performed with required support from the Operating, Radiation Protection, and System Engineering Departments.

1.6 ACCEPTANCE CRITERIA

This Program is based on Reference 3 and acceptance criteria are incorporated into appropriate station procedures.

1.7 LCOARS/COMPENSATORY MEASURES

The compensatory measures for exceeding secondary water chemistry parameters can be identified in appropriate station procedures. In addition, a Problem Identification Form (PIF) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

To assure corporate and station steam generator chemistry objectives are met, an ongoing review of secondary water chemistry will be conducted by the Chemistry Department. The Chemistry Supervisor and/or their designee is responsible for a monthly review of key program parameters, chosen by the Chemistry Supervisor and /or their designee. The Program's effectiveness will be measured against recognized industry standards, such as INPO standards (or other comparable standards).

The Chemistry Department is additionally responsible for reporting and reviewing programmatic failures through an approved station problem identification process.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall require a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include Regulatory Assurance in all cases. As a part of the ITR, for a change to this Program, concurrence from Byron and Braidwood Plant Operations Review Committee (PORC) approval is required. The concurrence shall be that Byron is implementing the same change or that the change has been reviewed and determined not to be applicable to Byron.

VENTILATION FILTER TESTING PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to provide guidelines for performing surveillance testing of Technical Specification (TS) 5.5.11, "Ventilation Filter Testing Program (VFTP)" HVAC System Filters at Braidwood Station.

1.2 REFERENCES

1. Technical Specification Section 5.5.11, "Ventilation Filter Testing Program (VFTP)"
2. USNRC Regulatory Guide 1.52, Rev. 2, March 1978
3. ANSI N510 1980
4. ASTM D 3803-1989, "Standard Test Method for Nuclear Grade Activated Carbon"
5. UFSAR Appendix A

1.3 DEFINITIONS AND/OR ACRONYMS

1. Ventilation Filter Testing Program - VFTP
2. High Efficiency Particulate Air - HEPA

1.4 PROGRAM DESCRIPTION

This Program implements the following required testing of Engineered Safety Feature (ESF) ventilation filter systems at the frequencies specified in accordance with References 2 and 3.

1. Demonstrate for each of the ESF filter systems that an in-place test of the High Efficiency Particulate Air (HEPA) filters shows a penetration when tested in accordance with References 2 and 3 at the system flow rate, specified in Table 1, Part 1.
2. Demonstrate for each of the ESF filter systems that an in place test of the charcoal absorber shows a bypass leakage within limits when tested in accordance with References 2 and 3 at the system flow rated specified in Table 1, Part 2.

3. Demonstrate for each of the ESF filter systems that a laboratory test of a sample of the charcoal absorber, when obtained as described in Reference 2, shows the methyl iodide penetration less than the value specified in Table 1, Part 3, when tested in accordance with References 2, 3 and 4 at a temperature of 30°C and Relative Humidity (RH) specified in Table 1, Part 3.

4. Demonstrate for each of the ESF filter systems that the pressure drop across the combined HEPA filters and the charcoal adsorbers is < 6 inches of water gauge when tested in accordance with References 2 and 3 at the system flow rate, specified in Table 1, Part 4.

5. Demonstrate for each of the ESF filter systems that a bypass leakage test of the 1) combined HEPA filters and damper or 2) combined charcoal filter and damper leakage shows a total bypass leakage within acceptable limits at the system flow rate specified in Table 1, Part 5.

6. Demonstrate that the heaters for each of the ESF filter systems dissipate the value specified in Table 1, Part 6, when tested in accordance with References 3 and 5.

1.5 <u>PROGRAM IMPLEMENTATION</u>

<u>Technical Section Filter Testing, Inspection and Repair</u>

1. Control Room Ventilation (VC) System:

   a. At least once per 18 months (+ 25% tolerance) or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housing, or (2) following painting, fire or chemical release in any ventilation zone communicating with the Emergency Makeup System filter plenum shall meet the following requirements:

      1. Verify that each HEPA and charcoal bank satisfies the inplace penetration testing acceptance criteria of less than 0.05% and less than 1.0%, respectively; and that the system flow rate is ≥ 5400 cfm and ≤ 6600 cfm for the Emergency Makeup System using test procedure guidance in accordance with References 2 and 3;

2. Verify, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample from the Emergency Makeup System obtained in accordance with Reference 2 meets the laboratory testing criteria for a methyl iodide penetration of less than 2.0% when tested according to Reference 4 at a temperature of
30 °C and a RH of 70%; and

3. Verify a system flow rate of ≥ 5400 cfm and ≤ 6600cfm for the Emergency Makeup System and ≥ 44,550 cfm and ≤ 54,450 cfm for the Recirculation System when tested in accordance with Reference 3.

b. After every 720 hours (+ 25% tolerance) of Emergency Makeup System operation, verify, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample from the Emergency Makeup System obtained in accordance with Reference 2, meets the laboratory testing criteria for a methyl iodide penetration of less than 2.0% when tested according to Reference 4 at a temperature of 30°C and a RH of 70%.

c. At least once per 18 months (+ 25% tolerance) by:

1. verifying the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6.0 inches Water Gauge while operating the Emergency Makeup System at a flow rate of ≥ 5400 cfm and ≤ 6600 cfm when tested in accordance with References 2 and 3.

2. verifying that the heaters dissipate ≥ 24.5 kW and ≤ 29.9 kW when tested in accordance with Reference 3 and the exceptions noted in Reference 5.

d. After each complete or partial replacement of a HEPA filter bank in the Emergency Makeup System, verify that the affected HEPA filter bank satisfies the inplace penetration testing acceptance criteria of less than 0.05% in accordance with Reference 3 while operating the Emergency Makeup System at a flow rate of ≥ 5400 cfm and ≤ 6600 cfm.

e. After each complete or partial replacement of a charcoal adsorber bank in the Emergency Makeup System, verify that the affected charcoal adsorber bank satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating the system at a flow rate of ≥ 5400 cfm and ≤ 6600 cfm.

f. At least once per 18 months (+ 25% tolerance) or (1) after any structural maintenance on the charcoal adsorber housings, or (2) following painting, fire or chemical release in any ventilation zone communicating with the recirculation charcoal adsorber by:

1. verifying that the recirculation charcoal adsorber plenum satisfies the inplace penetration testing acceptance criteria of less than 2% total bypass, using the test procedure guidance in accordance with References 2 and 3, while the system flow rate is ≥ 44,550 cfm and ≤ 54,450 cfm for the recirculation charcoal adsorber;

2. verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample from the recirculation charcoal adsorber obtained in accordance with Reference 2 meets the laboratory testing criteria for a methyl iodide penetration of less than 4% when tested according to Reference 4 at a temperature of 30 °C and a RH of 70%; and

3. verifying a system flow rate of ≥ 44,550 cfm and ≤ 54,450 cfm for the Recirculation Charcoal Adsorber when tested in accordance with Reference 3.

g. After each complete or partial replacement of a charcoal adsorber bank in the Recirculation Charcoal Absorber System by verifying that the charcoal adsorber bank satisfies the inplace penetration testing acceptance criteria of less than 0.1% in accordance with Reference 3 while operating at a system flow rate of ≥ 44,550 cfm and ≤ 54,450 cfm.

h. After every 720 hours (+ 25% tolerance) of Recirculation Charcoal Adsorber System operation by verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Reference 2, meets the laboratory testing criteria for a methyl iodide penetration of less than 4% when tested according to Reference 4 at a temperature of 30°C and a RH of 70%.

2. Non-Accessible Area Exhaust Filter Plenum Ventilation System:

a. At least once per 18 months (+ 25% tolerance) or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housing, or (2) following painting, fire or chemical release in any ventilation zone communicating with the exhaust filter plenum by:

1. verifying that each HEPA and charcoal bank satisfies the inplace penetration and bypass leakage testing acceptance criteria of less than 1%, using the test procedure guidance in accordance with References 2 and 3, while the flow rate is ≥ 60,210 cfm and ≤ 73,590 cfm for the train;

2. verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample from each bank of adsorbers of the train obtained in accordance with Reference 2 meets the laboratory testing criteria for a methyl iodide penetration of less than 4.5% (and administratively controlled to less than 3% to accommodate total bypass leakage margin) when tested according to Reference 4 at a temperature of 30 °C and a RH of 70%; and

3. verifying a system flow rate of ≥ 60,210 cfm and ≤ 73,590 cfm through the train through the exhaust filter plenum when tested in accordance with Reference 3.

4. verifying that with 2 of 3 trains operating at a flow rate of ≥ 60,210 cfm and ≤ 73,590 cfm for each train and exhausting through the HEPA filters and charcoal adsorbers, with 2 main VA supply and 2 main VA exhaust fans operating, the total charcoal bypass flow of the system including damper bypass leakage at an additional 0.5 inches water gauge differential pressure above actual differential pressure for all three trains (two on-line and one in standby) is less than or equal to 4%.

5. verifying that with 2 of 3 trains operating at a flow rate of ≥ 60,210 cfm and ≤ 73,590 cfm for each train and exhausting through the HEPA filters and charcoal adsorbers, with 2 main VA supply and 2 main VA exhaust fans operating, the total HEPA bypass flow of the system including damper bypass leakage at an additional 0.5 inches wter gauge differential pressure above actual differential pressure for all three trains (two on-line and one in standby) is less than or equal to 1%.

6. verifying, with a system flow of ≥ 60,210 cfm and ≤ 73,590 cfm through the train and exhaust filter plenum, that the flow rate in each filter bank is ≥ 20,070 cfm and ≤ 24,530 cfm.

b. After every 720 hours (+25% tolerance) of charcoal adsorber operation by verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample obtained from each bank of adsorbers of the train in accordance with Reference 2, meets the laboratory testing criteria for a methyl iodide penetration of less than an average of 4.5% (and administratively controlled to less than 3% to accommodate total bypass leakage margin) when tested according to Reference 4 at a temperature of 30°C and a RH 70%.

c. At least once per 18 months (+25% tolerance) by verifying for each filter bank of the train that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6.0 inches Water Gauge while operating the exhaust filter plenum at a flow rate of ≥ 60,210 cfm and ≤ 73,590 cfm when tested in accordance with References 2 and 3.

d. After each complete or partial replacement of a HEPA filter bank by verifying that the exhaust filter plenum satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating at a flow rate of ≥ 60,210 cfm and ≤ 73,590 cfm through the train.

e. After each complete or partial replacement of a charcoal adsorber bank by verifying that the exhaust filter plenum satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating at a system flow rate of ≥ 60,210 cfm and ≤ 73,590 cfm through the train.

3. Fuel Handling Building Exhaust Filter Plenums:

a. At least once per 18 months (+ 25% tolerance) or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housing, or (2) following painting, fire or chemical release in any ventilation zone communicating with the system by:

1. verifying that the Fuel Handling Building Exhaust Filter Plenum satisfies the inplace penetration testing acceptance criteria of less than 1% when using the test procedure guidance in accordance with References 2 and 3 while the system flow rate is ≥ 18,900 cfm and ≤ 23,100 cfm;

2. verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Reference 2 meets the laboratory testing criteria for a methyl iodide penetration of less than 10% when tested according to Reference 4 at a temperature of 30 °C and a RH of 95%;

3. verifying a flow rate of ≥ 18,900 cfm and ≤ 23,100 cfm through the Fuel Handling Building Exhaust Filter Plenum during operation when tested in accordance with Reference 3; and

4. verifying that with the system operating at a flow rate of ≥ 18,900 cfm and ≤ 23,100 cfm and exhausting through the HEPA filters and charcoal adsorbers, with 2 main VA supply and 2 main VA exhaust fans operating, the total HEPA bypass flow of the system including damper bypass leakage at an additional 0.5 inches water gauge differential pressure above actual differential pressure is less than or equal to 1% and the total charcoal bypass flow of the system including damper bypass leakage is less than or equal to 1%.

b. After every 720 hours (+25% tolerance) of charcoal adsorber operation by verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Reference 2, meets the laboratory testing criteria for a methyl iodide penetration of less than 10% when tested according to Reference 4 at a temperature of 30°C and a RH of 95%.

c. At least once per 18 months (+25% tolerance) by verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6.0 inches Water Gauge while operating the exhaust filter plenum at a flow rate of ≥ 18,900 cfm and ≤ 23,100 cfm when tested in accordance with References 2 and 3.

d. After each complete or partial replacement of a HEPA filter bank by verifying that the Fuel Handling Building Exhaust Filter Plenum satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating at a system flow rate of ≥ 18,900 cfm and ≤ 23,100 cfm; and

e. After each complete or partial replacement of a charcoal adsorber bank by verifying that the Fuel Handling Building Exhaust Filter Plenum satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating at a system flow rate of ≥ 18,900 cfm and ≤ 23,100 cfm.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria is listed in Table 1.

1.7 LCOARS/COMPENSATORY MEASURES

In the event any of the acceptance criteria is not met, the Shift Manager will immediately be notified. The Shift Manger shall determine OPERABILITY status and implement a LCOAR as applicable. In addition, an Issue Report may be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Not applicable.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall require a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

TABLE 1

VENTILATION FILTER TESTING PROGRAM (VFTP)

Part 1

ESF Ventilation System	Flow Rate	Penetration
Control Room Ventilation (VC) Filtration System (makeup)	≥ 5400 cfm and ≤ 6600 cfm	<0.05%
Nonaccessable Area Exhaust Filter Plenum Ventilation System (after structural maintenance of the HEPA filter housings)	≥ 60,210 cfm and ≤ 73,590 cfm per train, and ≥ 20,070 cfm and ≤ 24,530 cfm per bank	< 1%
Nonaccessible Area Exhaust Filter Plenum Ventilation System (for reasons other than structural maintenance of the EPA filter housings)	≥ 60,210 cfm and ≤ 73,590 cfm per train	< 1%
Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System	≥ 18,900 cfm and ≤ 23,100 cfm	< 1%

Part 2

ESF Ventilation System	Flow Rate	Bypass
VC Filtration System (makeup)	≥ 5400 cfm and ≤ 6600 cfm	< 1%
VC Filtration System (recirculation, charcoal bed after complete or partial replacement)	≥ 44,550 cfm and ≤ 54,450 cfm	< 0.1%
Nonaccessible Area Exhaust Filter Plenum Ventilation System (after structural maintenance of the charcoal adsorber housings)	≥ 60,210 cfm and ≤ 73,590 cfm per train, and ≥ 20,070 cfm and ≤ 24,530 cfm per bank	< 1%
Nonaccessible Area Exhaust Filter Plenum Ventilation System (for reasons other than structural maintenance of the charcoal adsorber housings)	≥ 60,210 cfm and ≤ 73,590 cfm per train	< 1%
FHB Ventilation System	≥ 18,900 cfm and ≤ 23,100 cfm per train	< 1%

Part 3

ESF Ventilation System	Penetration	RH
VC Filtration System (makeup)	2.0%	70%
VC Filtration System (recirculation)	4%	70%
Nonaccessible Area Exhaust Filter Plenum Ventilation System	4.5%	70%
FHB Ventilation System	10%	95%

Part 4

EFS Ventilation System	Flow Rate
VC Filtration System (makeup)	≥ 5400 cfm and ≤ 6600 cfm
Nonaccessible Area Exhaust Filter Plenum Ventilation System	≥ 60,210 cfm and ≤ 73,590 cfm per train
FHB Ventilation System	≥ 18,900 cfm and ≤ 23,100 cfm

Part 5

ESF Ventilation System	Flow Rate	Bypass
Nonaccessible Area Exhaust Filter Plenum Ventilation System	≥ 60,210 cfm and ≤ 73,590 cfm per on-line train	≤ 1% (HEPA) ≤ 4% (Charcoal)
FHB Ventilation System	≥ 18,900 cfm and ≤ 23,100 cfm	≤ 1%
VC Filteration System (recirculation for reasons other than complete or partial charcoal bed replacement)	≥ 44,550 cfm and ≤ 54,450	< 2%

Part 6

ESF Ventilation System	Wattage
VC Filtration System	≥ 24.5 kW and ≤ 29.9 kW

EXPLOSIVE GAS AND STORAGE TANK RADIOACTIVITY MONITORING PROGRAM BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1. PURPOSE

In accordance with Technical Specification (TS) Specification 5.5.12, "Explosive Gas and Storage Tank Radioactive Monitoring Program". This Program provides controls for:

1. potentially explosive gas mixtures contained in the Waste Gas System;
2. the quantity of radioactivity contained in gas decay tanks; and
3. the quantity of radioactivity contained in unprotected outdoor liquid radwaste storage tanks.

The requirements of this Program dictate the contents of the implementing procedures.

1.2 REFERENCES

1. TS Specification 5.5.12, "Explosive Gas and Storage Tank Radioactivity Monitoring Program"
2. UFSAR Section 11.3.2.6
3. ODCM
4. Standard Review Plan 11.3, Branch Technical Position (BTP) ETSB 11-5, "Postulated Radioactive Release due to Waste Gas System Leak or Failure," in NUREG-0800, July 1981
5. 10CFR20, Appendix B, Table 2, Column 2
6. General Design Criterion 60 of Appendix A to 10CFR50

1.3 DEFINITIONS AND/OR ACRONYMS

A WASTE GAS HOLDUP SYSTEM - Any system designed and installed to reduce radioactive gaseous effluents by collecting Reactor Coolant System off-gases from the Reactor Coolant System and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.
PRIMARY COOLANT DEGASSING OPERATION - When preparing the plant for MODE 5 prior to MODE 6, the Reactor Coolant is degassed to reduce the hydrogen concentrations. At the start of the degassing operation, the Volume Control Tank (VCT) gas space contains hydrogen and traces of fission gases. The operation involves opening the VCT vent, raising VCT water level to force gasses out of the tank, and closing the VCT vent.

MEMBER(S) OF THE PUBLIC - Include all persons who are not occupationally associated with the plant. This category does not include employees of the licensee, its contractors or vendors and persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.

The SITE BOUNDARY - Be that line beyond which the land is neither owned, nor leased, nor otherwise controlled by the licensee.

IMMEDIATELY - That the Required Actions should be pursued without delay and in a controlled manner.

1.4 PROGRAM DESCRIPTION

This Program ensures that the concentration of potentially explosive gas mixtures contained in the WASTE GAS HOLDUP SYSTEM is maintained below the flammability limits for hydrogen and oxygen. Sample instruments with alarms are provided to alert operators to take compensatory measures to prevent the hydrogen and oxygen concentrations from reaching flammability limits. Maintaining the concentration of hydrogen and oxygen below their flammability limits provides assurance that the releases of radioactive materials will be controlled in conformance with the requirements of Reference 6.

Restricting the quantity of radioactivity contained in each gas decay tank provides assurance that in the event of an uncontrolled release of the tank's contents, the resulting whole body exposure to a MEMBER OF THE PUBLIC at the nearest SITE BOUNDARY will not exceed 0.5 rem. This is consistent with Reference 4.

The quantity of radioactivity contained in all outdoor liquid radwaste tanks that are not surrounded by liners, dikes, or walls, capable of holding the tank's contents and that do not have tank overflows and surrounding area drains connected to the liquid radwaste treatment system is an amount that would result in concentrations less than the limits of Reference 5, at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tank's contents.

The Radiation Protection Department shall be the Program owner with required support from the Operating, Chemistry, and System Engineering Departments.

1.5 PROGRAM IMPLEMENTATION

The requirements of this Program apply at all times.

1. The concentration of hydrogen and oxygen in the WASTE GAS HOLDUP SYSTEM shall be determined to be within the acceptance criteria by continuously monitoring the waste gases in the WASTE GAS HOLDUP SYSTEM with the hydrogen and oxygen monitors required by TRM LCO 3.3.e.

2. The quantity of radioactivity contained in each gas decay tank shall be determined, in accordance with the guidance provided in Reference 4, to be within the acceptance criteria at least once per 7 days when radioactive materials are being added to the tank, and at least once per 24 hours during PRIMARY COOLANT DEGASSING OPERATION.

3. The quantity of radioactive material contained in the Primary Water Storage Tank and any Outside Temporary Tanks shall be determined to be within the acceptance criteria by analyzing a representative sample of the tank's contents at least once per 7 days when radioactive materials are being added to the tank.

If the supply and discharge piping to the Primary Water Storage Tanks are crosstied with flow for a sufficient duration, one sample of the Primary Water Makeup System may be used to represent the contents of each tank.

1.6 ACCEPTANCE CRITERIA

1. Explosive Gas Mixtures

The concentration of oxygen in the WASTE GAS HOLDUP SYSTEM shall be ≤ 2% by volume whenever the hydrogen concentration is > 4% by volume.

2. Radioactivity Contained in Gas Decay Tanks

The quantity of radioactivity contained in each gas decay tank shall be limited to ≤ 5 E+04 Curies of noble gases (considered as Xe-133 equivalent).

3. Radioactivity Contained in Unprotected Outdoor Liquid Radwaste Storage Tanks.

The quantity of radioactive material, excluding tritium and dissolved or entrained noble gases, shall be limited to the following:

a. Primary Water Storage Tank ≤ 2000 Curies
when sampling 0A and 0B Primary Water Storage Tanks individually

OR

Primary Water Storage Tank ≤ 1000 Curies
when obtaining one sample representing both tanks with 0A and 0B Primary Water Storage Tanks crosstied

b. Outside Temporary Tank ≤ 10 Curies

1.7 LCOARS/COMPENSATORY MEASURES

1. Explosive Gas Mixtures

a. With the concentration of oxygen in the WASTE GAS HOLDUP SYSTEM > 2% by volume but ≤ 4% by volume, when hydrogen is > 4% by volume, restore the oxygen concentration to ≤ 2% within 48 hours.

b. With the concentration of oxygen in the WASTE GAS HOLDUP SYSTEM > 4% by volume and the hydrogen concentration > 4% by volume, IMMEDIATELY suspend all additions of waste gases to the system and reduce the concentration of oxygen to ≤ 4% by volume, then restore the oxygen concentration to ≤ 2% within the following 48 hours.

The department responsible for the above actions is the Operating Department.

2. Radioactivity Contained in Gas Decay Tanks

With the quantity of radioactive material in any gas decay tank exceeding the acceptance criteria:

a. IMMEDIATELY suspend all additions of radioactive material to the tank, and within 48 hours, reduce the tank contents to within the limit; and

b. describe the events leading to this condition in the next Radioactive Effluent Release Report.

The department responsible for action a is the Operating Department, action b is the responsibility of the Radiation Protection Department.

3. Radioactivity Contained in Unprotected Outdoor Liquid Radwaste Storage Tanks

With the quantity of radioactive material in the Primary Water Storage Tank or any Outside Temporary Tank exceeding the acceptance criteria:

a. IMMEDIATELY suspend all additions of radioactive material to the tank;

b. within 48 hours reduce the tank contents to within the acceptance criteria; and

c. describe the events leading to this condition in the next Radioactive Effluent Release Report

The Operations Department is responsible for actions a and b, and the Radiation Protection Department is responsible for action c.

The Shift Manager shall determine OPERABILITY status and implement a LCOAR as applicable. A Problem Identification Form (PIF) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

This Program shall be reviewed every two years for technical accuracy and revision. The review shall be done by the Radiation Protection Department with input from the Operating, Chemistry, and System Engineering Departments.

Program failures shall be reported through an approved station problem identification process. The Operations Department will be responsible for ensuring that Program failures have been reported.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include Regulatory Assurance Department in all cases. As a part of the ITR, for a change to this Program, concurrence from Byron and Braidwood Plant Operations Review Committee (PORC) approval is required. The concurrence shall be that Byron is implementing the same change or that the change has been reviewed and determined not to be applicable to Byron.

DIESEL FUEL OIL TESTING PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to provide guidance for implementation of Diesel Fuel Oil Testing at the Braidwood Station as required by Technical Specification (TS) 5.5.13. This Program, through approved Exelon Nuclear, Braidwood Station, or Vendor procedures, ensures that delivered, new and stored diesel fuel oil meet the appropriate standards.

1.2 REFERENCES

1. Technical Specification 5.5.13, "Diesel Fuel Oil Testing Program"

2. ASTM Standards

   a. D5452-98, "Particulate Contamination in Aviation Fuels by Laboratory Filtration,"
   b. D1552-95, "Standard Test Method for Sulfur in Petroleum Products (High Temperature Method)"
   c. D975-98b, "Standard Specifications for Diesel Fuel Oils"
   d. D2622-98, "Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescent Spectrometry"
   e. D4176-93, "Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)"
   f. D4057-95, "Standard Practice for Manual Sampling of Petroleum and Petroleum Products"
   g. D1298-99, "Standard Practice for Density, Relative density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method"
   h. D4294-98, "Standard Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectroscopy"
   i. D2709-96e, "Test Method for Water and Sediment in Distillate Fuels by Centrifuge"
   j. D1500-98, "Standard Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)"

1.3 DEFINITIONS AND/OR ACRONYMS

1. DELIVERED DIESEL FUEL - Any diesel fuel being delivered to Braidwood Station which is intended to be used by INSTALLED PLANT EQUIPMENT. Fuel is typically delivered by truck and is either blended at approximately 25% #1 grade and 75% #2 grade, or purchased such that the resultant fuel has an approximate 25% #1 to 75% #2 ratio (i.e. one truck load #1 to three truck loads #2). This blend can be used year-around, but is intended to prevent winter gelling concerns. Braidwood Station may also specify straight #2 fuel if desired, with optional anti-gel additives utilized for winter considerations. Delivered diesel fuel oil receives a cursory analysis of properties to give confidence that the truck indeed contains diesel fuel oil prior to adding it to any OUTDOOR BULK DIESEL FUEL OIL TANK. If fuel is being delivered using the one truck load #1 to three truck loads #2 method to achieve the blend, it is recognized that the straight #1 fuel parameters may not meet the blend's specification. In this case, the fuel is still accepted since it is known that it will eventually be blended with #2 and the resultant further analyzed before use as described in the definition of "UNCERTIFIED" DIESEL FUEL OIL.

2. "UNCERTIFIED" DIESEL FUEL OIL - Any diesel fuel oil that has not been tested and found to meet the applicable acceptance criteria for grade #2 diesel fuel oil and is to be added, or already is in, the INSTALLED PLANT EQUIPMENT's TANKS or the OUTDOOR BULK DIESEL FUEL OIL TANKS. Fuel in the INSTALLED PLANT EQUIPMENT's TANKS or the OUTDOOR BULK DIESEL OIL TANKS can become "UNCERTIFIED" when samples are not found to meet fuel specification (following analysis of an optional confirmatory sample) or by adding DELIVERED or "UNCERTIFIED" FUEL to the tanks. In the event fuel is "UNCERTIFIED", actions are taken to either bring the fuel back into specifications and/or prevent the fuel from being used until it is deemed "CERTIFIED".

3. "CERTIFIED" DIESEL FUEL OIL - Diesel fuel oil in any station diesel fuel oil tank which has previously been sampled, analyzed, and found to meet the applicable acceptance criteria for grade #2 diesel fuel oil. This fuel can be stored in either the OUTDOOR BULK DIESEL FUEL OIL TANKS or tanks associated with the INSTALLED PLANT EQUIPMENT. This fuel is periodically sampled and analyzed. See Attachment A for test and test frequency.

4. NEW FUEL OIL - Diesel fuel oil that has been sampled and tested in accordance with the requirements of TS 5.5.13 for NEW FUEL OIL. TS 5.5.13 requires specific tests of fuel oil prior to addition to storage tanks, e.g., 1) an API gravity or an absolute specific gravity, 2) a flash point and kinematic viscosity, and 3) a clear and bright appearance with proper color or a water and sediment content. Additional tests are required to verify other properties of NEW FUEL OIL within 30 days following sampling and addition to storage tanks.

   For the Emergency Diesel Generators (EDGs), the OUTDOOR BULK DIESEL FUEL OIL TANKS (one 50,000 gal. and one 125,000 gal.) are normally the source of "NEW" FUEL OIL

5. STORED FUEL OIL - Diesel fuel oil that has been sampled and tested in accordance with the requirements of TS 5.5.13 for STORED FUEL OIL. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. Consequently, TS 5.5.13 requires STORED FUEL OIL to be tested for total particulate concentration every 31 days.

   For the EDGs, the inside storage tanks (each Unit 1 EDG is provided with two 25,000 gal. inside storage tanks and each Unit 2 EDG is provided with one 50,000 gal. inside storage tank) are the source of the required "STORED" FUEL OIL.

6. INSTALLED PLANT EQUIPMENT - EDGs, Diesel-driven fire pump, Security diesel generator, Diesel-driven Auxiliary Feedwater pump, Auxiliary boilers (note: Auxiliary boilers burn "CERTIFIED" or "UNCERTIFIED" fuel directly from the OUTDOOR BULK DIESEL FUEL OIL TANKS).

7. OUTDOOR BULK DIESEL FUEL OIL TANKS - Typically called 125K and 50K tanks (OD003T and OD012T respectively). These tanks receive the delivered fuel and store it "UNCERTIFIED" until being "CERTIFIED" through analysis. Once "CERTIFIED" the fuel stored in these tanks is normally used to fill the tanks of the INSTALLED PLANT EQUIPMENT.

1.4 PROGRAM DESCRIPTION

The Diesel Fuel Oil Testing Program provides guidance for testing DELIVERED, NEW, and STORED DIESEL FUEL OIL. This Program includes sampling and testing requirements as outlined in Attachment A which also may be contained in appropriate procedures, as well as acceptance criteria in accordance with the applicable standards. This Program also describes preventative maintenance activities that are performed to ensure good fuel quality and tank condition for certain INSTALLED PLANT EQUIPMENT TANKS.

1.5 PROGRAM IMPLEMENTATION

This Diesel Fuel Oil Testing Program implements required sampling and analysis of DELIVERED, NEW, and STORED DIESEL FUEL OIL. The Program includes sampling and testing requirements as outlined in Attachment A which also may be contained in appropriate procedures, as well as acceptance criteria, in accordance with applicable standards. This Program also describes preventative maintenance activities that are performed to ensure good fuel quality and tank condition for certain INSTALLED PLANT EQUIPMENT'S TANKS. This Program establishes the following:

1. Other properties of NEW FUEL OIL are within limits within 30 days following sampling in accordance with ASTM D4057-95 and addition to storage tanks;

2. Total particulate concentration of the fuel oil is ≤ 10 mg/l when tested every 31 days in accordance with ASTM D5452-98.

3. Acceptability (certification) of "UNCERTIFIED" fuel oil and continued certification on a periodic basis in the fuel oil storage tanks by determining that the fuel oil:

    a. meets ASTM D975-98b specifications;

    b. meets ASTM D5452-98 specification for particulate contamination;

    c. meets Illinois EPA sulfur requirements and may be tested in accordance with ASTM D1552-95, ASTM D2622-98, or ASTM D4294-98;

    d. a flash point and kinematic viscosity is within limits:

e. API specific gravity or an absolute specific gravity within limits when tested in accoradance with ASTM D1298-99;

f. water and sediment when tested in accordance with ASTM D2709-96e is within limits; and

g. a clear and bright appearance with when tested in accordance with ASTM D4176-93, and proper color when tested in accordance with ASTM D1500-98.

Actual testing for each individual tank may vary. The minimum testing schedule is shown in Attachment A. Actual fuel analysis performed is determined within specific Exelon Nuclear, Braidwood Station, or approved Vendor procedures.

4. 10 year OUTDOOR BULK DIESEL FUEL OIL TANK (0DO03T - 125K gallon tank and 0DO12T - 50K gallon tank) cleaning using a Sodium hypochlorite (household bleach) solution or evaluated equivalent; and

5. 10 year EDG tank cleaning using a Sodium Hypochlorite (household bleach) solution or evaluated equivalent (Unit 1 has four 25,000 gallon (1DO01TA/B/C/D) and Unit 2 has two 50,000 gallon (2DO01TA/B) tanks); and

6. Periodic check for and removal of accumulated water from the EDG day tanks.

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Diesel Fuel Oil Testing Program frequencies.

The Braidwood Operating Department, Chemistry Departments, and Vendors are responsible for the implementation, performance, completion, and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria for the fuel used in the INSTALLED PLANT EQUIPMENT at Braidwood is specified in the applicable Exelon Nuclear, Braidwood Station, and Vendor procedures implemented by this Program.

1.7 LCOARS/COMPENSATORY MEASURES

In the event the diesel fuel oil does not meet the acceptance criteria, the Shift Manager or designee shall be immediately notified. The Shift Manager or designee shall determine OPERABILITY status and implement a LCOAR(s) as applicable. Typically, fuel stored in the 125K and 50K OUTDOOR BULK DIESEL FUEL OIL TANKS which does not meet acceptance criteria is declared "UNCERTIFIED" since there is not any LOCAR(s) associated with these tanks. Actions are taken to prevent "UNCERTIFIED" fuel from being used. A confirmatory sample should be analyzed in the event a sample is found to not meet the acceptance criteria. In addition, a Condition Report (CR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Analysis results are reported to Braidwood by Vendor.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, concurrence from Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change has been reviewed and determined not to be applicable to Braidwood.

ATTACHMENT A
Diesel Fuel Oil Testing Matrix

	Outdoor Bulk Diesel Fuel Oil Tanks: 0D003T (125K gal.) 0D012T (50K gal.)	EDG Tanks: 1D001TA/B/C/D (25K gal.) 2D001TA/B (50K gal.)	EDG Tanks: 1D002TA/B (500 gal.) 2D002TA/B (500 gal.)	_B AF Pump Diesel Day Tanks: 1D010T (500 gal.) 2D010T (500 gal.)	Diesel-Driven Fire Pump Diesel Fuel Oil Tank: 0D005T (650 gal.)	Security Diesel Generator Day Tank: 0D006T (500 gal.)
Frequency	Monthly	Monthly	Monthly	Monthly(5)	Monthly(5)	Monthly
Parameter:						
Flash Point	XX(2)					
Cloud Point	XX(3)					
Water & Sediment	XX(1)(2)	X	X	X	X	X
Ramsbottom Carbon Residue	XX(3)					
Ash	XX(3)					
Kinematic Viscosity	XX(2)	X	X	X	X	X
Copper Strip Corrosion	XX(3)					
Cetane Index	XX(3)					
Sulfur	XX(3)					
API Gravity	XX(2)	X	X	X	X	X
Distillation Temperature	XX(3)					
Bacteria	X					
Clear & Bright	XX(1)(2)	X	X	X	X	X
Color	XX(1)(2)	X	X	X	X	X
Heat Value	X					
Total Particulate Contamination	XX(4)	XX	X	X	X	X
Removal of accumulated water	XX	XX	XX			

XX = Technical Specification required testing performed
X = Testing performed

NOTES:

(1) Water & Sediment OR Clear & Bright with Color is required.
(2) Technical Specifications require verifying within limits within 30 days prior to adding new fuel oil to storage tanks.
(3) Technical Specifications require verifying within 30 days following sampling and addition to storage tanks.
(4) Required since the Outdoor Bulk Diesel Fuel Oil Tanks are considered the source of stored fuel for the _B AF Pump Diesel Day Tanks.
(5) Testing performed on a monthly basis, however, results are only required to be verified on a quarterly basis.

TECHNICAL SPECIFICATIONS BASES CONTROL PROGRAM

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to provide guidance for identifying, processing, and implementing changes to the Technical Specifications (TS) Bases. This Program implements and satisfies the requirements of TS 5.5.14, "Technical Specifications (TS) Bases Control Program."

This Program is applicable to the preparation, review, implementation, and distribution of changes to the TS Bases. This Program also provides guidance for preparing TS Bases Change Packages for distribution.

1.2 REFERENCES

1. TS 5.5.14, "Technical Specifications (TS) Bases Control Program"
2. 10 CFR 50.4, "Written Communications"
3. 10 CFR 50.59, "Changes, Tests and Experiments"
4. 10 CFR 50.71, "Maintenance of Records, Making of Reports"
5. 10 CFR 50.90, "Application for Amendment of License or Construction Permit"

1.3 DEFINITIONS AND/OR ACRONYMS

1. 10 CFR 50.59 REVIEW - A written regulatory evaluation which provides the basis for the determination that a change does, or does not, require NRC approval pursuant to 10 CFR 50.59. The scope of the evaluation should be commensurate with the potential safety significance of the change, but must address the relevant safety concerns included in the Safety Analysis Report and other owner controlled documents. The depth of the evaluation must be sufficient to determine whether or not NRC approval is required prior to implementation. Depending upon the significance of the change, the evaluation may be brief; however, a simple statement of conclusion is not sufficient.

2. EDITORIAL CHANGE - Editorial changes include correction of punctuation, insignificant word or title changes, style or format changes, typographical errors, or correction of reference errors that do not change the intent, outcome, results, functions, processes, responsibilities, or performance requirements of the item being changed. Changes in numerical values shall <u>not</u> be considered as editorial changes. Editorial changes do not constitute a change to the TRM and therefore do not require further 10 CFR 50.59 Reviews. If the full scope of this proposed change is encompassed by one or more of the below, then the change is considered editorial.

   - Rewording or format changes that do not result in changing actions to be accomplished.
   - Deletion of cycle-specific information that is no longer applicable.
   - Addition of clarifying information, such as:
     - Spelling, grammar, or punctuation changes
     - Changes to references
     - Name or title references

1.4 <u>PROGRAM DESCRIPTION</u>

1. A Licensee may make changes to the TS Bases without prior NRC approval provided the changes do not require either of the following:

   a. A change in the TS as currently incorporated in the license; or

   b. A change to the Updated Final Safety Analysis Report (UFSAR) or TS Bases that requires NRC approval pursuant to 10 CFR 50.59.

2. Changes that meet the above criteria (i.e., 1.4.1.a or 1.4.1.b) shall be submitted to the NRC pursuant to 10 CFR 50.90 and reviewed and approved by the NRC prior to implementation.

3. The TS Bases shall be maintained consistent with the UFSAR.

4. If a change to the TS Bases is not consistent with the UFSAR, then the cognizant Engineer shall prepare and submit a UFSAR Change Package when the TS Bases Change Request is submitted to Regulatory Assurance (RA) for processing.

5. Changes to the TS Bases that do not require prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e), as modified by approved exemptions.

6. TS Bases changes associated with a TS Amendment shall be implemented consistent with the implementation requirements of the TS Amendment.

7. Cantera Licensing (CL) is responsible for the control and distribution of the TS Bases. In order to prevent distribution errors (i.e., omissions or duplications), CL shall maintain the master TS Bases distribution list.

1.5 PROGRAM IMPLEMENTATION

1. TS Bases Change Requestor identifies the need for a revision to the TS Bases and notifies the RA Licensing Engineer (i.e., hereafter referred to as RA LE). A TS Bases change can be initiated through any Stations' RA. TS Bases Change Requestor notifies their counterparts on the need for a change.

2. RA LE notifies their counterparts of identified need for revision to the TS Bases.

3. RA LE obtains concurrence from CL on the need for a change.

4. RA LE drafts TS Bases changes considering format, rules of usage, and technical adequacy.

5. CL Engineer (i.e., hereafter referred to as CLE) reviews the agreed upon TS Bases wording changes for consistency with format, rules of usage, and technical adequacy and provides final concurrence.

6. After concurrence of the TS Bases wording changes is obtained, CLE makes an electronic version available in a working directory for use in the preparation of the 10 CFR 50.59 REVIEW and Station Qualified Review (SQR) process. The CLE shall ensure that the master electronic TS Bases files are revised per step 14 below upon receiving SQR approval. The Revision number in the footer should be a sequential number (i.e., 1, 2, etc.).

****

NOTE

If the TS Bases changes are applicable to more than one Station, the following steps should be performed concurrently for each Station.

****

7. TS Bases Change Requestor provides a 10 CFR 50.59 REVIEW for the TS Bases changes in accordance with appropriate plant procedures. An exception to this requirement applies when the changes are being requested in order to reflect an approved NRC Safety Evaluation (SE) associated with a site specific Operating License or TS change. The NRC SE is sufficient to support the changes provided it has been determined that the changes are consistent with and entirely bounded by the NRC SE. A 10 CFR 50.59 REVIEW shall be performed for TS Bases changes that reflect generic industry approval by an NRC SE to determine site specific applicability. A 10 CFR 50.59 REVIEW is not required for an EDITORIAL CHANGE.

8. TS Bases Change Requestor completes Attachment A, "Technical Specifications Bases Change Request Form," as follows:

a. Identifies the affected sections, and includes a copy of the proposed TS Bases changes;

b. Briefly summarizes the changes including the LCO, Action, or Surveillance Requirement to which the changes apply;

c. Briefly summarizes the reason for the changes and attaches all supporting documentation;

d. Identifies any schedule requirements and proposed implementation date that apply (i.e., describe any time limitations that might apply which would require expedited processing). If the changes are outage related, then checks "yes" and lists the applicable outage identifier;

e. Identifies any known implementation requirements such as procedure changes, UFSAR changes, Passport changes, Reportability Manual revisions, pre-implementation training requirements, etc.;

f. If a 10 CFR 50.59 REVIEW was prepared to support the TS Bases changes, the Requestor then checks the appropriate box, lists the associated 10 CFR 50.59 REVIEW Number, and attaches the original;

g. If the changes to the TS Bases are the result of an approved NRC SE associated with a site specific Operating License or TS change and the scope of the changes determined to be consistent with and entirely bounded by the NRC SE, then the Requestor checks the appropriate box and attaches a copy;

h. If the changes to the TS Bases are EDITORIAL CHANGES, the the Requestor checks the appropriate box and no 10 CFR 50.59 REVIEW is required;

i. Signs and dates as Requestor and identifies the originating department;

j. Obtains approval to proceed from Department Supervisor (or designee); and

k. Returns Attachment A to the RA LE.

9. RA LE reviews the TS Bases Change Request Form, including supporting documentation, and documents the review by signing Attachment A. The review verifies that the following information or documentation is included:

    a. Completed 10 CFR 50.59 REVIEW. If the changes are related to an approved NRC SE associated with a site specific Operating License or TS change and determined to be entirely bounded by the NRC SE, then only a copy of the SE is required to be attached and no 10 CFR 50.59 REVIEW is required. A 10 CFR 50.59 REVIEW is not required for an EDITORIAL CHANGE;

    b. Identification of known documents requiring revisions; and

    c. Completed UFSAR Change Request with supporting documentation, in accordance with appropriate plant procedures, if applicable.

10. If the TS Bases change is not an EDITORIAL CHANGE, the RA LE/TS Bases Change Requestor obtains SQR approval of the TS Bases changes by performing the following:

    a. RA LE prepares the TS Bases Change SQR package. The SQR package shall include Attachment A (including completed 10 CFR 50.59 REVIEW or NRC SE) and the revised TS Bases pages. Attachment A is provided for the purpose of reviewing and finalizing the implementation requirements and ensuring the necessary actions have been initiated. RA LE shall assign Action Tracking (AT) items, as necessary, to track implementation requirements;

    b. TS Bases Change Requestor submits the TS Bases Change SQR package to the SQR Committee members for a preliminary review. The SQR composition shall include RA and Operating Departments in all cases; and

    c. TS Bases Change Requestor resolves preliminary review comments and finalizes the TS Bases Change SQR package.

11. The RAM shall determine the need for Plant Operations Review Committee (PORC) approval. The need for PORC approval shall be documented on Attachment A.

12. RA LE/TS Bases Change Requestor obtains PORC approval, if necessary.

13. RA LE notifies CLE of approval of the TS Bases changes by forwarding a copy of the approved SQR/PORC Change package to CLE.

14. After approval of the TS Bases changes by SQR/PORC, CLE ensures that the controlled master electronic files are updated.

15. RS/RA completes Attachment B, "Technical Specifications Bases Change Instruction Form," as follows:

    a. CLE indicates the effective date of the TS Bases changes consistent with the SQR/PORC approval or TS amendment required implementation date. If the TS Bases change is a result of a TS Amendment, the update shall be implemented coincident with implementation requirements of the TS Amendment. Otherwise, the update must be implemented by the date indicated on Attachment B;

    b. CLE lists each page to be removed and inserted, including the Affected Page List; and

    c. RA LE provides the updated master file directory for updating Electronic Document Management System (EDMS), if applicable.

16. CLE creates a TS Bases Change Package. The TS Bases Change Package shall consist of:

    a. TS Bases Change Instruction Form (Attachment B);

    b. Revised Affected Page List; and

    c. Revised TS Bases pages.

    One CLE shall assemble and approve the TS Bases Change Package for distribution and a second CLE shall perform a peer check to verify completeness of the TS Bases Change Package.

17. After the RA LE notifies the CLE that SQR/PORC approval of the TS Bases changes has been obtained and that all AT items assigned to track implementation requirements have been completed, CLE forwards the TS Bases Change Package to the RA LE as notification of the need to update the onsite TS Bases controlled copies and EDMS, if applicable. CLE also forwards the TS Bases Change Package to CL Records Management as notification of the need to update the offsite (CL) TS Bases controlled copies and to transmit updates to the offsite (non-CL) TS Bases controlled copies.

18. RA LE forwards the TS Bases Change Package to Station Records Management as notification of the need to update the onsite TS Bases controlled copies and EDMS, if applicable.

19. Upon completion of updating the onsite TS Bases controlled copies and EDMS (if applicable), Station Records Management Supervisor signs and dates Attachment B and returns Attachment B to the appropriate CLE.

20. Upon completion of updating the offsite (CL) TS Bases controlled copies and transmitting updates to the offsite (non-CL) TS Bases controlled copies, CL Records Management signs and dates Attachment B and returns Attachment B to the appropriate CLE.

21. RA LE ensures that the documentation required to be maintained as a quality record is provided to Station Records Management for the purpose of record retention.

1.6 ACCEPTANCE CRITERIA

Not applicable.

1.7 LCOARS/COMPENSATORY MEASURES

An Issue Report may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

The RAM will be responsible for ensuring that Program failures have been resolved.

1.8 REPORTING REQUIREMENTS

NOTE

TS Bases changes requiring prior NRC approval shall be submitted in accordance with Reference 5.

TS Bases changes not requiring prior NRC approval, as described in Section 1.4 of this Program, shall be submitted to the NRC in accordance with 10 CFR 50.71(e).

1.9 CHANGE CONTROL

Changes to this Program, other than EDITORIAL CHANGES, shall include a 10 CFR 50.59 REVIEW and a SQR. The SQR composition shall include RA Department in all cases. For a change to this Program, PORC approval from all Stations is required. The concurrence shall be that the other Stations are implementing the same changes or that the changes have been reviewed and determined not to be applicable to the other Stations.

ATTACHMENT A
TECHNICAL SPECIFICATIONS BASES CHANGE REQUEST FORM

1. Change Request #: ____________ Affected Bases Section(s): ____________________

2. Description of changes: ____

3. Reason for changes (attach all supporting documentation): ____________________

4. Schedule Requirements:
Outage Related (check one) ☐ No ☐ Yes, Outage # __________
Other (explain) ____

5. Implementation Requirements (attach additional pages, as necessary):
Identify the impact of the changes on the following:

Affected	N/A	
☐	☐	UFSAR ____________
☐	☐	TS ____________
☐	☐	Technical Requirements Manual ____________
☐	☐	NRC Safety Evaluation ____________
☐	☐	Fire Protection Report ____________
☐	☐	NRC Commitments ____________
☐	☐	Vendor Documentation ____________
☐	☐	Special Permits/Licenses ____________
☐	☐	Procedures ____________
☐	☐	Environmental Qualification ____________
☐	☐	Design Basis Documentation ____________
☐	☐	Engineering Calculations ____________
☐	☐	Drawings/Prints ____________
☐	☐	PRA Information ____________
☐	☐	Programs ____________
☐	☐	Reportability Manual ____________
☐	☐	QA Topical Report ____________
☐	☐	Passport ____________
☐	☐	Pre-Implementation Training Required ____________
☐	☐	Maintenance Rule ____________
☐	☐	Offsite Dose Calculation Manual ____________
☐	☐	Other ____________

6. Check one:
☐ 10 CFR 50.59 REVIEW Attached, 10 CFR 50.59 REVIEW #: ____________
☐ NRC SE Attached, Changes consistent with and entirely bounded by NRC SE
☐ EDITORIAL CHANGE, No 10 CFR 50.59 REVIEW required

7. Requestor: ____________ / ____________ / ____________
(Signature) (Date) (Department)

8. Requesting Supervisor Approval: ____________ / ____________
(Signature) (Date)

9. PORC Approval Required: ☐ Yes ☐ No

10. Licensing Engineer Review: ____________ / ____________
(Signature) (Date)

ATTACHMENT B
TECHNICAL SPECIFICATIONS BASES CHANGE INSTRUCTION FORM
FOR ONSITE/OFFSITE DISTRIBUTION AND FOR UPDATING EDMS

Braidwood/Byron/Dresden/LaSalle/QC (circle one) TS Bases Revision # ______

NOTE: This change is effective as of ____________________________ and shall be implemented by __________ (Date). (SQR/PORC or Amendment Implementation Date)

Approved for distribution: ________________________________ (CLE Signature) / ____________ (Date)

Verified: ________________________________ (CLE Signature) / ____________ (Date)

REMOVE Section	REMOVE Page	INSERT Section	INSERT Page	UPDATE EDMS Section	UPDATE EDMS Page
Affected Page List	All	Affected Page List	All	N/A	N/A

ATTACHMENT B
TECHNICAL SPECIFICATIONS BASES CHANGE INSTRUCTION FORM
FOR ONSITE/OFFSITE DISTRIBUTION AND FOR UPDATING EDMS

Braidwood/Byron/Dresden/LaSalle/QC (circle one) TS Bases Revision # ______

Station Records Management:

Onsite Distribution Completed: ____________________/____________
(Station Records Mgmt. Supr.) (Date)

EDMS Update Completed: ____________________/____________
(Station Records Mgmt. Supr.) (Date)

** Return this sheet to: Cantera Licensing
Braidwood/Byron/Dresden/LaSalle/QC (circle one) CLE
CANTERA

CL Records Management:

Offsite (CL) Distribution Completed: ____________________/____________
(CL Records Mgmt.) (Date)

Offsite (non-CL) Distribution Transmitted: ____________________/____________
(CL Records Mgmt.) (Date)

** Return this sheet to Braidwood/Byron/Dresden/LaSalle/QC (circle one) CL

Offsite (non-CL) Controlled Copy Holders:

Offsite (non-CL) Distribution Completed: ____________________/____________
(Signature) (Date)

** Return this sheet to: EXELON GENERATION COMPANY, LLC
LICENSING AND REGULATORY AFFAIRS DEPARTMENT
4300 WINFIELD ROAD
WARRENVILLE, IL 60555

SAFETY FUNCTION DETERMINATION PROGRAM (SFDP)
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of the SFDP is to ensure that the proper Actions are taken upon failure to concurrently meet two or more Technical Specifications (TS) Limiting Conditions for Operation (LCOs) such that multiple inoperabilities of Systems, Structures, or Components (SSCs) do not result in an undetected LOSS OF SAFETY FUNCTION (LOSF).

1.2 REFERENCES

1. Technical Specification LCO 3.0.6
2. TS Specification 5.5.15, "Safety Function Determination Program (SFDP)"
3. Maintenance Rule Scoping Manual

1.3 DEFINITIONS AND/OR ACRONYMS

1. ACTIONS - In the LCO Actions section, it describes the Required Actions to be taken under designated Conditions within specified COMPLETION TIMES.
2. LOSS OF SAFETY FUNCTION (LOSF) - A LOSF exists when, assuming no concurrent single failure and assuming no concurrent loss of offsite power or loss of emergency diesel generator(s), a safety function assumed in the accident analysis cannot be performed.
3. COMPLETION TIME - In the LCO Actions section, it states the amount of time allowed to complete a Required Action.
4. COMPLETION TIME EXTENSION - The additional amount of time a SUPPORTED SYSTEM may be inoperable due to its associated SUPPORT SYSTEM being inoperable. NOTE - the inoperability of the SUPPORTED SYSTEM must only be directly attributed to its associated SUPPORT SYSTEM being inoperable and the SUPPORT SYSTEM Required Actions not specifically requiring entry into the SUPPORTED SYSTEMS Required Actions and associated COMPLETION TIMES.
5. CONDITION - In the LCO Actions section, it describes the ways in which the requirements of an LCO can fail to be met.

1.3. 6. OPERABLE/OPERABILITY - A system, subsystem, train, component, or device shall be OPERABLE when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

7. SAFETY FUNCTION - An accident mitigation feature required by NRC regulation, plant design or Technical Specifications normally composed of two trains of SUPPORTED and SUPPORT equipment.

8. SUPPORTED SYSTEM - A SSC, required by the TS, which requires a SUPPORT SYSTEM to ensure its safety function can be performed. Process parameters or operating limits do not comprise SUPPORTED SYSTEMS for the purposes of implementing LCO 3.0.6.

1.3. 9. SUPPORT SYSTEM - A SSC which is needed by another TS LCO required SSC to perform a safety function.

An example would be the Component Cooling Water (CC) System (SUPPORT SYSTEM) which is required by the Residual Heat Removal System (SUPPORTED SYSTEM) to fulfill the RH safety function. A SUPPORT SYSTEM may also be a SUPPORTED SYSTEM. An example is the Component Cooling Water (CC) System which needs the Essential Service Water (SX) System to fulfill its safety function.

NOTE

A SSC which monitors or maintains a process parameter or operating limit is not a SUPPORT SYSTEM for the purposes of implementing LCO 3.0.6. An example is Rod Position Indication which is used to monitor control rod insertion limits. Inoperability of the Rod Position Indication System does not automatically suggest that the control rods are no longer within insertion limits. Control rod insertion limits are monitored separately and Actions are taken as appropriate when insertion limits are not met or if Surveillance Requirements can not be performed when required.
Likewise, parameter limits that could affect other parameter limits if exceeded are also not considered SUPPORT SYSTEM for the purposes of implementing LCO 3.0.6. An example is that exceeding control rod insertion limits could affect hot channel factors.

1.4 PROGRAM DESCRIPTION

1. TS LCO 3.0.2 states that upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5 and LCO 3.0.6. LCO 3.0.6 provides an exception to LCO 3.0.2 for SUPPORTED SYSTEMS by not requiring the Required Actions for the SUPPORTED SYSTEMS to be performed when the failure to meet an LCO is solely due to a SUPPORT SYSTEM LCO not being met. In this situation, although the SUPPORTED SYSTEM is declared inoperable, LCO 3.0.6 requires only the Conditions and Required Actions of the SUPPORT SYSTEM to be performed. The Conditions and Required Actions for the SUPPORTED SYSTEM are not required to be performed (i.e., cascading to the SUPPORTED SYSTEM) per LCO 3.0.6.

   There are two types of SUPPORT SYSTEMS which must be considered when implementing LCO 3.0.6: (1) those addressed in Technical Specifications, and (2) those which are not. If the required SUPPORT SYSTEM is not addressed in the Technical Specifications, the impact of the SUPPORT SYSTEM inoperability must be evaluated with respect to any SUPPORTED SYSTEM which is addressed in Technical Specifications. An example of this is the loss of a ventilation system for which there is no LCO. If the equipment supported by the ventilation system were subsequently exposed to freezing conditions, then all affected systems which have an LCO must be evaluated to ensure that they remain OPERABLE and that there is no LOSF.

   If the SUPPORT SYSTEM is addressed in the Technical Specifications, only the SUPPORT SYSTEM LCO must be entered per LCO 3.0.6 (i.e., "cascading" to the SUPPORTED SYSTEM is not required). However, the SUPPORT SYSTEM inoperability must still be evaluated with respect to the existing plant conditions to ensure that a LOSF does not exist. An example of this is the loss of component cooling water to one residual heat removal (RHR) heat exchanger. If the electrical bus supplying the second RHR pump were also removed from service, a LOSF may exist following a loss-of-coolant-accident and this plant configuration must be evaluated. It should be noted that for cases in which the inoperable SUPPORT SYSTEM is addressed in Technical Specifications, "cascading" can still be performed. LCO 3.0.6 only provides an option for not cascading at the discretion of operations.

1.4. 2. If the exception of 3.0.6 is utilized, additional evaluations and limitations may be required in accordance with Specification 5.5.15, "Safety Function Determination Program (SFDP)" (Reference Figure 1).

If a LOSF is determined to exist by this Program, the appropriate Conditions and Required Actions of the LCO in which the LOSF exists are required to be entered. When a SUPPORT SYSTEM'S Required Action directs a SUPPORTED SYSTEM to be declared inoperable or directs entry into Conditions and Required Actions for a SUPPORTED SYSTEM, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

3. Since "cascading" is not required when applying 3.0.6, a possibility exists that unrelated concurrent failures of more than one system could result in the complete loss of both trains of a SUPPORTED SYSTEM. Therefore, upon a failure to meet two or more LCOs during the same time period, an evaluation shall be conducted to determine if a LOSF exists. Generally, this is done by confirming that the remaining required redundant SSCs are OPERABLE. If a LOSF does exist, the SFDP directs that the appropriate actions be taken.

NOTE

If the failure of an TS required SUPPORT SYSTEM results in the inoperability of a system outside of the TS, and that system is subsequently relied upon by a SUPPORTED SYSTEM to remain OPERABLE, then LCO 3.0.6 could apply and only the SUPPORT SYSTEM'S Required Actions would be entered.

1.4. 4. A single component inoperability may result in multiple inoperabilities within a single train and affect multiple TS LCOs. LCO 3.0.6 limits the amount of "cascading" Actions that are required when an inoperable SSC renders a SUPPORT SYSTEM inoperable.

A LOSF evaluation must only be performed when equipment is inoperable in more than one train. For multiple inoperabilities within a single train, whether separate inoperabilities or inoperabilities of SUPPORTED SYSTEM(S) due to the inoperability of a SUPPORT SYSTEM, compliance with the Required Actions within the LCOs as directed by LCO 3.0.2 and LCO 3.0.6 is sufficient to ensure safe operation.

If the inoperable system is a SUPPORT SYSTEM and its Required Actions have not been pre-evaluated in combination with other inoperabilities as noted in Table 1, then perform a LOSF evaluation in accordance with Section 1.5. LCO's which are not SUPPORT SYSTEMS may also result in a LOSF when taken in combination with additional inoperabilities. Therefore, a LOSF evaluation is required and the Required Actions of the applicable LCOs shall be met in accordance with LCO 3.0.2.

1.4. 4. (CONTINUED)

If more than one LCO's Required Actions have been entered, then determine if all the LCOs have been entered for the same train.

a. If the LCOs have been entered for the same train, then no LOSF exists provided the redundant equipment on the opposite train is not inoperable for other reasons. No further evaluation is required.

b. If the LCOs have been entered for different trains, then a LOSF evaluation shall be performed to determine if the initial inoperability(ies), in conjunction with subsequent inoperability(ies) in the required redundant train, results in the loss of a safety function. This evaluation shall address the following examples:

1) A required system redundant to the system(s) supported by the inoperable SUPPORT SYSTEM is also inoperable (see Figure 2, Example 1); or

2) A required system redundant to the system(s)in turn supported by the inoperable SUPPORTED SYSTEM is also inoperable (see Figure 2, Example 2); or

3) A required system redundant to the SUPPORT SYSTEM(s) for the SUPPORTED SYSTEMs (a) and (b) above is also inoperable (see Figure 2, Example 3).

For a TS related SUPPORT SYSTEM, Table 1 may be used as a guide for evaluating SUPPORT/SUPPORTED SYSTEM(s) relationships between TS systems.

Inoperable SSC(s) should be evaluated if the inoperability impacts the ability of the SSC(s) to perform its required safety function.

1.5 <u>PROGRAM IMPLEMENTATION</u> - LOSS OF SAFETY FUNCTION (LOSF) EVALUATION

> **NOTE**
>
> 1. If an LCO is not met for a SUPPORT SYSTEM, and the SUPPORT SYSTEM Actions direct the Actions for the SUPPORTED SYSTEMS be entered, enter the appropriate Actions for the SUPPORTED SYSTEMS.
>
> 2. If a SUPPORTED SYSTEM LCO is not met solely due to a SUPPORT SYSTEM inoperability, and the SUPPORT SYSTEM Actions do not direct that Actions for the SUPPORTED SYSTEMS be entered, then do not enter the Actions for the SUPPORTED SYSTEMS per LCO 3.0.6.

1. Identify if the degraded SSC renders a TS required SSC inoperable. If NO, then no further evaluation is necessary.

2. If YES, then enter the LCOAR for the inoperable SSC.

3. Determine if the inoperable SSC is also a SUPPORT SYSTEM SSC.

4. If YES, then identify all TS required SUPPORTED SYSTEM SSC's that are rendered inoperable as a result of this LCOAR entry.

5. If the SUPPORT SYSTEM SSC Required Actions direct performance of any SUPPORTED SYSTEM SSC Required Action(s), then enter the LCOAR for the SUPPORTED SYSTEM SSC as directed and perform the Required Actions.

6. For ALL inoperable SUPPORT and SUPPORTED SYSTEM SSC's, perform an evaluation to ensure a LOSF does not exist for current plant conditions. Perform cross-train checks to ensure redundant trains are fully operational.

1.5. 7. If <u>any</u> redundant train SSC is NOT fully Operational, then one of the following conditions will apply:

a. The SSC is part of a single LCO with multiple subsystems and the LCO specified function is intact. NO LOSF exists for this specific SSC.

b. The SSC will still perform it's required Safety Function as defined in the Safety Analysis Report (SAR). NO LOSF exists for this specific SSC.

c. A LOSF exists. Enter the LCOAR and perform the Required Actions of the SSC in which the LOSF exists for the specific Condition(s) that apply.

8. If No LOSF exists, for all SUPPORTED SYSTEM SSC's which are rendered inoperable, perform one of the following actions:

a. Enter the LCOAR(s) for each inoperable SSC and perform the Conditions and Required Actions as directed (Cascading), OR

b. Declare the SUPPORTED SYSTEM SSC(s) inoperable and apply LCO 3.0.6 to preclude entry into the Conditions and Required Actions associated with the inoperable SUPPORTED SYSTEM SSC(s). Track the inoperable SSC(s) on the Delayed LCOAR Entry Table of the inoperable SUPPORT SYSTEM SSC LCOAR.

NOTE: Examples of LOSF evaluations may be found in Figures 1 and 2, and Attachment 2.

1.6 ACCEPTANCE CRITERIA

Not Applicable.

1.7 LCOARS/COMPENSATORY MEASURES

The Shift Manager is responsible for initiating any LCOARs or Compensatory Measures resulting from the LOSF evaluation. In addition, an Issue Report (IR) may be generated to provide proper tracking and resolution of noted problems associated with the implementation of this program.

1.8 REPORTING REQUIREMENTS

This will be evaluated on a case-by-case situation.

1.9 CHANGE CONTROL

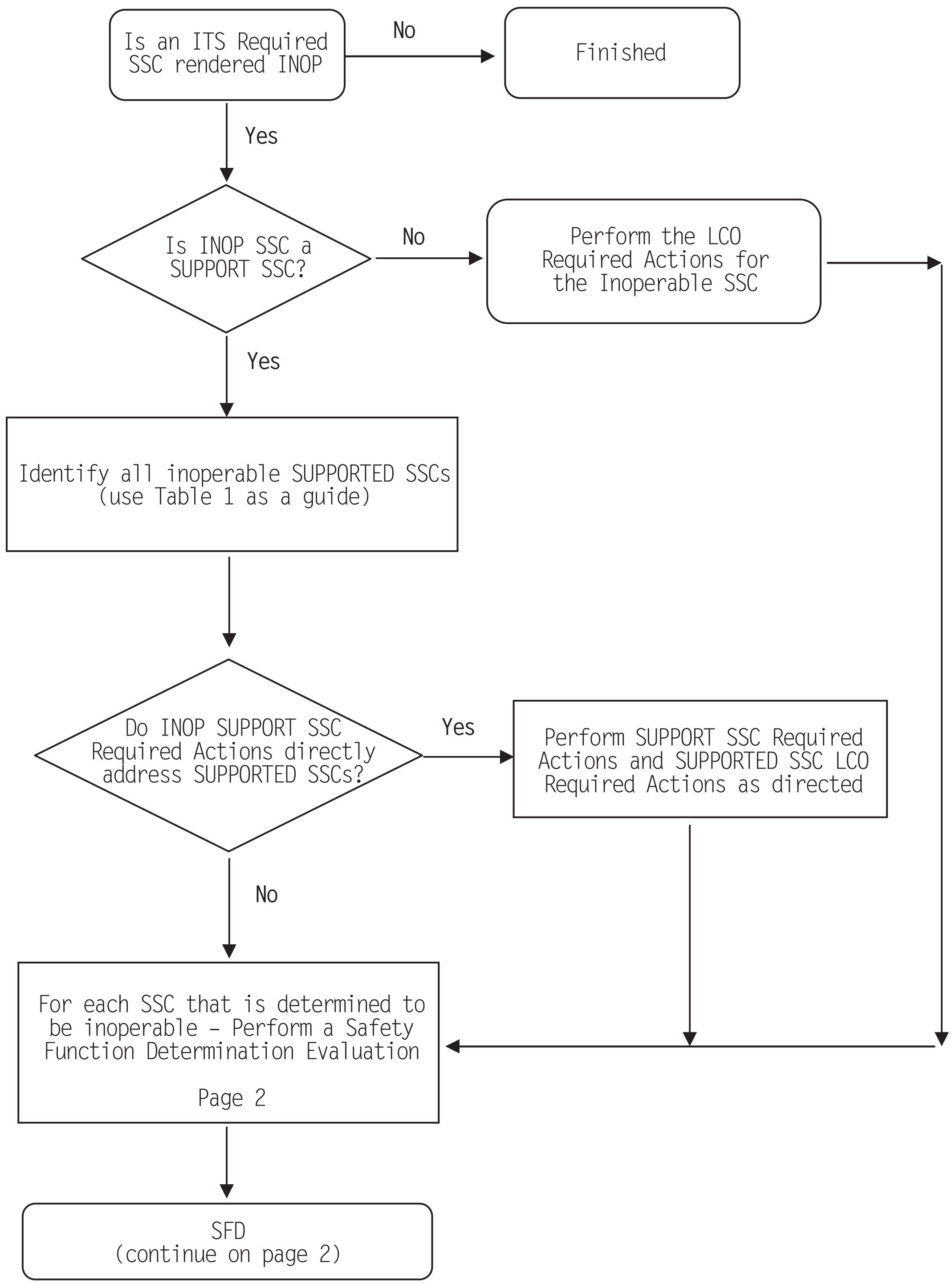
Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

FIGURES 1 and 2

SFDP FLOWCHART

SUPPORT/SUPPORTED SYSTEM DIAGRAM

SAFETY FUNCTION DETERMINATION PROGRAM (SFDP)



SAFETY FUNCTION DETERMINATION PROGRAM (SFDP)

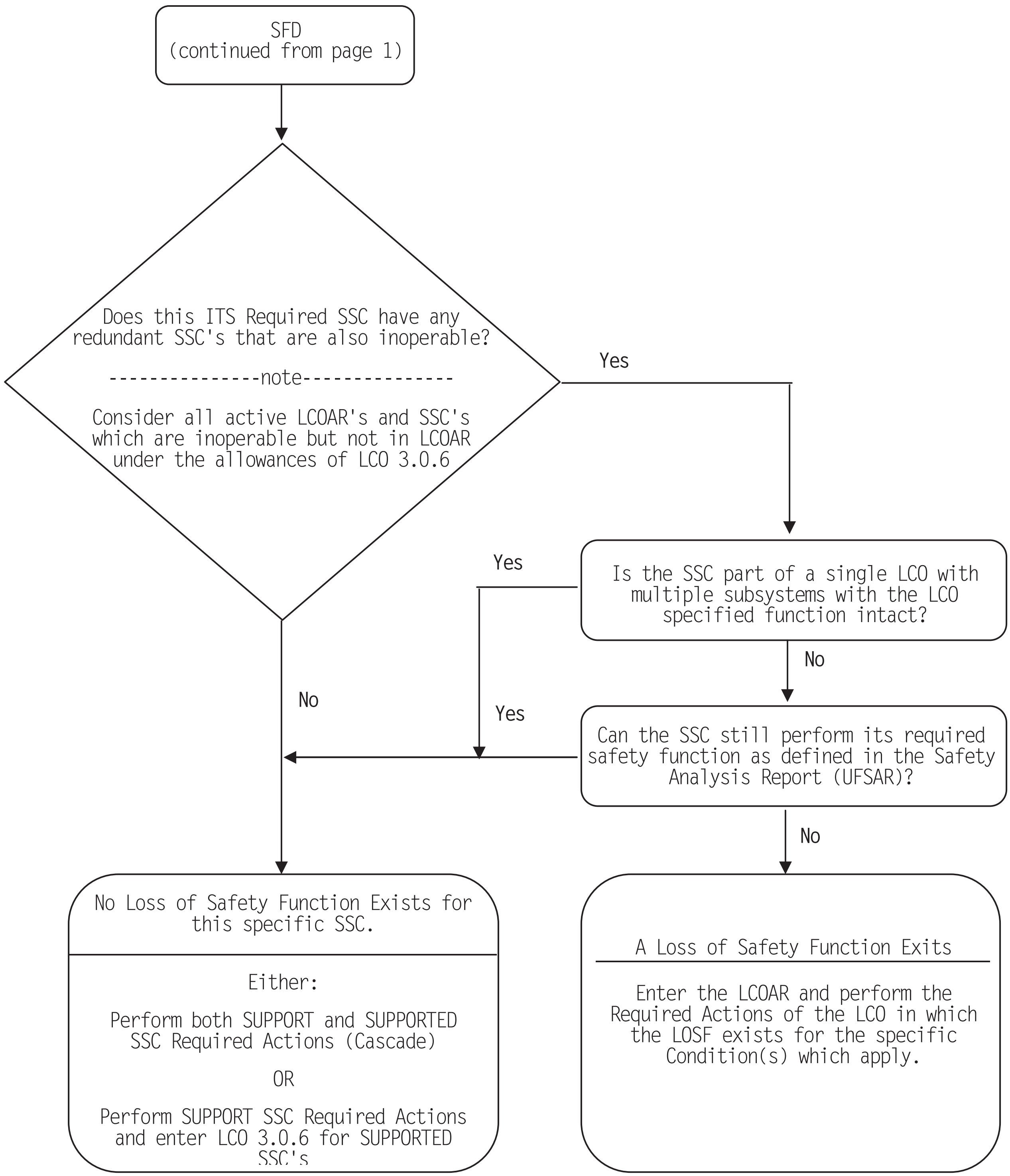


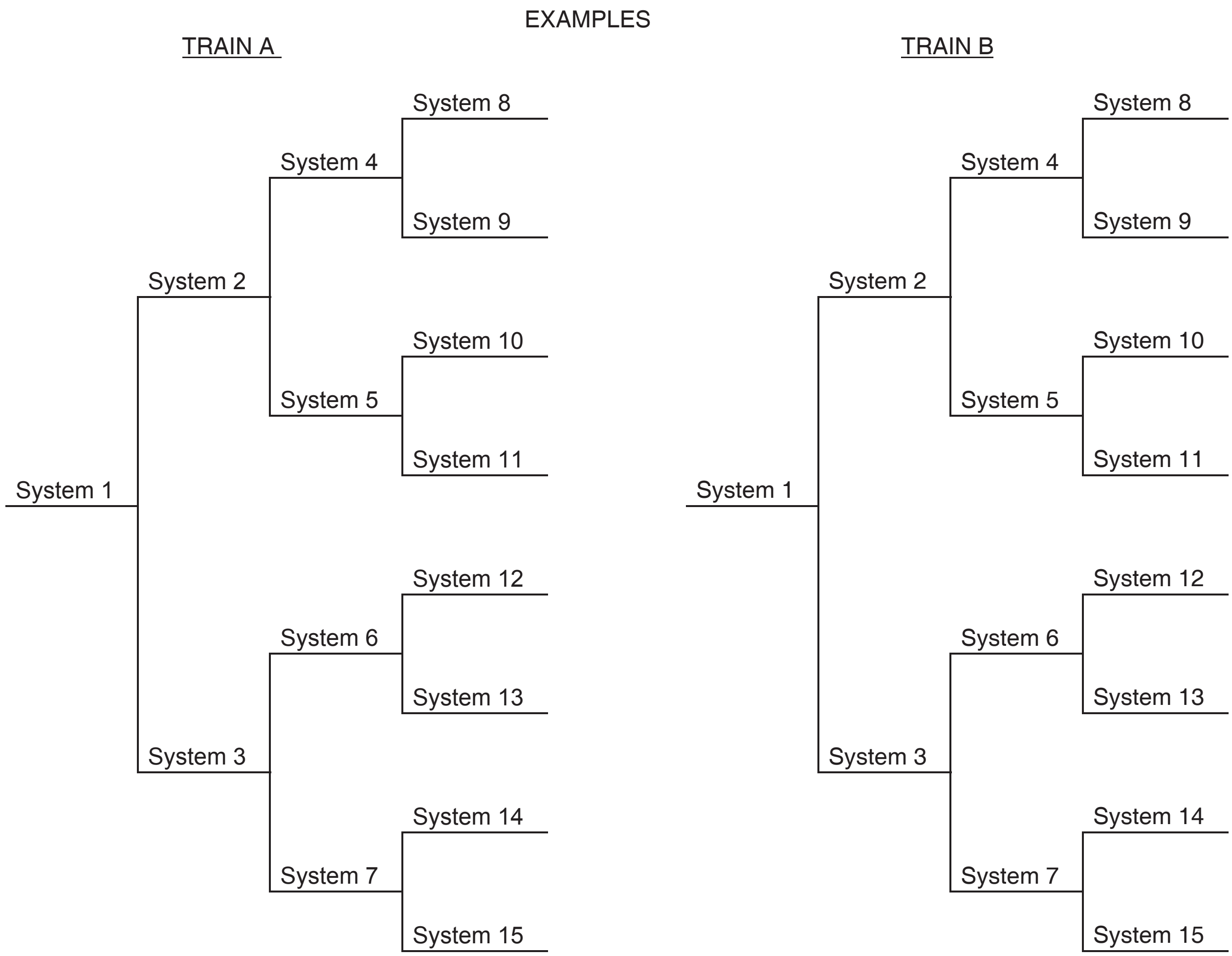
FIGURE 2
SUPPORT/SUPPORTED SYSTEM DIAGRAM

EXAMPLE 1

A LOSF may exist when a SUPPORT SYSTEM is inoperable, and:

A required system redundant to the system(s) supported by the inoperable SUPPORT SYSTEM is also inoperable.

If System 2 of Train A is inoperable, and System 5 of Train B is inoperable, a LOSF exists in SUPPORTED SYSTEM 5, 10, 11.



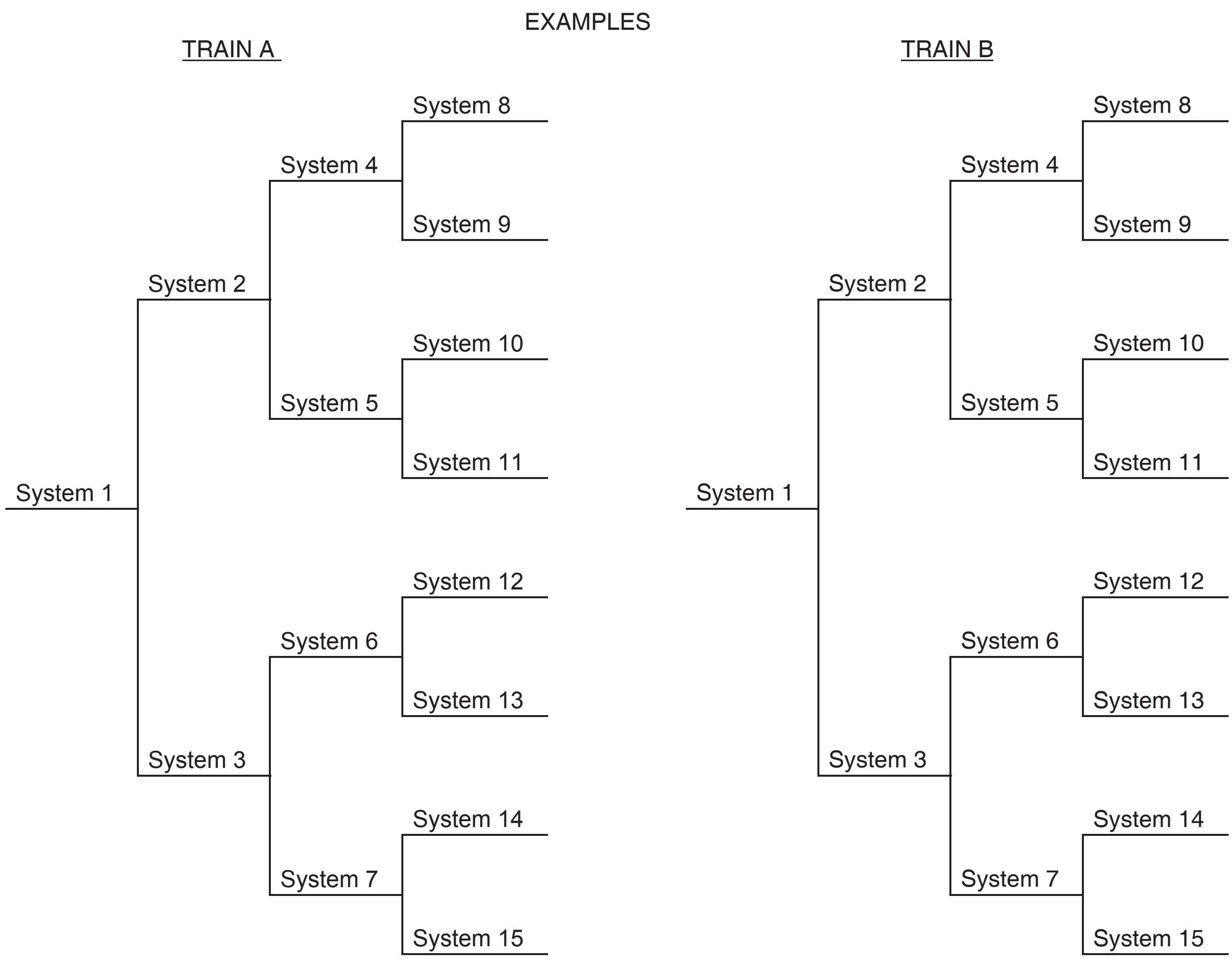
Note: Chart reads from left to right, i.e., System 1 is a SUPPORT SYSTEM for Systems 2 through 15.

FIGURE 2
SUPPORT/SUPPORTED SYSTEM DIAGRAM
EXAMPLE 2

A LOSF may exist when a SUPPORT SYSTEM is inoperable, and:

A required system redundant to the system(s) in turn supported by the inoperable SUPPORTED SYSTEM is also inoperable.

If System 2 of Train A is inoperable, and System 11 of Train B is inoperable, a LOSF exists in System 11 which is in turn supported by System 5.



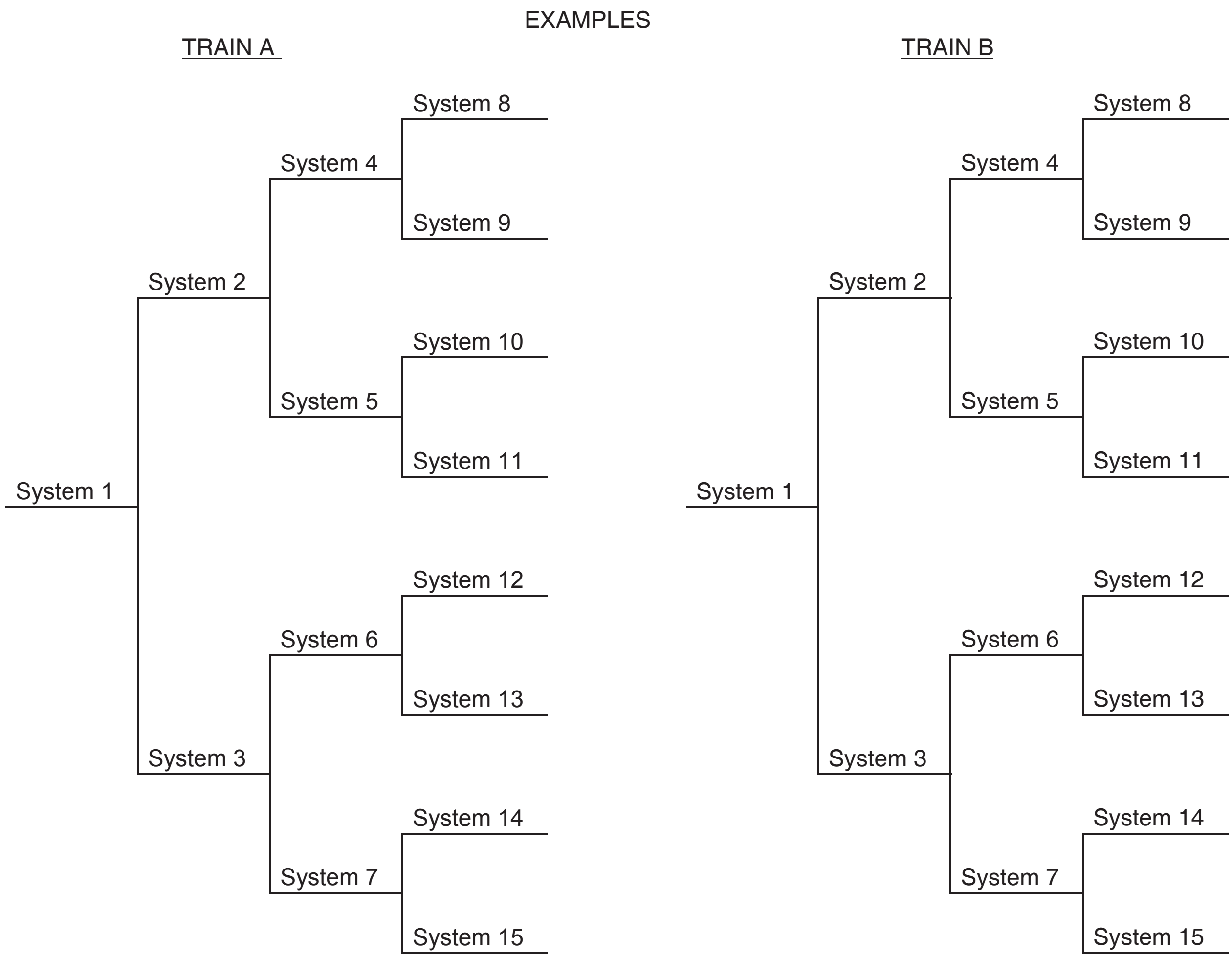
Note: Chart reads from left to right, i.e., System 1 is a SUPPORT SYSTEM for Systems 2 through 15.

FIGURE 2
SUPPORT/SUPPORTED SYSTEM DIAGRAM
EXAMPLE 3

A LOSF may exist when a SUPPORT SYSTEM is inoperable, and:

A required system redundant to the SUPPORT SYSTEM(S) for the SUPPORTED SYSTEMS (a) and (b) above is also inoperable.

If System 2 of Train A is inoperable, and System 1 of Train B is inoperable, a LOSF Exists in Systems 2, 4, 5, 8, 9, 10 and 11.



Note: Chart reads from left to right, i.e., System 1 is a SUPPORT SYSTEM for Systems 2 through 15.

TABLE 1 - SUPPORT SYSTEM TO SUPPORTED SYSTEM TS REFERENCE

TABLE 1 (page 1 of 7)
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.3.2	Engineered Safety Feature Actuation System (ESFAS) Instrumentation	3.3.1	Reactor Trip System (RTS) Instrumentation
		3.3.6	Containment Ventilation isolation Instrumentation
		3.3.7	Control Room Ventilation (VC) Filtration System Actuation Instrumentation
		3.3.8	Fuel Handling Building Exhaust Filter Plenum (FHB)System Actuation Instrumentation
		3.5.2	ECCS - Operating
		3.5.3	ECCS - Shutdown
		3.6.3	Containment Isolation Valves
		3.6.6	Containment Spray and Cooling Systems
		3.6.7	Spray Additive System
		3.7.2	Main Steam Isolation Valves (MSIVs)
		3.7.5	Auxiliary Feedwater (AF) System
		3.7.7	Component Cooling Water (CC)
		3.7.8	Essential Service Water (SX) System
		3.7.10	Control Room Ventilation (VC) Filtration System
		3.7.11	Control Room Ventilation (VC) Temp Control System
		3.7.12	Nonaccessible Area Exhaust Filter Plenum Ventilation System
		3.7.13	Fuel Handling Exhaust Filter Plenum (FHB) Ventilation System
		3.8.1	AC Sources - Operating
3.3.5	Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation	3.8.1	AC Sources - Operating
		3.8.2	AC Sources - Shutdown

TABLE 1 (page 2 of 7)
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.3.6	Containment Ventilation Isolation Instrumentation	3.6.3	Containment Isolation Valves
3.3.7	Control Room Ventilation (VC) Filtration System Actuation Instrumentation	3.7.10	Control Room Ventilation (VC) Filtration System
3.3.8	Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System Actuation Instrumentation	3.7.13	FHB Ventilation System
3.4.14	RCS Pressure Isolation Valve (PIV) Leakage	3.4.6 3.4.13 3.5.2 3.5.3	RCS Loops - Mode 4 RCS Operational Leakage ECCS - Operating ECCS - Shutdown
3.4.17	RCS Loop Isolation Valves	3.3.9 3.4.4 3.4.5 3.4.6 3.4.12	BDPS RCS Loops - MODES 1 and 2 RCS Loops - MODE 3 RCS Loops - MODE 4 LTOP System
3.5.4	Refueling Water Storage Tank (RWST)	3.3.9 3.5.2 3.5.3 3.6.6	BDPS ECCS - Operating ECCS - Shutdown Containment Spray and Cooling Systems
3.5.5	Seal Injection Flow	3.5.2	ECCS - Operating
3.6.2	Containment Airlocks	3.6.1	Containment

TABLE 1 (page 3 of 7)
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.6.3	Containment Isolation Valves	3.5.2 3.5.3 3.6.1 3.6.6 3.7.7 3.7.8	ECCS - Operating ECCS - Shutdown Containment Containment Spray and Cooling Systems Component Cooling System Essential Service Water (SX)
3.6.6	Containment Spray	3.6.7	Spray Additive System
3.7.6	Condensate Storage Tank	3.7.5	Auxiliary Feedwater (AF) System
3.7.7	Component Cooling Water (CC) System	3.4.4 3.4.5 3.4.6 3.4.7 3.4.8 3.5.2 3.5.3 3.9.5 3.9.6	RCS Loops - Modes 1 and 2 RCS Loops - Mode 3 RCS Loops - Mode 4 RCS Loops - Mode 5, Loops Filled RCS Loops - Mode 5, Loops not Filled ECCS - Operating ECCS - Shutdown Residual Heat Removal (RHR) Coolant Circulation-High Water Level Residual Heat Removal (RHR) Coolant Circulation-Low Water Level

TABLE 1 (page 4 of 7)
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.7.8	Essential Service Water (SX) System	3.4.6 3.5.2 3.5.3 3.6.6 3.7.5 3.7.7 3.7.11 3.8.1 3.8.2	RCS Loops - Mode 4 ECCS - Operating ECCS - Shutdown Containment Spray and Cooling System Auxiliary Feedwater System Component Cooling Water (CC) System Control Room Ventilation (VC) Temperature Control System AC Sources - Operating (DG only) AC Sources - Shutdown (DG only)
3.7.9	Ultimate Heat Sink	3.7.5 3.7.8	"B" AFW System Essential Service Water (SX)

TABLE 1 (page 5 of 7)
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.8.1	AC Sources - Operating	3.8.9	Distribution Systems – Operating (AC portion only)
3.8.3	Diesel Fuel Oil	3.8.1 3.8.2	AC Sources - Operating AC Sources - Shutdown
3.8.4	DC Sources - Operating	3.8.1 3.8.7 3.8.9 3.4.12	AC Sources - Operating Inverters - Operating Distribution Systems - Operating LTOP System
3.8.5	DC Sources - Shutdown	3.4.12 3.8.2 3.8.8 3.8.10	LTOP System AC Sources - Shutdown Inverters - Shutdown Distribution Systems - Shutdown
3.8.6	Battery Parameters	3.8.4 3.8.5	DC Sources - Operating DC Sources - Shutdown
3.8.7	Inverters - Operating	3.8.9	Distribution Systems - Operating
3.8.8	Inverters - Shutdown	3.4.12 3.8.10	LTOP Distribution Systems - Shutdown

TABLE 1 (page 6 of 7)
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.8.9	Distribution Systems - Operating	3.3.1	Reactor Trip System (RTS) Instrumentation
		3.3.2	Engineered Safety Feature Actuation System (ESFAS) Instrumentation
		3.3.3	Post Accident Monitoring (PAM) Instrumentation
		3.3.4	Remote Shutdown System
		3.3.5	Loss of Power (LOP) Diesel Generator (DG) Start Inst.
		3.3.6	Containment Ventilation Isolation Instrumentation
		3.3.7	Control Room Ventilation (VC) Filtration System Actuation Instrumentation
		3.3.8	Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System Actuation Instrumentation
		3.4.5	RCS Loops - Mode 3
		3.4.6	RCS Loops - Mode 4
		3.4.9	Pressurizer
		3.4.11	Pressurizer Power Operated Relief Valves (PORVs)
		3.4.12	LTOP System
		3.4.15	RCS Leakage Detection Instrumentation
		3.5.2	ECCS - Operating
		3.5.3	ECCS - Shutdown
		3.6.3	Containment Isolation Valves
		3.6.6	Containment Spray and Cooling Systems
		3.6.7	Spray Additive Tank
		3.7.2	Main Steam Isolation Valves (MSIVs)
		3.7.4	Steam Generator Power Operated Relief Valves
		3.7.5	Auxiliary Feedwater (AF) System
		3.7.7	Component Cooling Water (CC) System
		3.7.8	Essential Service Water (SX) System
		3.7.9	Ultimate Heat Sink
		3.7.10	Control Room Ventilation (VC) Filtration System
		3.7.11	Control Room Ventilation (VC) Temperature Control System
		3.7.12	Nonessential Area Exhaust Filter Plenum Ventilation System
		3.7.13	Fuel Handling Building (FHB) Ventilation System
		3.8.1	AC Sources - Operating
		3.8.4	DC Sources - Operating
		3.8.7	Inverters - Operating

TABLE 1 (page 7 of 7)
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.8.10	Distribution Systems - Shutdown	3.3.1	Reactor Trip System (RTS)
		3.3.6	Containment Ventilation Isolation Instrumentation
		3.3.7	Control Room Ventilation (VC) Filtration System Actuation Instrumentation
		3.4.7	RCS Loops - Mode 5, Loops Filled
		3.4.8	RCS Loops - Mode 5, Loops Not Filled
		3.4.12	LTOP System
		3.7.10	Control Room Ventilation (VC) Filtration System
		3.7.11	Control Room Ventilation (VC) Temperature Control System
		3.7.12	Nonaccessible Area Exhaust Filter Plenum Ventilation System
		3.7.13	Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System
		3.8.1	AC Sources - Operating
		3.8.2	AC Sources - Shutdown
		3.8.4	DC Sources - Operating
		3.8.5	DC Sources - Shutdown
		3.8.7	Inverters - Operating
		3.9.3	Nuclear Instrumentation
		3.9.4	Containment Penetrations
		3.9.5	Residual Heat Removal (RHR) and Coolant Circulation - High Water Level
		3.9.6	Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level

ATTACHMENT 1

LCOAR FORMAT

SAFETY FUNCTION DETERMINATION PROGRAM REQUIREMENTS

A. Loss of Safety Function (LOSF) Evaluation

Is there any inoperable or degraded SUPPORT SYSTEM or SUPPORTED SYSTEM equipment on the opposite/redundant train that, when coupled with this inoperable equipment, might result in a complete loss of a Tech Spec required safety function.

1. NO - No LOSF exists. No further evaluation is necessary.

2. YES - A LOSF may exist. Using the SFDP and BwAP 340-1, evaluate which of the following conditions apply:

   a. The SSC is part of an LCO with multiple subsystems and the LCO specified function is intact. No LOSF exists.

   b. The SSC will still perform its required safety function as defined in the Safety Analysis Report (SAR). No LOSF exists.

   c. A LOSF exists. Perform the Required Actions of the SSC LCO in which the LOSF exists for the specific Condition(s) that apply.

LCO 3.0.6 - DELAYED LCOAR ENTRY CALCULATION.

Perform this step only if NO LOSF exists and it is desired to delay SUPPORTED SYSTEM LCOAR entry as allowed by LCO 3.0.6. A LOSF does not exist if the redundant train of the inoperable SUPPORTED SYSTEM(S) equipment is OPERABLE.

1. Rules of Usage:

   a. With a single SUPPORT SYSTEM inoperable, the affected SUPPORTED SYSTEM(s) LCOAR entry(s) is not required to be entered unless directed by the SUPPORT SYSTEM Required Actions.

   b. In the event additional SUPPORT SYSTEM(s) become inoperable during the Completion Time for restoration of the first SUPPORT SYSTEM, the LCOAR entry(s) of the SUPPORTED SYSTEM may be delayed by either the maximum allowed Completion Time of the SUPPORT SYSTEMs, OR 2 times the Completion Time for restoration of the SUPPORTED SYSTEM (applied at the time the second SUPPORT SYSTEM becomes inoperable), whichever is less.

2. When tracking delayed LCOAR entry times, it is imperative that the INOPERABLE TIME/DATE and required LCOAR entry TIME/DATE reflect the total time the SUPPORTED SYSTEM has been inoperable. A review of all active LCOARS must be performed to ensure SUPPORTED SYSTEM(s) do not remain inoperable for longer than allowed in 1.b. above.

B. SUPPORT SYSTEM to SUPPORTED SYSTEM Tech Spec cross reference is found in the SFDP. Complete the following table(s) for all inoperable SUPPORTED SYSTEMS for the purpose of tracking delayed LCOAR entry given subsequent additional SUPPORT SYSTEM inoperabilities.

Table 1: Supported System delayed LCOAR entry Table: (example)

SUPPORT SYSTEM: LCO 3.7.7 Component Cooling Water

SUPPORTED SYSTEM TS NUMBER	SUPPORTED SYSTEM	INOPERABLE TIME / DATE	Enter LCOAR TIME / DATE
3.4.4	RCS Loops - Modes 1 & 2	________	________
3.4.5	RCS Loops - Mode 3	________	________
3.4.6	RCS Loops - Mode 4	________	________
3.4.7	RCS Loops - Mode 5, Loops filled	________	________
3.4.8	RCS Loops - Mode 5, Loops not filled	________	________
3.5.2	ECCS - Operating	________	________
3.5.3	ECCS - Shutdown	________	________
3.9.5	RHR Coolant Circulation - High Water Level	________	________
3.9.6	RHR Coolant Circulation - Low Water Level	________	________
________	________	________	________
________	________	________	________
________	________	________	________

Table 2: ANY/All other SUPPORTED SYSTEMS which are inoperable as a result of the SUPPORTED SYSTEM(S) identified in table 1 above.

SUPPORTED SYSTEM TS NUMBER	2nd / 3rd LEVEL SUPPORTED SYSTEM	INOPERABLE TIME / DATE	Enter LCOAR TIME / DATE
	(none pre-identified)		
________	________________	________________	________________
________	________________	________________	________________
________	________________	________________	________________
________	________________	________________	________________
________	________________	________________	________________
________	________________	________________	________________
________	________________	________________	________________
________	________________	________________	________________
________	________________	________________	________________

ATTACHMENT 2

SFDP EVALUATION EXAMPLES

ATTACHMENT 2

ITEMS CLEARLY INOPERABLE

A. A SSC that is unable to perform its specified function(s) because of obvious failure, damage, or malfunction, or because it is disabled for testing or maintenance is inoperable.

B. A SSC that trips (where tripped is not the safety function condition) is inoperable unless it can be restarted promptly, without performing maintenance. If the attempt at restart is unsuccessful, the SSC is inoperable. The time frame for compensatory action begins at the time of the initial trip.

C A SUPPORTED SSC is inoperable when a SUPPORT SYSTEM is not capable of performing its related support function. However, if it is determined that the SSC is capable of performing its intended function, even with an inoperable SUPPORT SYSTEM, then the TS SUPPORTED SYSTEM may be considered OPERABLE.

D. Failure of a SSC to meet quantitative acceptance criteria specified in Surveillance Procedures is inoperable unless the Surveillance Procedure acceptance criteria is more conservative than the existing TS SR acceptance criteria and the results of the surveillance is clearly within the acceptance criteria of the TS SR.

E. A SSC is inoperable if it fails to meet a safety function requirement identified in a docketed letter to the NRC that specifically describes its functional capability/requirement.

F. A SSC is inoperable if its configuration results in the LOSF or a loss of capability to withstand a single failure, if required.

G. If calculation indicates that a SSC will not be able to perform as needed to mitigate the affects of a design basis accident, then the SSC is inoperable.

ATTACHMENT 2 (cont'd)

ITEMS POTENTIALLY INOPERABLE

A. A suspected error in any analysis that could affect the functional status of a SSC.

B. A lack of documentation that could affect the functional status of a SSC.

C. A minor deviation (incorrect bolt size, tolerance/clearance, etc.) found in a SSC. Also included in this category are items such as unevaluated installation of lead shielding on a system or removal of a component from a system without using temporary restraints and without a prior Engineering evaluation.

D. An unfulfilled EQ installation or maintenance requirement for a component or device where the impact is not obvious.

EXAMPLE: The EQ Program may require O-rings be replaced with new O-rings every time a cover is removed from a device and at least once every five years. The consequences of failure to replace the O-ring at the end of the five year interval may not be clear, and may or may not cause the device to be inoperable.

EXAMPLE: An unidentified wire is found in an EQ valve operator and there is not sufficient information available to determine whether the wire is suitable for the application.

E. An item found in nonconformance with electrical separation criteria specified in the UFSAR.

F. An item found in noncompliance with physical separation or mechanical isolation requirements specified by Plant Drawings,Operating Procedures, Fire Hazards Analysis, etc.

G. Equipment found out-of-tolerance in the nonconservative direction.

H. When a SSC is found to be outside its design basis, it may be considered operable when it is judged that the SSC is capable of performing its specified functions(s). Further testing calculations, etc. may be required to support this position.

I. Discovery of an unanalyzed condition associated with the current design basis (i.e., an unanalyzed condition which should have been analyzed).

ATTACHMENT 2 (cont'd)

SFDP EVALUATION - EXAMPLE 1

EXAMPLE 1: At 0100, with Unit 2 in MODE 1, the Unit 2 4160V "242" bus is determined to be inoperable due to degraded voltage. No other TS SSC inoperabilities exist.

The 4160 V "242" bus is a SUPPORT SSC, addressed by TS LCO 3.8.9. Required Action requires restoring the bus to OPERABLE status within 8 hours.

The following is the LOSF determination for the SUPPORTED SYSTEM:

* LCO 3.3.1 RTS Instrumentation; all channels are capable of performing their design function; no LOSF exists.

* LCO 3.3.2 EFSAS Instrumentation; all channels are capable of performing their design function; no LOSF exists.

* LCO 3.3.3 PAM Instrumentation; since at least one channel is OPERABLE, no LOSF exists.

* LCO 3.3.4 Remote Shutdown System; the functions of the PAM are still OPERABLE since the "241" 4160 V bus is OPERABLE, no LOSF exists.

* LCO 3.3.5 LOP Diesel Generator Start Inst; since there is still one bus with two channels of loss of voltage Function and two channels of degraded voltage Function still OPERABLE, no LOSF exists.

* LCO 3.3.6 Containment Ventilation Isolation Instrumentation; since one rad monitor is still OPERABLE, no LOSF exists.

* LCO 3.3.7 Control Room Ventilation Filtration System Actuation Instrumentation; since the opposite train of the VC Filtration System is OPERABLE and powered by the offsite train, no LOSF exists.

* LCO 3.3.8 Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System Actuation Instrumentation; since the other channel is OPERABLE, no LOSF exists.

ATTACHMENT 2 (cont'd)

- LCO 3.4.9 Pressurizer; the Pressurizer is still OPERABLE since two groups of heaters is still OPERABLE, no LOSF exists.
- LCO 3.4.11 Pressurizer PORVs; since bus 241 is still OPERABLE the PORVs are OPERABLE since power is still being supplied, no LOSF exists.
- LCO 3.4.15 RCS Leakage Detection Instrumentation is not lost, no LOSF exists.
- LCO 3.5.2 ECCS - Operating, because Charging, Safety Injection, and RHR are OPERABLE, no LOSF exists.
- LCO 3.6.3 Containment Isolation Valves; loss of one bus of the 4160 volt will not render the Containment Isolation Valves inoperable, no LOSF exists.
- LCO 3.6.6 Containment Spray and Containment Cooling Trains, Containment Cooling is not considered inoperable. No LOSF exists because only one train is required.
- LCO 3.6.7 Spray Additive Tank; with a loss of 242v bus, the spray Additive Tank is still OPERABLE, no LOSF exists.
- LCO 3.7.2 Main Steam Isolation Valves; there will be no loss of function since the MSIVs will fail in the closed position.
- LCO 3.7.4 Steam Generator Power Operated Valves; no LOSF exists since the valves would be placed in a closed position which is their intended position for mitigation of an accident.

ATTACHMENT 2 (cont'd)

* LCO 3.7.5 Auxiliary Feedwater is considered OPERABLE. No LOSF exists because only one train is required.

* LCO 3.7.7 Component Cooling Water, is considered OPERABLE because the other subsystem is OPERABLE, no LOSF exists.

* LCO 3.7.8 Essential Service Water is considered OPERABLE because SX can perform its safety function with one train no LOSF exists.

* LCO 3.7.10 Control Room Ventilation Filtration System; the other train of VC Filtration System is still OPERABLE, no LOSF exists.

* LCO 3.7.11 Control Room Ventilation Temperature Control System; the other train of VC Temperature Control is still OPERABLE, no LOSF exists.

* LCO 3.7.12 Nonessential Area Exhaust Filter Plenum Ventilation System; the other 2 trains of Nonessential Area Exhaust Filter Plenum Ventilation System are OPERABLE, no LOSF exists.

* LCO 3.7.13 Fuel Handling Building Ventilation System; the other train is still OPERABLE, no LOSF exists.

* LCO 3.8.1 AC Sources-Operating; the opposite train is OPERABLE, no LOSF exists.

* LCO 3.8.4 DC Sources - Operating; the batteries and chargers are OPERABLE, no LOSF exists.

* LCO 3.8.7 Inverters - Operating; the other inverters are OPERABLE, no LOSF exists.

<u>Conclusions</u>: No LOSF exists. LCO 3.0.6 may be entered with a Completion Time of 8 hours to restore the inoperable bus to OPERABLE status, beginning at 0100.

ATTACHMENT 2 (cont'd)

SFDP EVALUATION - EXAMPLE 2

EXAMPLE 2: At 0500, with Unit 2 in MODE 1, both channels of the Containment Radiation-High monitor are determined to be inoperable.

This instrumentation supports the Containment Ventilation Isolation instrumentation by providing input to the Automatic Actuation Logic and Actuation relays, and Containment Radiation-High. Since these supported functions require at least 2 channels, for the monitors, entry must be made into the Required Actions for LCO 3.3.6.

These Actions directly specify to enter applicable Conditions and Required Actions of LCO 3.6.3 for containment valves made inoperable by isolation instrumentation (Required Action B.1). As stated in LCO 3.0.6, when the SUPPORT SYSTEM SSC Required Actions provide direction for SUPPORTED SYSTEM SSCs, the applicable SUPPORTED SYSTEM SSC Conditions and Required Actions shall be entered. This effectively precludes the use of LCO 3.0.6.

<u>Conclusion:</u> The LCO 3.3.6 Required Actions should be performed, as well as those for all the inoperable SUPPORTED SYSTEMS. The SFDP will not be entered since LCO 3.0.6 cannot be used.

ATTACHMENT 2 (cont'd)

SFDP EVALUATION - EXAMPLE 3

EXAMPLE 3: At 0130, with both Units at 100% power, the Spray Additive Tank is determined to be inoperable.

Per LCO Bases 3.6.7, the Spray Additive Tank provides sodium hydroxide through the suction of the Containment Spray Pumps and into the containment. The purpose of the sodium hydroxide is to provide iodine scrubbing in the case of a LOCA.

In the event the Spray Additive Tank is inoperable, it will not disable the Containment Spray Pump to perform its intended safety function which is to spray borated water from the RWST into containment in order to reduce pressure and temperature. Since this function will still be performed, even with the Spray Additive Tank inoperable, it is not considered to be a SUPPORT SYSTEM for the Containment Spray Pump.

The same is not true in the case where the Containment Spray Pump is inoperable. In this case the Containment Spray Pump is a SUPPORT SYSTEM for the Spray Additive Tank. If the Containment Spray Pump is inoperable, the sodium hydroxide, function of the Spray Additive Tank, will not be sprayed into containment. In this case the Spray Additive Tank is a SUPPORTED SYSTEM to the Containment Spray Pump.

<u>Conclusion:</u> Since the Spray Additive Tank is not a SUPPORT SYSTEM for the Containment Spray Pumps, both trains of Containment Spray are OPERABLE, and no LOSF exists.

ATTACHMENT 2 (cont'd)

SFDP EVALUATION - EXAMPLE 4

EXAMPLE 4: At 1300, Unit 1 was at 100% power and Train B Essential Service Water (SX) System became inoperable with the associated LCOAR implemented. At 1400, the Condensate Storage Tank (CST) becomes inoperable.

Train B SX is a SUPPORT SYSTEM to the Auxiliary Feedwater (AF) Pumps (SUPPORTED SYSTEM). No LOSF exists at this time (1300 to 1359 hours) since Train A SX is intact and, being a cross-tied system,can supply all the SX needs to both trains of AF, etc. and since no redundant systems are inoperable. The Actions for SX (LCO 3.7.8, Action A.1) are entered. The Actions for AF (LCO 3.7.5) are not entered since AF is operable.

At 1400 hours, the CST becomes inoperable. The CST (LCO 3.7.6) is considered to be a SUPPORT SYSTEM to the AF. However, the CST is not the safety related water supply to the AF, it is only the preferred supply. At this point the plant is in 2 LCOs and a SFDP evaluation is warranted. In this case, the evaluation should show that no LOSF exists for the following reason:

> The CST does support the AF, however, the CST is not the safety related water supply to the AF, it is only the preferred supply. Therefore, the AF is not inoperable due to the CST being inoperable. Furthermore, SX remains available to AF.

<u>Conclusion:</u> A LOSF does not exist and Technical Specification 3.7.6 is entered for the CST inoperability.

COMPLETION TIME EXTENSIONS APPLICABLE TO THE SFDP
EXAMPLES

RULES OF USAGE FOR COMPLETION TIME EXTENSIONS

1. <u>Single SUPPORT SYSTEM inoperable affecting SUPPORTED SYSTEM(s)</u>

   With a single SUPPORT SYSTEM inoperable, the affected SUPPORTED SYSTEM(s) LCOARs entry(s) is not required to be entered unless directed by the SUPPORT SYSTEM Required Actions. Reference Case A.

2. <u>Multiple SUPPORT SYSTEMS become inoperable affecting the same SUPPORTED SYSTEM(s)</u>

   When a SUPPORT SYSTEM becomes inoperable, the Required Action(s) LCOAR entry is not required to be entered unless directed by the SUPPORT SYSTEM Required Actions. In the event additional SUPPORT SYSTEM(s) become inoperable during the Completion Time of the first SUPPORT SYSTEM, the LCOAR entry(s) of the SUPPORTED SYSTEM(s) may be delayed by either:

   a) The maximum allowed Completion Time of the SUPPORT SYSTEM(S)

   <u>OR</u>

   b) 2 times the Completion Time for restoration of the SUPPORTED SYSTEM (applied at the time the second SUPPORT SYSTEM becomes inoperable),

<u>whichever is the shorter duration.</u> Reference Cases B and C.

The SFDP requires declaring SUPPORTED SYSTEM(S) inoperable if a SUPPORT SYSTEM inoperability renders the SUPPORTED SYSTEM incapable of performing its required function. However, the Conditions and Required Actions of the SUPPORTED SYSTEM do not have to be entered (i.e., the LCO Required Actions are not entered) except as directed by the SUPPORT SYSTEM Required Actions.

Consequently, it is possible to have SUPPORTED SYSTEM(S) inoperable for longer periods of time than their respective Completion Time would allow on their own. Per Technical Specifications 5.5.15, the SFDP must include measures to ensure that the SUPPORTED SYSTEM's Completion Times are not inappropriately extended.

The Required Action may be delayed only if the inoperability is due solely to an inoperability of a SUPPORT SYSTEM. If a SUPPORTED SYSTEM is made directly inoperable, then the LCO and Required Actions are entered at the time of direct inoperability per LCO 3.0.2.

The following criteria apply to Completion Time extension:

CASE A:

If only one SUPPORT SYSTEM is inoperable, General Rule 1 applies and the SUPPORTED SYSTEM LCOAR entry need not be entered unless directed by the SUPPORT SYSTEM Required Actions.

Example:

System A (SUPPORTED SYSTEM)	Action Completion Time - 3 days
System B (SUPPORT SYSTEM)	Action Completion Time - 7 days

LCOAR entry on SUPPORTED SYSTEM A is not required to be entered.

<u>Case B:</u>

The SUPPORT SYSTEMS become inoperable at different times. The LCOAR entry for the SUPPORTED SYSTEM may be delayed as follows:

Example:

System A (SUPPORTED SYSTEM)	Action Completion Time - 7 days
System B (SUPPORT SYSTEM)	Action Completion Time - 3 days
System C (SUPPORT SYSTEM)	Action Completion Time - 3 days

System B and C support System A

System B (SUPPORT SYSTEM) is inoperable at T = 0 days

Therefore: System A (SUPPORTED SYSTEM) Conditions and Required Action(s) need not be entered unless directed by the System B (SUPPORT SYSTEM) Required Actions.

System C (SUPPORT SYSTEM) becomes inoperable 2 days after System B (SUPPORT SYSTEM) became inoperable. System B is still not OPERABLE.

Therefore: At T = 0 days until the second SUPPORT SYSTEM becomes inoperable, General Rule 1 is applied. At this point, System B (SUPPORT SYSTEM) Completion Time is 3 days. System A (SUPPORTED SYSTEM) LCOAR is not entered unless directed by the System B (SUPPORT SYSTEM) Required Actions.

At T = 2 days, System C (SUPPORT SYSTEM) becomes inoperable. System C (SUPPORT SYSTEM) also supports System A (SUPPORTED SYSTEM) initiating General Rule 2 at T = 2 days. System C (SUPPORT SYSTEM) has a Completion Time of 3 days. Therefore, the maximum Completion Time for this scenario is from T = 0 days to T = 3 days for System B (SUPPORT SYSTEM), and from T = 2 days to T = 5 days for System C (SUPPORT SYSTEM). The maximum delay time for System A (SUPPORTED SYSTEM) LCOAR entry is 5 days because:

System B (SUPPORT SYSTEM) Completion Time is T = 3 days

System C (SUPPORT SYSTEM) Completion Time is T = 5 days

T = 5 days is the longer of the two completion times and is compared with the two times the SUPPORTED SYSTEMS's completion time for restoration. System C (SUPPORT SYSTEM) completion time is at T = 5 days. System A (SUPPORTED SYSTEM) completion time limit is 2 X 7 = 14 days after T = 2 days. T = 2 + 14 or a total of 16 days. Since T = 5 days is less than T = 16 days, the maximum allowed delay time to enter the System A (SUPPORTED SYSTEM) LCOAR is the shorter of the two, 5 days.

<u>CASE C:</u>

Two SUPPORT SYSTEMS become inoperable at different times. The LCOAR entry for the SUPPORTED SYSTEM may be delayed as follows:

Example:

System A (SUPPORTED SYSTEM)	Action Completion Time - 3 days
System B (SUPPORT SYSTEM)	Action Completion Time - 3 days
System C (SUPPORT SYSTEM)	Action Completion Time - 7 days

System B and C support System A

Case C1 - System B (SUPPORT SYSTEM) B becomes inoperable at T = 0 days.

System B (SUPPORT SYSTEM) with a Completion Time of 3 days, renders System A (SUPPORTED SYSTEM) inoperable. General Rule 1 is applied, which allows an overall Completion Time of 3 days for the System B (SUPPORT SYSTEM). The LCOAR for System A (SUPPORTED SYSTEM) is not required to be entered unless directed by the System B (SUPPORT SYSTEM) Required Actions.

At T = 1 day, System C (SUPPORT SYSTEM) becomes inoperable and has a Completion Time of 7 days. System C (SUPPORT SYSTEM) also supports System A (SUPPORTED SYSTEM). System B (SUPPORT SYSTEM) continues to remain inoperable through its Completion Time T = 3 days.

Once System C (SUPPORT SYSTEM) becomes inoperable concurrent with System B, General Rule 2 is applied at T=1, the Completion Times are:

T = 0 days to T = 3 days for System B (SUPPORT SYSTEM), and

T = 1 day to T = 8 days for System C (SUPPORT SYSTEM).

At T = 3 days System B (SUPPORT SYSTEM) is not declared OPERABLE, and the appropriate subsequent Required Actions of System B (SUPPORT SYSTEM) are entered. The Required Actions of System A (SUPPORTED SYSTEM) A are not entered (unless SUPPORT SYSTEM B or C Required Actions specifically direct them to be entered) until T = 7 days (2 times System A's Completion Time after T = 1 day).

T = 7 days is less than System C's T = 8 days Completion Time. Not entering the Required Actions for System A (SUPPORTED SYSTEM) is allowed under LCO 3.0.6 provided the inoperability of System A (SUPPORTED SYSTEM) is solely due to the inoperability of System B (SUPPORT SYSTEM) and subsequently System C (SUPPORT SYSTEM).

Case C2 - At T = 0 day, System B (SUPPORT SYSTEM) becomes inoperable, with a Completion Time of 3 days, and renders System A (SUPPORTED SYSTEM) inoperable. General Rule 1 is applied, which allows an overall Completion Time of 3 days for System B (SUPPORT SYSTEM).

At T = 1 days, System C (SUPPORT SYSTEM) becomes inoperable and has a Completion Time of 7 days. System C (SUPPORT SYSTEM) also supports System A (SUPPORTED SYSTEM). When System C (SUPPORT SYSTEM) becomes inoperable, General Rule 2 is triggered requiring System A (SUPPORTED SYSTEM) LCOAR entry no later than day 7 (2 x 3 days after T=1). The Completion Times are:

From T = 0 day to T = 3 days for System B (SUPPORT SYSTEM), and
From T = 1 day to T = 8 days for System C (SUPPORT SYSTEM).

System B (SUPPORT SYSTEM) is declared OPERABLE at T = 2 days.

System C (SUPPORT SYSTEM) remains inoperable and consequently, System A (SUPPORTED SYSTEM) is <u>still</u> inoperable solely due to its SUPPORT SYSTEM (System C) being inoperable. At this point, General Rule 2 remains in effect to eliminate continuous alternating inoperabilities. This would allow the Required Action entry for System A (SUPPORTED SYSTEM) to still be delayed only until day 7 (T = 1 + 6 days).

CONTAINMENT LEAKAGE RATE TESTING PROGRAM BRAIDWOOD

TABLE OF CONTENTS

SECTIONS	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

This Program provides controls to implement the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions including routine inspections, tests, and reporting requirements pursuant to Technical Specification (TS) 5.5.16, "Containment Leakage Rate Testing Program." The Program inspection and test frequencies and associated acceptance criteria shall be in accordance with the guidelines contained in Regulatory Guide 1.163, September 1995, NEI 94-01, Revision 0, and ANSI/ANS-56.8-1994 as modified by approved exceptions as specified in TS 5.5.16. Exceptions to the guidance in NEI 94-01, Revision 0 and ANSI/ANS-56.8-1994 are as stated in Regulatory Guide 1.163 and TS 5.5.16.

1.2 REFERENCES

1. Technical Specifications:
   a. 3.6.1, "Containment"
   b. 3.6.2, "Containment Air Locks"
   c. 3.6.3, "Containment Isolation Valves"
   d. 5.5.16, “Containment Leakage Rate Testing Program”
   e. TS Amendment No. 149, “Request for Amendment to Technical Specification 5.5.16, “Containment Leakage Rate Testing Program,”” issued April 2, 2008
2. UFSAR:
   a. Section 6.2, "Containment Systems"
   b. Section 6.2.6.1, "Containment Integrated Leakage Rate Test"
   c. Section 6.2.6.2, "Containment Penetration Leakage Rate Test"
3. NRC/Industry Documents:
   a. NEI 94-01 Rev. 0, "Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J"

b. ANSI/ANS-56.8-1994, "Containment System Leakage Testing Requirements"

c. 10 CFR 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water Cooled Power Reactors"

d. NRC Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program"

e. NUREG 1493, "Performance-Based Containment Leak-Test Program"

4. Braidwood Maintenance Rule 10 CFR 50.65

1.3 DEFINITIONS AND/OR ACRONYMS

1. PERFORMANCE CRITERIA - The performance standards against which test results are to be compared for establishing the acceptability of the containment system as a leakage-limiting boundary.

2. CONTAINMENT SYSTEM - The principal barrier, after the reactor coolant pressure boundary, to prevent the release of quantities of radioactive material that would have a significant radiological effect on the health of the public.

3. OVERALL INTEGRATED LEAKAGE RATE - The total leakage rate through all tested leakage paths, including containment welds, valves, fittings, and components that penetrate the containment system.

4. L_a - The maximum allowable primary containment leakage rate, L_a, shall be 0.20% of the primary containment air weight per day at the calculated peak containment pressure (P_a).

5. P_a - The maximum calculated primary pressure, P_a, (Unit 1 = 42.8 psig) (Unit 2 = 38.4 psig) for the design basis loss of coolant accident.

6. TYPE A TEST - An Integrated Leakage Rate Test (ILRT) to measure the CONTAINMENT SYSTEM overall integrated leakage rate under conditions representing DBA containment pressure and systems alignments.

7. TYPE B TEST - A Local Leakage Rate Test (LLRT) intended to detect or measure leakage across pressure-retaining or leakage-limiting boundaries other than valves, such as:

    a. containment penetrations whose design incorporates resilient seals, gaskets, sealant compounds, expansion bellows, or flexible seal assemblies;

    b. seals, including door operating mechanism penetrations, which are part of the primary containment; or

    c. doors and hatches with resilient seals or gaskets except for seal-welded doors.

8. TYPE C TESTS - A pneumatic Local Leakage Rate Test (LLRT) to measure containment isolation valve leakage rates.

9. UPPER CONFIDENCE LIMIT (UCL) - A calculated value constructed from test data which places a statistical upper bound on the true integrated leakage rate (%/24h).

10. MINIMUM PATHWAY LEAKAGE RATE (MNPLR) - The minimum leakage rate that can be attributed to a penetration leakage path (e.g., the smaller of either the inboard or outboard barrier's individual leakage rates).

11. MAXIMUM PATHWAY LEAKAGE RATE (MXPLR) - The maximum leakage rate attributed to a penetration leakage path. The MXPLR is the larger, not the total, leakage of two valves in series.

1.4 PROGRAM DESCRIPTION

This Program provides administrative guidelines for the Braidwood Containment Leakage Rate Testing Program, guidelines for the coordination of inspection, trending, reporting, performance evaluation, repair, establishing surveillance intervals, and regulatory compliance for Type A, B, and C leakage testing.

10 CFR 50 Appendix J Option B allows the use of a performance-based program to perform the Type A, B, and C containment leakage testing. Program requirements are further defined in References 3.a, 3.b, 3.c, and 3.d. These documents require that periodic testing be conducted to verify the leakage integrity of the containment and those systems and components which penetrate the containment. The objective for monitoring performance of TYPE A TESTS focuses on verifying the leakage integrity of a passive

containment structure.

TYPE B and C TESTS focus on assuring that containment penetrations are essentially leak tight. The results of these tests are evaluated against performance criteria and the required testing intervals are adjusted based on the performance of the component/system.

Option B allows licensees with good ILRT performance history to reduce the TYPE A TEST frequency from three tests in 10 years to one test in 10 years. Exception to the Option B TYPE A TEST frequency is as specified in TS 5.5.16. For TYPE B and TYPE C TESTS, Option B allows Braidwood Station to reduce testing frequency based on the experience history of each component, and establish controls to ensure continued performance during the extended testing interval. Type B and C LLRT intervals utilize the requirements and guidance as stipulated in Reference 3.a and 3.d.

1.5 PROGRAM IMPLEMENTATION

Inspection, trending, reporting, performance evaluation, repair, surveillance intervals, and regulatory compliance for Type A, B, and C leakage testing shall be initiated and maintained in accordance with the Braidwood Containment Leakage Rate Testing Program.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria for TYPE A TESTS are contained in applicable Station Procedures. Acceptance criteria for TYPE B and C TESTS are contained in applicable Station Procedures. The acceptance criteria specified in the individual leak rate test procedures are administrative guidelines that are used to help maintain low containment leakage rates. The acceptance criteria associated with the individual leak rate test procedures are not Technical Specification requirements with the exception of the personnel/emergency airlock door seals and overall air lock leakage. The acceptance criteria associated with the personnel/emergency airlock door seals and overall air lock leakage are as specified in TS 5.5.16.

1.7 LCOARS/COMPENSATORY MEASURES

If any abnormalities in containment leakage exceed the acceptance criteria, the Shift Manager will be immediately notified. The Shift Manager shall determine OPERABILITY status and implement a LCOAR as applicable. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Any reporting requirements associated with acceptance criteria of this Program not being met shall be reported in accordance with the requirements specified in the implementing procedures.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

TECHNICAL REQUIREMENTS MANUAL CONTROL PROGRAM

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to provide guidance for identifying, processing, and implementing changes to the Technical Requirements Manual (TRM). This Program implements and satisfies the requirements of TRM Section 1.6, "Technical Requirements Manual Revisions."

This Program is applicable to the preparation, review, implementation, and distribution of changes to the TRM. This Program also provides guidance for preparing TRM Change Packages for distribution.

1.2 REFERENCES

1. TRM Section 1.6, "Technical Requirements Manual Revisions"
2. 10 CFR 50.4, "Written Communications"
3. 10 CFR 50.59, "Changes, Tests and Experiments"
4. 10 CFR 50.71, "Maintenance of Records, Making of Reports"
5. 10 CFR 50.90, "Application for Amendment of License or Construction Permit"

1.3 DEFINITIONS AND/OR ACRONYMS

10 CFR 50.59 REVIEW - A written regulatory evaluation which provides the basis for the determination that a change does, or does not, require NRC approval pursuant to 10 CFR 50.59. The scope of the evaluation should be commensurate with the potential safety significance of the change, but must address the relevant safety concerns included in the Safety Analysis Report and other owner controlled documents. The depth of the evaluation must be sufficient to determine whether or not NRC approval is required prior to implementation. Depending upon the significance of the change, the evaluation may be brief; however, a simple statement of conclusion is not sufficient.

EDITORIAL CHANGE - Editorial changes include correction of punctuation, insignificant word or title changes, style or format changes, typographical errors, or correction of reference errors that do not change the intent, outcome, results, functions, processes, responsibilities, or performance requirements of the item being changed. Changes in numerical values shall not be considered as editorial changes. Editorial changes do not constitute a change to the TRM and therefore do not require further 10 CFR 50.59 Reviews. If the full scope of this proposed change is encompassed by one or more of the below, then the change is considered editorial.

- Rewording or format changes that do not result in changing actions to be accomplished.
- Deletion of cycle-specific information that is no longer applicable.
- Addition of clarifying information, such as:
    - Spelling, grammar, or punctuation changes
    - Changes to references
    - Name or title references

1.4 PROGRAM DESCRIPTION

1. A Licensee may make changes to the TRM without prior NRC approval provided the changes do not require NRC approval pursuant to 10 CFR 50.59.

2. Changes that require NRC approval pursuant to 10 CFR 50.59 shall be submitted to the NRC pursuant to 10 CFR 50.90 and reviewed and approved by the NRC prior to implementation.

3. The TRM is part of the Updated Final Safety Analysis Report (UFSAR) by reference and shall be maintained consistent with the remainder of the UFSAR.

4. If a change to the TRM is not consistent with the remainder of the UFSAR, then the cognizant Engineer shall prepare and submit a UFSAR Change Package when the TRM Change Request is submitted to Regulatory Assurance (RA) for processing.

5. Changes to the TRM that do not require prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e), as modified by approved exemptions.

6. TRM changes associated with a Technical Specifications (TS) Amendment shall be implemented consistent with the implementation requirements of the TS Amendment.

7. RA is responsible for the control and distribution of the TRM. In order to prevent distribution errors (i.e., omissions or duplications), RA shall maintain the master TRM distribution list.

1.5 PROGRAM IMPLEMENTATION

1. TRM Change Requestor identifies the need for a revision to the TRM and notifies the RA Licensing Engineer (i.e., hereafter referred to as RA LE). A TRM change can be initiated through any Stations' RA. TRM Change Requestor notifies their counterparts on the need for a change.

2. RA LE notifies their counterparts of identified need for revision to the TRM.

3. RA LE assigns a TRM Change Request Number (CR #).

4. RA LE drafts TRM changes considering format, rules of usage, and technical adequacy.

5. RA LE makes an electronic version of the proposed TRM changes available in a working directory for use in the preparation of the 10 CFR 50.59 REVIEW and Station Qualified Review (SQR) process. The RA LE shall ensure that the master electronic TRM files are revised per step 12 below upon receiving SQR approval. The Revision number in the footer should be a sequential number (i.e., 1, 2, etc.).

```
**********************************************************
*                          NOTE                          *
*                                                        *
* If the TRM changes are applicable to more than one     *
* Station, the following steps should be performed       *
* concurrently for each Station.                         *
**********************************************************
```

6. TRM Change Requestor provides a 10 CFR 50.59 REVIEW for the TRM changes in accordance with appropriate plant procedures. An exception to this requirement applies when the changes are being requested in order to reflect an approved NRC Safety Evaluation (SE) associated with a site specific Operating License or TS change. The NRC SE is sufficient to support the changes provided it has been determined that the changes are consistent with and entirely bounded by the NRC SE. A 10 CFR 50.59 REVIEW shall be performed for TRM changes that reflect generic industry approval by an NRC SE to determine site specific applicability. A 10 CFR 50.59 REVIEW is not required for an EDITORIAL CHANGE.

7. TRM Change Requestor completes Attachment A, "Technical Requirements Manual Change Request Form," as follows:

   a. Identifies the affected sections, and includes a copy of the proposed TRM changes;

   b. Briefly summarizes the changes including the TLCO, Action, Surveillance Requirement, or Bases (if applicable) to which the changes apply;

   c. Briefly summarizes the reason for the changes and attaches all supporting documentation;

   d. Identifies any schedule requirements and proposed implementation date that apply (i.e., describe any time limitations that might apply which would require expedited processing). If the changes are outage related, then checks "yes" and lists the applicable outage identifier;

   e. Identifies any known implementation requirements such as procedure changes, UFSAR changes, Passport changes, Reportability Manual revisions, pre-implementation training requirements, etc.;

f. If a 10 CFR 50.59 REVIEW was prepared to support the TRM changes, the Requestor then checks the appropriate box, lists the associated 10 CFR 50.59 REVIEW Number, and attaches the original;

g. If the changes to the TRM are the result of an approved NRC SE associated with a site specific Operating License or TS change and the scope of the changes determined to be consistent with and entirely bounded by the NRC SE, then the Requestor checks the appropriate box and attaches a copy;

h. If the changes to the TRM are EDITORIAL CHANGES, then the Requestor checks the appropriate box and no 10 CFR 50.59 REVIEW is required;

i. Signs and dates as Requestor and identifies the originating department;

j. Obtains approval to proceed from Department Supervisor (or designee); and

k. Returns Attachment A to the RA LE.

8. RA LE reviews the TRM Change Request Form, including supporting documentation, and documents the review by signing Attachment A. The review verifies that the following information or documentation is included:

a. Completed 10 CFR 50.59 REVIEW. If the changes are related to an approved NRC SE associated with a site specific Operating License or TS change and determined to be entirely bounded by the NRC SE, then only a copy of the SE is required to be attached and no 10 CFR 50.59 REVIEW is required. A 10 CFR 50.59 REVIEW is not required for an EDITORIAL CHANGE;

b. Identification of known documents requiring revisions; and

c. Completed UFSAR Change Request with supporting documentation, in accordance with appropriate plant procedures, if applicable.

9. If the TRM change is not an EDITORIAL CHANGE, the RA LE/TRM Change Requestor obtains SQR approval of the TRM change by performing the following:

a. RA LE prepares the TRM Change SQR package. The SQR package shall include Attachment A (including completed 10 CFR 50.59 REVIEW or NRC SE) and the revised TRM pages. Attachment A is provided for the purpose of reviewing and finalizing the implementation requirements and ensuring the necessary actions have been initiated. RA LE shall assign Action Tracking (AT) items, as necessary, to track implementation requirements;

b. TRM Change Requestor submits the TRM Change SQR package to the SQR Committee members for a preliminary review. The SQR composition shall include RA and Operating Departments in all cases; and

c. TRM Change Requestor resolves preliminary review comments and finalizes the TRM Change SQR package.

10. The RAM shall determine the need for Plant Operations Review Committee (PORC) approval. The need for PORC approval shall be documented on Attachment A.

11. RA LE/TRM Change Requestor obtains PORC approval, if necessary.

12. After approval of the TRM changes by SQR/PORC, RA LE ensures that the controlled master electronic files are updated.

13. RA LE completes Attachment B, "Technical Requirements Manual Change Instruction Form," as follows:

a. Indicates the effective date of the TRM changes consistent with the SQR/PORC approval or TS amendment required implementation date. If the TRM change is a result of a TS Amendment, the update shall be implemented consistent with the implementation requirements of the TS Amendment. Otherwise, the update must be implemented by the date indicated on Attachment B;

b. Lists each page to be removed and inserted, including the Affected Page List; and

c. Provides the updated master file directory for updating Electronic Document Management System (EDMS), if applicable.

14. RA LE creates a TRM Change Package. The TRM Change Package shall consist of:

    1. TRM Change Instruction Form (Attachment B);

    2. Revised Affected Page List; and

    3. Revised TRM pages.

    One RA LE shall assemble and approve the TRM Change Package for distribution and a second RA LE shall perform a peer check to verify completeness of the TRM Change Package.

15. After verifying that SQR/PORC approval of the TRM changes has been obtained and that all AT items assigned to track implementation requirements have been completed, RA LE forwards the TRM Change Package to Station Records Management as notification of the need to update the onsite TRM controlled copies and EDMS, if applicable.

16. RA LE also forwards the TRM Change Package to Cantera Licensing (CL) Records Management as notification of the need to update the offsite (CL) TRM controlled copies and to transmit updates to the offsite (non-CL) TRM controlled copies.

17. Upon completion of updating the onsite TRM controlled copies and EDMS (if applicable), Station Records Management Supervisor signs and dates Attachment B and returns Attachment B to the RA LE.

18. Upon completion of updating the offsite (CL) TRM controlled copies and transmitting updates to the offsite (non-CL) TRM controlled copies, CL Records Management signs and dates Attachment B and returns Attachment B to the RA LE.

20. RA LE ensures that the documentation required to be maintained as a quality record is provided to Station Records Management for the purpose of record retention.

1.6 ACCEPTANCE CRITERIA

Not applicable.

1.7 LCOARS/COMPENSATORY MEASURES

An Issue Report may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

The RAM will be responsible for ensuring that Program failures have been resolved.

1.8 REPORTING REQUIREMENTS

NOTE

TRM changes requiring prior NRC approval shall be submitted in accordance with Reference 5.

TRM changes not requiring prior NRC approval, as described in Section 1.4 of this Program, shall be submitted to the NRC in accordance with 10 CFR 50.71(e).

1.9 CHANGE CONTROL

Changes to this Program, other than EDITORIAL CHANGES, shall include a 10 CFR 50.59 REVIEW and a SQR. The SQR composition shall include RA Department in all cases. For a change to this Program, PORC approval from all Stations is required. The concurrence shall be that the other Stations are implementing the same changes or that the changes have been reviewed and determined not to be applicable to the other Stations.

ATTACHMENT A
TECHNICAL REQUIREMENTS MANUAL CHANGE REQUEST FORM

1. Change Request #: ____________ Affected TRM Section(s): ________________________

2. Description of changes: ____

3. Reason for changes (attach all supporting documentation): ____________________

4. Schedule Requirements:
Outage Related (check one) ☐ No ☐ Yes, Outage # __________
Other (explain) ____

5. Implementation Requirements (attach additional pages, as necessary):
Identify the impact of the changes on the following:

Affected	N/A	
☐	☐	UFSAR ________
☐	☐	TS ________
☐	☐	TS Bases ________
☐	☐	NRC Safety Evaluation ________
☐	☐	Fire Protection Report ________
☐	☐	NRC Commitments ________
☐	☐	Vendor Documentation ________
☐	☐	Special Permits/Licenses ________
☐	☐	Procedures ________
☐	☐	Environmental Qualification ________
☐	☐	Design Basis Documentation ________
☐	☐	Engineering Calculations ________
☐	☐	Drawings/Prints ________
☐	☐	PRA Information ________
☐	☐	Programs ________
☐	☐	Reportability Manual ________
☐	☐	QA Topical Report ________
☐	☐	Passport ________
☐	☐	Pre-Implementation Training Required ________
☐	☐	Maintenance Rule ________
☐	☐	Offsite Dose Calculation Manual ________
☐	☐	Other ________

6. Check one:
☐ 10 CFR 50.59 REVIEW Attached, 10 CFR 50.59 REVIEW #:________________
☐ NRC SE Attached, Changes consistent with and entirely bounded by NRC SE
☐ EDITORIAL CHANGE, No 10 CFR 50.59 REVIEW required

7. Requestor: ____________________/____________________/____________________
(Signature) (Date) (Department)

8. Requesting Supervisor Approval: ____________________/____________________
(Signature) (Date)

9. PORC Approval Required: ☐ Yes ☐ No

10. Licensing Engineer Review: ____________________/____________________
(Signature) (Date)

ATTACHMENT B
TECHNICAL REQUIREMENTS MANUAL CHANGE INSTRUCTION FORM
FOR ONSITE/OFFSITE DISTRIBUTION AND FOR UPDATING EDMS

Braidwood/Byron/Dresden/LaSalle/QC (circle one) TRM Revision # ______

NOTE: This change is effective as of ____________________________ and shall be implemented
(SQR/PORC or Amendment Implementation Date)
by __________ .
(Date)

Approved for distribution: ______________________________/____________
(RA LE Signature) (Date)

Verified: ______________________________/____________
(RA LE Signature) (Date)

REMOVE Section	REMOVE Page	INSERT Section	INSERT Page	UPDATE EDMS Section	UPDATE EDMS Page
Affected Page List	All	Affected Page List	All	N/A	N/A

ATTACHMENT B
TECHNICAL REQUIREMENTS MANUAL CHANGE INSTRUCTION FORM
FOR ONSITE/OFFSITE DISTRIBUTION AND FOR UPDATING EDMS

Braidwood/Byron/Dresden/LaSalle/QC (circle one) TRM Revision # ______

Station Records Management:

Onsite Distribution Completed: ____________________/____________
(Station Records Mgmt. Supr.) (Date)

EDMS Update Completed: ____________________/____________
(Station Records Mgmt. Supr.) (Date)

** Return this sheet to: Regulatory Assurance
Braidwood/Byron/Dresden/LaSalle/QC (circle one) Station

CL Records Management:

Offsite (CL) Distribution Completed: ____________________/____________
(CL Records Mgmt. Dept.) (Date)

Offsite (non-CL) Distribution Transmitted: ____________________/____________
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CONFIGURATION RISK MANAGEMENT PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

This Configuration Risk Management Program provides a proceduralized process to ensure that a configuration risk assessment is conducted prior to and during performance of maintenance activities that remove SSCs from service.

1.2 REFERENCES

1. Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants"
2. Regulatory Guide 1.174, "An Approach for using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"
3. Regulatory Guide 1.177, "An Approach for Plant-Specific-Risk-Informed Decisionmaking: Technical Specifications"
4. NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"

1.3 DEFINITIONS AND/OR ACRONYMS

1. Configuration Risk Management Program - CRMP
2. Probabilistic Risk Assessment - PRA
3. Structure, System, or Component - SSC

1.4 PROGRAM DESCRIPTION

The CRMP is a subset of the work management process. The CRMP ensures that configuration risk is assessed (probabilistic and/or deterministic), and managed, prior to initiating any maintenance activity consistent with the requirements of 10 CFR 50.65. The CRMP also ensures that risk is reassessed if an emergent condition results in a plant configuration that has not been previously assessed.

Probabilistic risk assessments of online configurations are performed using the level 1 PRA model. Deterministic defense-in-depth evaluations of key safety functions are performed for online and shutdown configurations using a safety function assessment module. Deterministic evaluations of plant configurations that result in a change to initiating event frequency and/or decrease in mitigation capability are performed using a plant transient assessment module.

The CRMP establishes risk thresholds and administrative limits for risk significant configuration out of service times to ensure that average baseline risk is maintained within an acceptable band.

Overall risk is managed to the most restrictive risk threshold specified within the CRMP. Risk significant configurations are generally avoided. If a risk significant configuration occurs, immediate actions are taken to protect redundant/diverse SSCs that are relied upon to mitigate events.

The CRMP requires that the PRA model meet industry certification standards to ensure the scope and quality of the PRA is adequate. The CRMP requires that the PRA model the current design configuration of the plant, and that plant modification and procedure changes are monitored and evaluated as to the impact on the PRA model. The CRMP establishes compensatory measures in the event a plant configuration is outside the scope of the PRA, or PRA results are unavailable.

1.5 PROGRAM IMPLEMENTATION

The CRMP is implemented through a company-wide standard procedure. The Work Control and Risk Management Engineering Departments are responsible for the CRMP and associated procedure implementation at the stations.

1.6 ACCEPTANCE CRITERIA

The configuration risk management acceptance criteria are contained within the implementing procedures.

1.7 LCOARS/COMPENSATORY MEASURES

The CRMP provides administrative limits for Technical Specification Limiting Condition of Operation Allowed Outage Time and Maintenance Rule unavailability time. When the administrative limit will be exceeded, compensatory measures are established to reduce risk, limit unavailability time, and implement a contingency plan to restore and/or mitigate the loss of a key safety function.

1.8 REPORTING REQUIREMENTS

The normal work management process and control room logs provide adequate documentation of configuration risk.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include Regulatory Assurance Department in all cases. As a part of the ITR, for a change to this Program, concurrence from Byron and the Braidwood Plant Operations Review Committee (PORC) approval is required. The concurrence shall be that Byron is implementing the same change or that the change has been reviewed and determined not to be applicable to Byron.

BATTERY MONITORING AND MAINTENANCE PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTIONS	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

This Program provides guidance and clarifying information related to the Battery Monitoring and Maintenance Program. This Program complies with the requirements of Technical Specification (TS) 5.5.17, "Battery Monitoring and Maintenance Program." This program provides for the restoration and maintenance of batteries based on the recommendations given in Reference 2.

1.2 REFERENCES

1. TS 5.5.17, "Battery Monitoring and Maintenance Program"
2. IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications"
3. UFSAR Chapter 8, "Electric Power"
4. NRC Regulatory Guide 1.129, "Maintenance, Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants"

1.3 DEFINITIONS AND/OR ACRONYMS

1. ELECTROLYTE LEVEL - The battery cell fluid level found by visual observation.
2. BATTERY CELL PARAMETERS - Voltage, specific gravity, and resistance/impedance.
3. INTER-CELL/INTER-TIER or INTER-RACK CONNECTIONS - Connections made between rows/steps or racks of individual battery cells.
4. FLOAT VOLTAGE - The voltage applied to a battery to maintain it in a fully charged condition during normal operation.
5. SPECIFIC GRAVITY - A measurement of an individual battery cell electrolyte to determine the state of charge.
6. ELECTROLYTE LEVEL MINIMUM ESTABLISHED DESIGN LIMIT - 1/2 inch below the minimum level indication mark.
7. ELECTROLYTE TEMPERATURE MINIMUM ESTABLISHED DESIGN LIMIT - 60°F.

1.4 PROGRAM DESCRIPTION

This Program ensures the methodologies, parameters, and corrective actions comply with the reference requirements. This Program addresses the station 125 VDC Engineered Safety Features (ESF) Batteries (Division 11(21) and Division 12(22)).

The OPERABILITY requirements for the 125 VDC ESF Batteries are defined in TS Limiting Conditions for Operation (LCOs) 3.8.4, "DC Sources - Operating," 3.8.5, "DC Sources - Shutdown," and 3.8.6, "Battery Parameters." LCO 3.8.6 delineates the limits on battery float current as well as electrolyte temperature, level, and float voltage.

This Program which complies with the requirements of TS 5.5.17 provides for monitoring various battery parameters based on the recommendations of Reference 2.

1.5 PROGRAM IMPLEMENTATION

The Battery Monitoring and Maintenance Program contains the methodology and parameters used to ensure the station batteries are capable of meeting design and operating requirements.

As required by TS 5.5.17, this Program provides for the restoration and maintenance, based on the recommendations of Reference 2 or of the battery manufacturer of the following:

1. Actions to restore battery cells with float voltage < 2.13 V, and

2. Actions to equalize and test battery cells that had been discovered with electrolyte level below the minimum established design limit.

This Program is implemented by Technical Requirements Manual Limiting Condition for Operation (TLCO) 3.8.c, "Battery Monitoring and Maintenance." The Bases for TLCO 3.8.c is provided in Attachment A to this Program.

1.6 ACCEPTANCE CRITERIA

The acceptance criteria are contained in station operating or surveillance procedures. TLCO 3.8.c contains the Conditions, Required Actions and associated Completion Times, and Surveillance Requirements required to comply with TS 5.5.17.

1.7 LCOARS/COMPENSATORY MEASURES

TLCO 3.8.c provides the Conditions, Required Actions and associated Completion Times, and Surveillance Requirements required to comply with TS 5.5.17. The requirements of TLCO 3.8.c are proceduralized via the associated LCOAR.

1.8 REPORTING REQUIREMENTS

There are no reporting requirements for the Battery Monitoring and Maintenance Program.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change has been reviewed and determined not to be applicable to Braidwood.

Attachment A

Bases for TLCO 3.8.c, “Battery Monitoring and Maintenance”

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.c Battery Monitoring and Maintenance

BASES

BACKGROUND	This TLCO delineates the requirements of the Battery Monitoring and Maintenance Program in accordance with Technical Specification (TS) 5.5.17. A discussion of the batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources-Operating," LCO 3.8.5, "DC Sources-Shutdown," and LCO 3.8.6, "Battery Parameters."
APPLICABLE SAFETY ANALYSES	The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation. The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the plant. This includes maintaining at least one division of DC sources OPERABLE during accident conditions, in the event of: a. An assumed loss of all offsite AC power or all onsite AC power; and b. A worst case single failure.
LCO	Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met. OPERABILITY of the batteries is defined by LCO 3.8.6, "Battery Parameters."

BASES

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystems. Therefore, battery electrolyte is only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussion in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

The ACTIONS Table is modified by a Note which indicates that separate Condition entry is allowed for each battery. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each affected battery. Complying with the Required Actions for one battery may allow for continued operation, and subsequent battery parameters out of limits are governed by separate Condition entry and application of associated Required Actions.

<u>A.1, A.2, and A.3</u>

With one or more cells in one battery not within limits (i.e., Category A limits not met, Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table T3.8.6-1 in the accompanying TLCO, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met and operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check will provide a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cell. One hour is considered a reasonable amount of time to perform the required verification.

ACTIONS (continued)

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A or B limits. This periodic verification is consistent with the normal Frequency of pilot cell surveillances.

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. With the consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable.

BASES

ACTIONS (continued)

B.1 and B.2

With one battery with one or more battery cells with electrolyte level less than the minimum established design limit (i.e., 1/2” below the minimum level indication mark), TS 5.5.17 requires that the Battery Monitoring and Maintenance Program provide actions to equalize and test the affected battery cell(s). The Specification 5.5.17 item b to initiate action to equalize and test in accordance with manufacturer’s recommendation is taken from Annex D of IEEE Standard 450-1995, “IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications.” 31 days is allowed to equalize and test the affected battery cell(s). However, Condition B is modified by a Note which indicates that Required Actions B.1 and B.2 must be completed after restoring the affected cell electrolyte level to greater than or equal to the minimum established design limits, i.e., after LCO 3.8.6, “Battery Parameters,” Required Action C.3 is completed. With the consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable. Based on the results of the manufacturer’s recommended testing the battery may have to be declared inoperable and the affected cell(s) replaced.

SURVEILLANCE REQUIREMENTS

TSR 3.8.c.1

This TSR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte level of pilot cells.

BASES

SURVEILLANCE REQUIREMENTS (continued)

TSR 3.8.c.2

The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3). In addition, within 7 days of a battery discharge < 110 V or a battery overcharge > 145 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to < 110 V, do not constitute a battery discharge provided the battery terminal voltage and float current return to pre-transient values. This inspection is also consistent with IEEE-450 (Ref. 3), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

TSR 3.8.c.3

Visual inspection to detect corrosion of the battery cells and connections, or measurement of the resistance of each intercell, interrack, intertier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

The limits established for this TSR must not be above the ceiling value established by the manufacturer.

Connection resistance is obtained by subtracting the normal resistance of the interrack (cross room rack) connector or the intertier (bi-level rack) connector from the measured intercell (cell-to-cell) connection resistance.

The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.

BASES

SURVEILLANCE REQUIREMENTS (continued)

TSR 3.8.c.4

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not necessarily represent a failure of this TSR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

TSR 3.8.c.5 and TSR 3.8.c.6

Visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anti-corrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance TSR. The presence of visible corrosion does not necessarily represent a failure of this TSR provided visible corrosion is removed during performance of TSR 3.8.c.5.

The connection resistance limits for TSR 3.8.c.6 shall not be above the ceiling value established by the manufacturer.

Connection resistance is obtained by subtracting the normal resistance of the interrack (cross room rack) connector or the intertier (bi-level rack) connector from the measured intercell (cell-to-cell) connection resistance.

Table T3.8.6-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose temperature, voltage, and electrolyte specific gravity approximate the state of charge of the entire battery.

The Category A limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, footnote (a) to Table T3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendations of IEEE-450 (Ref. 3), which states that prolonged operation of cells < 2.13 V can reduce the life expectancy of cells.

The Category A limit specified for specific gravity for each pilot cell is ≥ 1.200 (0.015 below the manufacturer fully charged nominal specific gravity or a battery charging current that had stabilized at a low value). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C).

The specific gravity readings are corrected for actual electrolyte temperature. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. Footnote (b) to Table T3.8.6-1 requires the float voltage correction for average electrolyte temperature. The Category B limit specified for specific gravity for each connected cell is ≥ 1.195 (0.020 below the manufacturer fully charged, nominal specific gravity) with the average of all connected cells > 1.205 (0.010 below the manufacturer fully charged, nominal specific gravity). These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell will not mask overall degradation of the battery.

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety.

The Category C limits specified for electrolyte level (above the top of the plates and not overflowing) ensure that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C limits for float voltage is based on IEEE-450 (Ref. 3), which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit of average specific gravity ≥ 1.195 is based on manufacturer recommendations (0.020 below the manufacturer recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (d) to Table T3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery recharge. Within 7 days, each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days.

REFERENCES

1. UFSAR, Chapter 6.
2. UFSAR, Chapter 15.
3. IEEE-450-1995.

CONTROL ROOM ENVELOPE HABITABILITY PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

This Program ensures that Control Room Envelope Habitability (CREH) is maintained such that, with an OPERABLE Control Room Ventilation (VC) Filtration System, the Control Room Envelope (CRE) occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge by assessing and performing testing in accordance with Technical Specification (TS) 3.7.10, “Control Room Ventilation (VC) Filtration System” and the Control Room Habitability Program. The CREH Program is defined by TS 5.5.18.

1.2 REFERENCES

1. Technical Specifications:

   a. 3.7.10, "Control Room Ventilation (VC) Filtration System"

   b. 5.5.18, "Control Room Envelope Habitability Program"

2. Update Final Safety Analysis Report Sections:

   a. 6.4, "Habitability Systems"

   b. 9.4.1, "Control Room HVAC System"

3. Regulatory Guide 1.196, “Control Room Habitability at Light-Water Nuclear Power Reactors,” Revision 0

4. NEI 99-03, “Control Room Habitability Assessment Guidance,” Revision 0

5. Design Basis Accident (DBA) Control Room Dose Calculations:

   a. BRW-04-0038-M, “Loss Of Coolant Accident”
   b. BRW-04-0039-M, “Control Rod Ejection Accident”
   c. BRW-04-0040-M, “Main Steam Line Break Accident”
   d. BRW-04-0041-M, “Fuel Handling Building Accident”
   e. BRW-04-0042-M, “Steam Generator Tube Rupture Accident”
   f. BRW-04-0043-M, “Locked Rotor Accident”

1.3 DEFINITIONS AND/OR ACRONYMS

1. BREACH: Any work activity or testing that creates or enlarges an opening through a barrier, which would allow the propagation of a hazard through the barrier. Following are some examples:
   - Modification (addition, removal or degradation) of a penetration seal or structural component
   - Core boring
   - Blocking open a door/hatch or damper
   - Modification (addition, removal, or degradation) of a door/hatch or damper

2. CONTROL ROOM ENVELOPE (CRE): The area within the confines of the control room envelope boundary that contains the spaces Occupants inhabit to control the plant for normal and accident conditions. This area encompasses the control room and other non-critical areas to which frequent personnel access or continuous occupancy is not necessary in the event of an accident. The CRE is protected during normal operation, natural events, and accident conditions. The Braidwood CRE is shown in drawing M-1033-13.

3. CRE BOUNDARY: A combination of walls, floor, roof, ducting, doors, penetrations and equipment that physically form the CRE.

4. CRE INTEGRITY: The condition whereby the control room habitability systems (CRHSs) are functioning to ensure the protection of the Operators in the CRE during normal and accident conditions.

5. CONTROL ROOM HABITABILITY SYSTEMS (CRHS): The plant systems that help ensure CRE habitability. This includes the Control Room (CR) emergency ventilation/filtration system and the Control Room (CR) heating, ventilating and air-conditioning (HVAC) systems. The CRE boundary is considered as an integral part of the CRHS, since it is critical to maintaining CRE habitability.

6. FILTERED INLEAKAGE: This inleakage occurs at a location in the CRHS that allows the inleakage air contamination to be filtered prior to entering the habitability zone. An example is duct inleakage on the suction side of a recirculation air carbon filter where the duct is outside the CRE. Radionuclides are removed from this air prior to it entering the CRE. There is no filtering assumed for hazardous chemical events.

7. INTEGRATED TRACER GAS TEST: A tracer gas test to determine total inleakage into the CRE. The tracer gas test is actually measuring the total amount of outside air entering the CRE, and the inleakage air is determined by subtracting the filtered outside air supply value from this figure. This particular test may not locate leaks; it does, however, provide a value for total inleakage.

8. TRACER GAS (from ASTM E741): A gas that can be mixed with air in very small concentrations in order to study air movement.

9. UNFILTERED INLEAKAGE: This is inleakage that occurs at a location in the CRHS that allows inleakage air to enter the control room envelope without any contaminants being filtered prior to entry. Examples would be penetrations and dampers that are at a negative pressure with respect to potentially contaminated surroundings and located such that radionuclides are not removed prior to the inleakage air entering the CRE.

1.4 PROGRAM DESCRIPTION

This Program ensures that CRE Habitability is maintained in accordance with NRC regulations and plant-specific commitments. Specifically, the CRE Habitability Program ensures compliance with 10 CFR 50, Appendix A, General Design Criterion 19 - Control Room (GDC 19). CRE Habitability must be maintained during normal operations as well as during radiological, hazardous chemical, or smoke event emergencies. Administration of this Program, through periodic inleakage testing, periodic assessments, configuration control, and preventive maintenance, will ensure that CRE Habitability and Integrity are maintained. This CRE Habitability Program is the result of an NRC commitment to Generic Letter 2003-01 for all Exelon Nuclear / AmerGen plant Technical Specifications to have an administrative program for CRE Habitability.

1.5 PROGRAM IMPLEMENTATION

A CRE Habitability Program shall be established and implemented to ensure that CRE Habitability is maintained such that, with an OPERABLE Control Room Emergency Ventilation/Filtration System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of 5 rem total effective dose equivalent (TEDE) for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

d. Measurement of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one train of the Control Room Emergency Ventilation/Filtration System, operating at the flow rate required by the Ventilation Filter Testing Program, at a Frequency of 18 months on a STAGGERED TEST BASIS. The results shall be trended and used as part of the 18 month~~s~~ assessment of the CRE boundary.

e. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.

1.6 ACCEPTANCE CRITERIA

1. The quantitative limits on unfiltered air inleakage do not exceed the values assumed in the dose analysis for DBAs.

2. Periodic Assessments do not identify any degraded conditions or programs that could result in exceeding the licensing basis analysis of DBA consequences to the CRE occupants.

1.7 LCOARS/COMPENSATORY MEASURES

In the event any of the acceptance criteria is not met, the Shift Manager will immediately be notified. The Shift Manager shall determine OPERABILITY status and implement a LCOAR as applicable. In addition, an Issue Report may be generated to provide proper tracking and resolution of the noted problems associated with the implementation of this program.

1.8 REPORTING REQUIREMENTS

Any reporting requirements associated with acceptance criteria of this Program not being met shall be reported in accordance with the requirements specified in the implementing procedures or determined through the Corrective Action Process.

1.9 <u>CHANGE CONTROL</u>

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Braidwood has been reviewed and was determined not to be applicable to Byron.

SURVEILLANCE FREQUENCY CONTROL PROGRAM
BRAIDWOOD

TABLE OF CONTENTS

SECTION	TITLE
1.1	PURPOSE
1.2	REFERENCES
1.3	DEFINITIONS AND/OR ACRONYMS
1.4	PROGRAM DESCRIPTION
1.5	PROGRAM IMPLEMENTATION
1.6	ACCEPTANCE CRITERIA
1.7	LCOARS/COMPENSATORY MEASURES
1.8	REPORTING REQUIREMENTS
1.9	CHANGE CONTROL

1.1 PURPOSE

The purpose of this Program is to provide the administrative controls for modifying surveillance frequencies in accordance with Technical Specification (TS) 5.5.19, “Surveillance Frequency Control Program.” The Surveillance Frequency Control Program (SFCP) ensures that Surveillance Requirements specified in the TSs are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met.

1.2 REFERENCES

1. Technical Specification 5.5.19, "Surveillance Frequency Control Program"
2. NEI 04-10, “Risk-Informed Method for Control of Surveillances Frequencies,” Revision 1
3. Letter from N.J. DiFrancesco (U. S. NRC) to M.J. Pacilio (Exelon Generation Company, LLC), "Braidwood Station, Units 1 and 2 - Issuance of Amendments Regarding Technical Specification Change for the Relocation of Specific Surveillance Frequency Requirements Based on Technical Specification Task Force-425," dated February 24, 2011.

1.3 DEFINITIONS AND/OR ACRONYMS

Definitions and/or acronyms are consistent with definitions provided in Technical Specification Section 1.0, "Use and Application."

1.4 PROGRAM DESCRIPTIONS

The list of periodic surveillances and associated TS Bases information that were relocated to the SFCP as part of License Amendment No. 165 for Braidwood Station, Units 1 and Unit 2 are provided in a separate tab in the TS LCO book for ease of locating.

Table 1 under this tab includes a reference to the TS SR number, a surveillance description, the frequency, and current revision. The description is a summary description of the referenced TS SR which is provided for information purposes only and is not intended to be a substitute for the actual TS requirements. Refer to the TS for the specific action required by each respective TS SR identified in the list.

Table 2 under this tab provides the associated Bases description for each TS SR Frequency.

Changes to the type or scope of testing (e.g., Channel Check, Channel Functional Test, or Channel Calibration) are not allowed without prior NRC approval. The specified frequencies ensure TS SRs are performed at intervals sufficient to assure associated Limiting Conditions for Operation (LCOs) are met.

Changes to the information in Tables 1 and 2 may occur for one of two reasons:

1. Addition, deletion, or modification of the associated TS SR through a license amendment request, or

2. A change to a surveillance frequency in accordance with the SFCP and associated implementing procedures. Changes to individual surveillance frequencies are evaluated using the methodology provided in NEI 04-10, "Risk-Informed Method for Control of Surveillance Frequencies," Revision 1.

As noted in Tables 1 and 2, Surveillance Frequencies beyond Revision 0 have been evaluated in accordance with TS Section 5.5.19, “Surveillance Frequency Control Program.” Surveillance frequencies at Revision 0 reflect the approved licensing basis upon initial SFCP implementation.

The provisions of TS SR 3.0.2 and 3.0.3 are applicable to the frequencies established in the SFCP.

1.5 PROGRAM IMPLEMENTATION

Changes to the Frequencies listed in the Surveillance Frequency Control Program shall be made in accordance with NEI 04-10, "Risk-Informed Method for control of Surveillance Frequencies," Revision 1.

1.6 ACCEPTANCE CRITERIA

Not applicable.

1.7 LCOARS/COMPENSATORY MEASURES

Noncompliance with the frequencies specified in the SFCP (e.g., a missed surveillance) requires generation of an Issue Report in accordance with LS-AA-125.

1.8 REPORTING REQUIREMENTS

Based on the guidance provided in NUREG-1022, "Event Reporting Guidelines, 10 CFR 50.72 and 50.73," Revision 2, missed surveillances are not reportable as a condition prohibited by TS unless the surveillance, once performed, indicates that the equipment was not capable of performing its specified safety function(s) for a period of time longer than allowed by TS.

1.9 CHANGE CONTROL

The change control process associated with revisions to Surveillance Frequencies is defined in NEI 04-10, “Risk-Informed Method for Control of Surveillances Frequencies,” Revision 1.

CORE OPERATING LIMITS REPORT (COLR)

FOR

BRAIDWOOD UNIT 1 CYCLE 20

EXELON TRACKING ID:

COLR BRAIDWOOD 1 REVISION 13

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Braidwood Station Unit 1 Cycle 20 has been prepared in accordance with the requirements of Technical Specification 5.6.5 (ITS).

The Technical Specification Safety Limits and Limiting Conditions for Operation (LCOs) affected by this report are listed below:

SL	2.1.1	Reactor Core Safety Limits (SLs)
LCO	3.1.1	SHUTDOWN MARGIN (SDM)
LCO	3.1.3	Moderator Temperature Coefficient (MTC)
LCO	3.1.4	Rod Group Alignment Limits
LCO	3.1.5	Shutdown Bank Insertion Limits
LCO	3.1.6	Control Bank Insertion Limits
LCO	3.1.8	PHYSICS TESTS Exceptions – MODE 2
LCO	3.2.1	Heat Flux Hot Channel Factor ($F_Q(Z)$)
LCO	3.2.2	Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)
LCO	3.2.3	AXIAL FLUX DIFFERENCE (AFD)
LCO	3.2.5	Departure from Nucleate Boiling Ratio (DNBR)
LCO	3.3.1	Reactor Trip System (RTS) Instrumentation
LCO	3.3.9	Boron Dilution Protection System (BDPS)
LCO	3.4.1	Reactor Coolant System (RCS) Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
LCO	3.9.1	Boron Concentration

The portions of the Technical Requirements Manual (TRM) affected by this report are listed below:

TRM TLCO 3.1.b	Boration Flow Paths – Operating
TRM TLCO 3.1.d	Charging Pumps – Operating
TRM TLCO 3.1.f	Borated Water Sources – Operating
TRM TLCO 3.1.g	Position Indication System – Shutdown
TRM TLCO 3.1.h	Shutdown Margin (SDM) – MODE 1 and MODE 2 with keff ≥ 1.0
TRM TLCO 3.1.i	Shutdown Margin (SDM) – MODE 5
TRM TLCO 3.1.j	Shutdown and Control Rods
TRM TLCO 3.1.k	Position Indication System – Shutdown (Special Test Exception)

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

2.0 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented in the following subsections. These limits are applicable for the entire cycle unless otherwise identified. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 5.6.5.

2.1 Reactor Core Safety Limits (SLs) (SL 2.1.1)

2.1.1 In MODES 1 and 2, the combination of Thermal Power, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the limits specified in Figure 2.1.1.

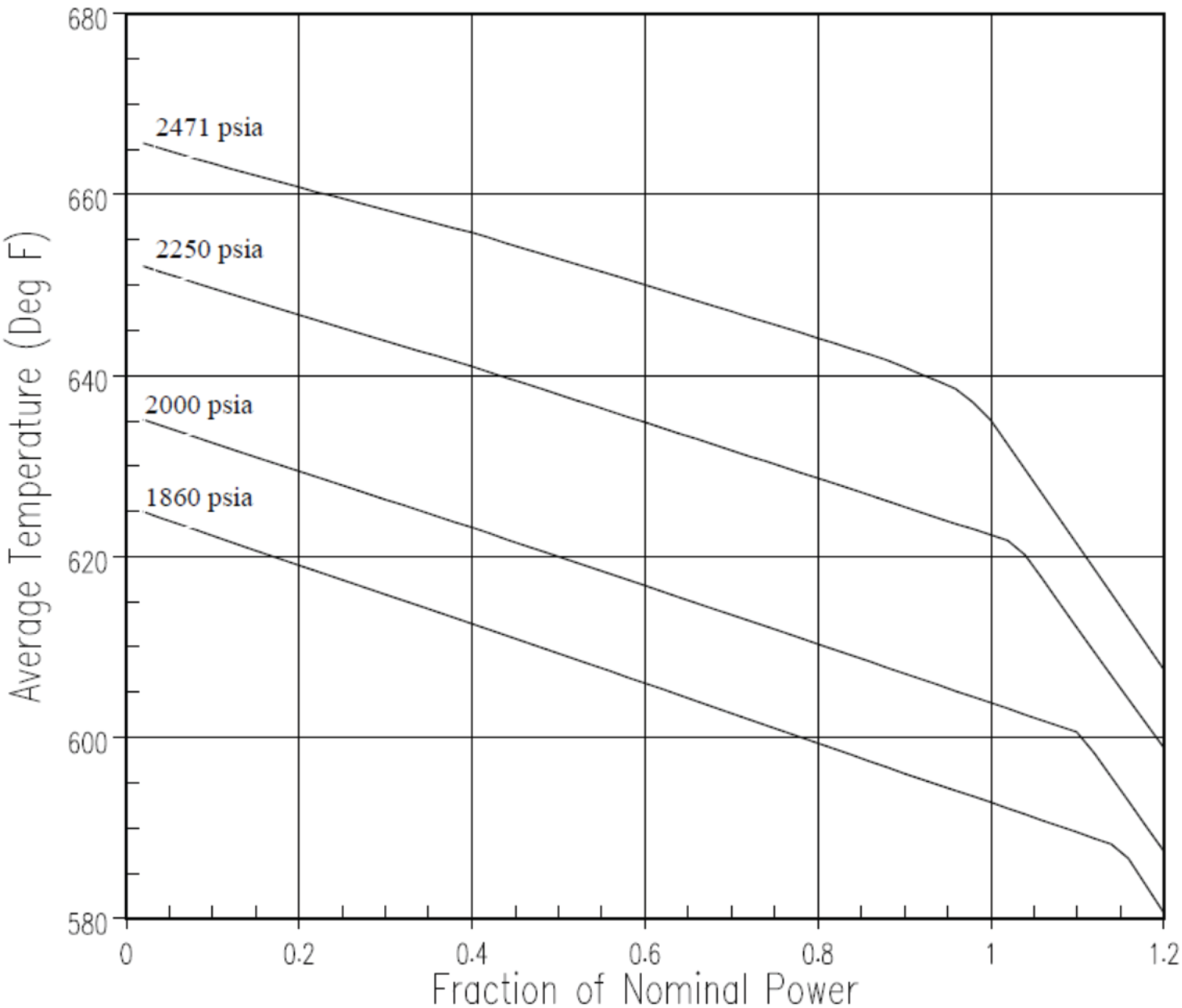


Figure 2.1.1: Reactor Core Limits

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

2.2 SHUTDOWN MARGIN (SDM)

The SDM limit for MODES 1, 2, 3, and 4 is:

2.2.1 The SDM shall be greater than or equal to 1.3% $\Delta k/k$ (LCOs 3.1.1, 3.1.4, 3.1.5, 3.1.6, 3.1.8, 3.3.9; TRM TLCOs 3.1.b, 3.1.d, 3.1.f, 3.1.h, and 3.1.j).

The SDM limit for MODE 5 is:

2.2.2 SDM shall be greater than or equal to 1.3% $\Delta k/k$ (LCO 3.1.1, LCO 3.3.9; TRM TLCOs 3.1.i and 3.1.j).

2.3 Moderator Temperature Coefficient (MTC) (LCO 3.1.3)

The Moderator Temperature Coefficient (MTC) limits are:

2.3.1 The BOL/ARO/HZP-MTC upper limit shall be $+2.104 \times 10^{-5}$ $\Delta k/k/°F$.

2.3.2 The EOL/ARO/HFP-MTC lower limit shall be -4.6×10^{-4} $\Delta k/k/°F$.

2.3.3 The EOL/ARO/HFP-MTC Surveillance limit at 300 ppm shall be -3.7×10^{-4} $\Delta k/k/°F$.

2.3.4 The EOL/ARO/HFP-MTC Surveillance limit at 60 ppm shall be -4.3×10^{-4} $\Delta k/k/°F$.

where: BOL stands for Beginning of Cycle Life
ARO stands for All Rods Out
HZP stands for Hot Zero Thermal Power
EOL stands for End of Cycle Life
HFP stands for Hot Full Thermal Power

2.4 Shutdown Bank Insertion Limits (LCO 3.1.5)

2.4.1 All shutdown banks shall be fully withdrawn to at least 224 steps.

2.5 Control Bank Insertion Limits (LCO 3.1.6)

2.5.1 The control banks, with Bank A greater than or equal to 224 steps, shall be limited in physical insertion as shown in Figure 2.5.1.

2.5.2 Each control bank shall be considered fully withdrawn from the core at greater than or equal to 224 steps.

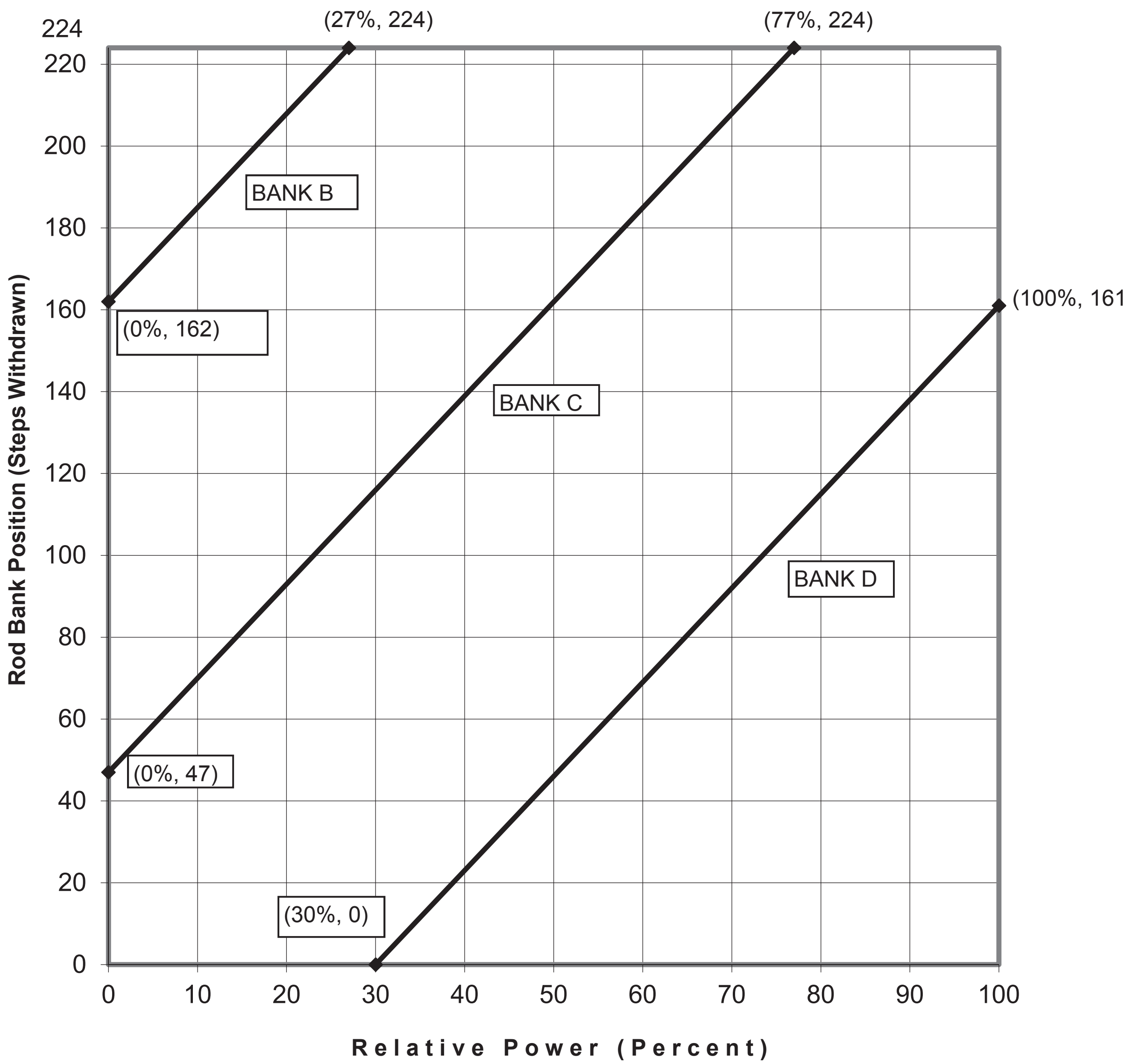
2.5.3 The control banks shall be operated in sequence by withdrawal of Bank A, Bank B, Bank C and Bank D. The control banks shall be sequenced in reverse order upon insertion.

2.5.4 Each control bank not fully withdrawn from the core shall be operated with the following overlap limits as a function of park position:

Park Position (step)	Overlap Limit (step)
226	111
227	112
228	113
229	114

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

Figure 2.5.1:
Control Bank Insertion Limits Versus Percent Rated Thermal Power



CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

2.6 Heat Flux Hot Channel Factor ($F_Q(Z)$) (LCO 3.2.1)

2.6.1 Total Peaking Factor:

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} x K(Z) \quad \text{for P} \leq 0.5$$

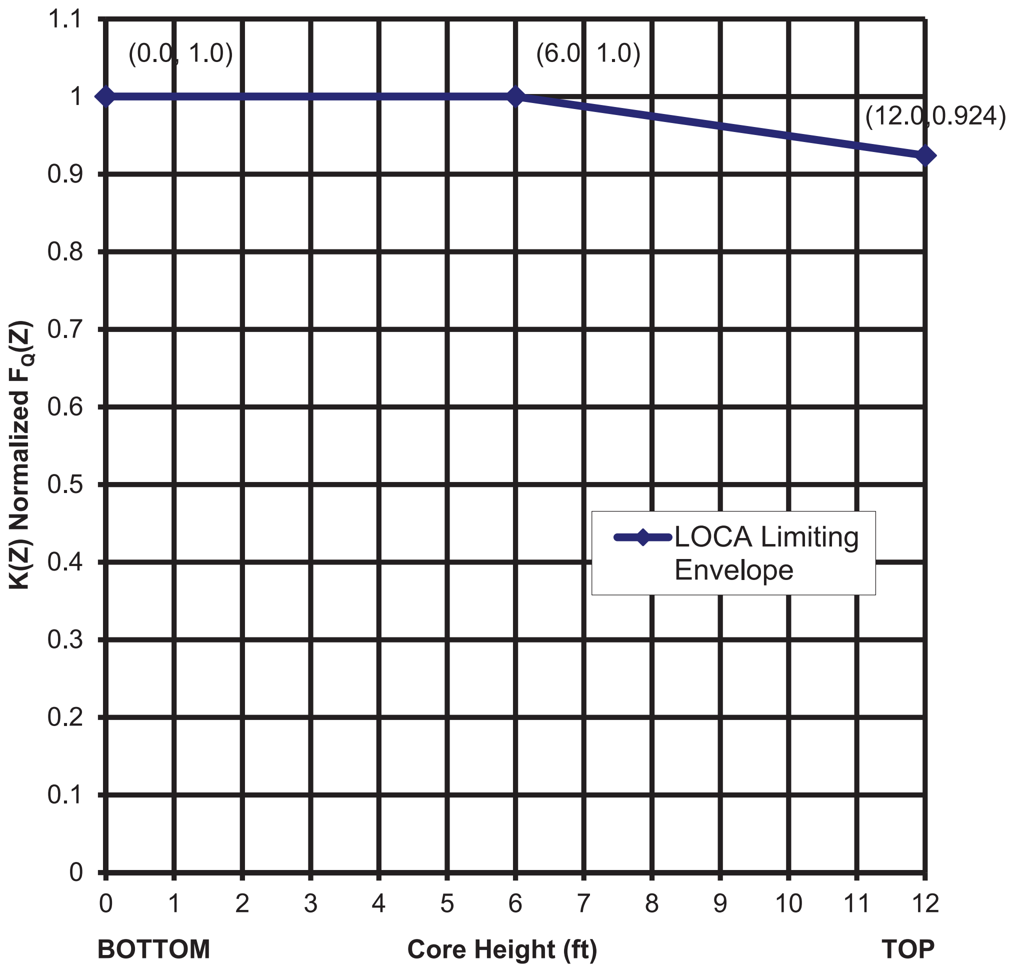
$$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} x K(Z) \quad \text{for P} > 0.5$$

where: P = the ratio of THERMAL POWER to RATED THERMAL POWER

F_Q^{RTP} = 2.60

K(Z) is provided in Figure 2.6.1.

Figure 2.6.1
K(Z) - Normalized $F_Q(Z)$ as a Function of Core Height



CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

2.6.2 W(Z) Values:

a) When the Power Distribution Monitoring System (PDMS) is OPERABLE,
W(Z) = 1.00000 for all axial points.

b) When PDMS is inoperable, W(Z) is provided as:

1) Table 2.6.2.a are the normal operation W(Z) values that correspond to the NORMAL AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits provided in Figure 2.8.1.a. The normal operation W(Z) values have been determined at burnups of 150, 6000, 14000, and 20000 MWD/MTU. The Normal AFD Acceptable Operation Limits may be invoked at any time and must be used with the corresponding W(Z) values.

2) Table 2.6.2.b are the Expanded normal operation W(Z) values that correspond to the EXPANDED AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits provided in Figure 2.8.1.b. The Expanded normal operation W(Z) values have been determined at burnups of 150, 6000, 14000, and 20000 MWD/MTU. The Expanded AFD Acceptable Operation Limits may be invoked at any time and must be used with the corresponding W(Z) values.

Table 2.6.2.c shows the $F^C_Q(z)$ penalty factors that are greater than 2% per 31 Effective Full Power Days (EFPD). These values shall be used to increase the $F^W_Q(z)$ as per Surveillance Requirement 3.2.1.2. A 2% penalty factor shall be used at all cycle burnups that are outside the range of Table 2.6.2.c.

2.6.3 Uncertainty:

The uncertainty, U_{FQ}, to be applied to the Heat Flux Hot Channel Factor $F_Q(Z)$ shall be calculated by the following formula

$$U_{FQ} = U_{qu} \bullet U_e$$

where:

U_{qu} = Base F_Q measurement uncertainty = 1.05 when PDMS is inoperable
(U_{qu} is defined by PDMS when OPERABLE.)
U_e = Engineering uncertainty factor = 1.03

2.6.4 PDMS Alarms:

$F_Q(Z)$ Warning Setpoint = 2% $F_Q(Z)$ Margin
$F_Q(Z)$ Alarm Setpoint = 0% $F_Q(Z)$ Margin

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

Table 2.6.2.a

W(Z) versus Core Height for Normal AFD Acceptable Operation Limits in Figure 2.8.1.a
(Top and Bottom 8% Excluded per WCAP-10216)

Height (feet)	150 MWD/MTU	6000 MWD/MTU	14000 MWD/MTU	20000 MWD/MTU
0.00 (core bottom)	1.1846	1.3192	1.2784	1.2178
0.20	1.1761	1.2860	1.2570	1.2116
0.40	1.1735	1.2680	1.2477	1.2118
0.60	1.1674	1.2574	1.2379	1.2100
0.80	1.1549	1.2388	1.2217	1.2029
1.00	1.1433	1.2202	1.2102	1.2015
1.20	1.1372	1.2102	1.1954	1.1921
1.40	1.1307	1.2051	1.1839	1.1861
1.60	1.1301	1.1876	1.1754	1.1767
1.80	1.1396	1.1715	1.1725	1.1676
2.00	1.1335	1.1564	1.1695	1.1569
2.20	1.1254	1.1383	1.1626	1.1437
2.40	1.1179	1.1232	1.1577	1.1313
2.60	1.1098	1.1072	1.1498	1.1164
2.80	1.1022	1.1070	1.1428	1.1073
3.00	1.0956	1.1067	1.1359	1.1043
3.20	1.0934	1.1043	1.1270	1.1042
3.40	1.0913	1.1040	1.1194	1.1117
3.60	1.0927	1.1023	1.1121	1.1202
3.80	1.0974	1.1018	1.1064	1.1289
4.00	1.1013	1.1011	1.1061	1.1427
4.20	1.1052	1.1001	1.1115	1.1554
4.40	1.1081	1.0990	1.1167	1.1668
4.60	1.1102	1.0959	1.1208	1.1764
4.80	1.1115	1.0937	1.1229	1.1864
5.00	1.1116	1.0918	1.1241	1.1935
5.20	1.1110	1.0879	1.1260	1.1991
5.40	1.1195	1.0848	1.1288	1.2028
5.60	1.1269	1.0848	1.1322	1.2043
5.80	1.1339	1.0917	1.1496	1.2082
6.00	1.1406	1.1002	1.1661	1.2247
6.20	1.1453	1.1069	1.1807	1.2383
6.40	1.1490	1.1136	1.1932	1.2499
6.60	1.1508	1.1194	1.2019	1.2565
6.80	1.1526	1.1233	1.2105	1.2622
7.00	1.1524	1.1283	1.2153	1.2639
7.20	1.1511	1.1362	1.2181	1.2617
7.40	1.1579	1.1451	1.2189	1.2556
7.60	1.1665	1.1532	1.2158	1.2456
7.80	1.1742	1.1614	1.2127	1.2346
8.00	1.1776	1.1678	1.2068	1.2226
8.20	1.1773	1.1735	1.1989	1.2058
8.40	1.1757	1.1794	1.1901	1.1910
8.60	1.1744	1.1895	1.1793	1.1752
8.80	1.1743	1.2061	1.1748	1.1629
9.00	1.1795	1.2205	1.1740	1.1651
9.20	1.1861	1.2374	1.1786	1.1653
9.40	1.1912	1.2495	1.1845	1.2010
9.60	1.1955	1.2624	1.1895	1.2470
9.80	1.1999	1.2716	1.2220	1.2860
10.00	1.2036	1.2791	1.2470	1.3200
10.20	1.2081	1.2795	1.2710	1.3566
10.40	1.2152	1.2848	1.2905	1.3884
10.60	1.2197	1.2830	1.3093	1.4162
10.80	1.2261	1.2916	1.3241	1.4320
11.00	1.2347	1.3023	1.3349	1.4418
11.20	1.2426	1.2988	1.3308	1.4347
11.40	1.2449	1.3089	1.3286	1.4176
11.60	1.2471	1.3118	1.3086	1.4116
11.80	1.2495	1.3147	1.2916	1.3956
12.00 (core top)	1.2557	1.3252	1.2794	1.3834

Note: W(Z) values at 20000 MWD/MTU may be applied to cycle burnups greater than 20000 MWD/MTU to prevent W(Z) function extrapolation

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

Table 2.6.2.b

W(Z) versus Core Height for Expanded AFD Acceptable Operation Limits in Figure 2.8.1.b
(Top and Bottom 8% Excluded per WCAP-10216)

Height (feet)	150 MWD/MTU	6000 MWD/MTU	14000 MWD/MTU	20000 MWD/MTU
0.00 (core bottom)	1.3461	1.4594	1.4170	1.3451
0.20	1.3317	1.4199	1.3910	1.3358
0.40	1.3275	1.4011	1.3800	1.3350
0.60	1.3192	1.3900	1.3680	1.3362
0.80	1.2964	1.3686	1.3480	1.3268
1.00	1.2776	1.3461	1.3340	1.3233
1.20	1.2661	1.3332	1.3160	1.3110
1.40	1.2554	1.3260	1.3020	1.3025
1.60	1.2533	1.3026	1.2840	1.2902
1.80	1.2578	1.2819	1.2700	1.2788
2.00	1.2449	1.2612	1.2550	1.2654
2.20	1.2275	1.2368	1.2370	1.2483
2.40	1.2118	1.2153	1.2240	1.2330
2.60	1.1943	1.1924	1.2112	1.2140
2.80	1.1785	1.1835	1.2014	1.1958
3.00	1.1638	1.1785	1.1906	1.1796
3.20	1.1567	1.1718	1.1799	1.1625
3.40	1.1527	1.1674	1.1720	1.1565
3.60	1.1477	1.1605	1.1619	1.1552
3.80	1.1427	1.1547	1.1532	1.1543
4.00	1.1367	1.1473	1.1436	1.1534
4.20	1.1366	1.1385	1.1364	1.1554
4.40	1.1373	1.1301	1.1317	1.1668
4.60	1.1367	1.1203	1.1255	1.1764
4.80	1.1355	1.1104	1.1229	1.1864
5.00	1.1331	1.1006	1.1241	1.1935
5.20	1.1295	1.0888	1.1260	1.1991
5.40	1.1259	1.0848	1.1288	1.2028
5.60	1.1269	1.0848	1.1322	1.2043
5.80	1.1339	1.0917	1.1496	1.2082
6.00	1.1406	1.1002	1.1661	1.2247
6.20	1.1453	1.1069	1.1807	1.2383
6.40	1.1490	1.1136	1.1932	1.2499
6.60	1.1508	1.1194	1.2019	1.2565
6.80	1.1526	1.1233	1.2105	1.2622
7.00	1.1524	1.1283	1.2153	1.2639
7.20	1.1511	1.1362	1.2181	1.2617
7.40	1.1579	1.1451	1.2189	1.2556
7.60	1.1665	1.1532	1.2158	1.2456
7.80	1.1742	1.1614	1.2127	1.2346
8.00	1.1776	1.1678	1.2068	1.2226
8.20	1.1773	1.1735	1.1989	1.2058
8.40	1.1757	1.1794	1.1901	1.1910
8.60	1.1744	1.1895	1.1793	1.1752
8.80	1.1743	1.2061	1.1748	1.1629
9.00	1.1795	1.2205	1.1740	1.1651
9.20	1.1861	1.2374	1.1786	1.1653
9.40	1.1912	1.2495	1.1845	1.2010
9.60	1.1955	1.2624	1.1895	1.2470
9.80	1.1999	1.2716	1.2220	1.2860
10.00	1.2036	1.2791	1.2470	1.3200
10.20	1.2081	1.2795	1.2710	1.3566
10.40	1.2152	1.2848	1.2905	1.3884
10.60	1.2197	1.2830	1.3093	1.4162
10.80	1.2261	1.2916	1.3241	1.4320
11.00	1.2347	1.3023	1.3349	1.4418
11.20	1.2426	1.2988	1.3308	1.4347
11.40	1.2449	1.3089	1.3286	1.4176
11.60	1.2471	1.3118	1.3086	1.4116
11.80	1.2495	1.3147	1.2916	1.3956
12.00 (core top)	1.2557	1.3252	1.2794	1.3834

Note: W(Z) values at 20000 MWD/MTU may be applied to cycle burnups greater than 20000 MWD/MTU to prevent W(Z) function extrapolation

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

Table 2.6.2.c
Penalty Factors in Excess of 2% per 31 EFPD

Cycle Burnup (MWD/MTU)	**Penalty Factor $F^C_Q(z)$**
0	1.0200
501	1.0200
676	1.0304
852	1.0392
1027	1.0450
1202	1.0487
1378	1.0501
2781	1.0200
13830	1.0200
14006	1.0207
14882	1.0203
15058	1.0200
16461	1.0200
17162	1.0225
17864	1.0255
18215	1.0258
18566	1.0255
18916	1.0230
19267	1.0200
24768	1.0200

Notes:

Linear interpolation is adequate for intermediate cycle burnups.

All cycle burnups outside the range of Table 2.6.2.c shall use a 2% penalty factor for compliance with the 3.2.1.2 Surveillance Requirements.

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

2.7 Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$) (LCO 3.2.2)

2.7.1 $F^N_{\Delta H} \leq F^{RTP}_{\Delta H}[1.0 + PF_{\Delta H}(1.0 - P)]$

where: P = the ratio of THERMAL POWER to RATED THERMAL POWER (RTP)
$F^{RTP}_{\Delta H}$ = 1.70
$PF_{\Delta H}$ = 0.3

2.7.2 Uncertainty:

The uncertainty, $U_{F\Delta H}$, to be applied to the Nuclear Enthalpy Rise Hot Channel Factor $F^N_{\Delta H}$ shall be calculated by the following formula:

$U_{F\Delta H} = U_{F\Delta Hm}$

where:

$U_{F\Delta Hm}$ = Base $F^N_{\Delta H}$ measurement uncertainty = 1.04 when PDMS is inoperable
($U_{F\Delta Hm}$ is defined by PDMS when OPERABLE.)

2.7.3 PDMS Alarms:

$F^N_{\Delta H}$ Warning Setpoint = 2% $F^N_{\Delta H}$ Margin
$F^N_{\Delta H}$ Alarm Setpoint = 0% $F^N_{\Delta H}$ Margin

2.8 AXIAL FLUX DIFFERENCE (AFD) (LCO 3.2.3)

2.8.1 When PDMS is inoperable, the AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits are provided in the Figures described below or the latest valid PDMS Surveillance Report, whichever is more conservative.

a) Figure 2.8.1.a is the Normal AFD Acceptable Operation Limits associated with the W(Z) values in Table 2.6.2.a. Prior to changing to Figure 2.8.1.a, confirm that the plant is within the specified AFD envelope.

b) Figure 2.8.1.b is the Expanded AFD Acceptable Operation Limits associated with the W(Z) values in Table 2.6.2.b.

2.8.2 When PDMS is OPERABLE, no AFD Acceptable Operation Limits are applicable.

2.9 Departure from Nucleate Boiling Ratio (DNBR) (LCO 3.2.5)

2.9.1 $DNBR_{APSL} \geq 1.563$

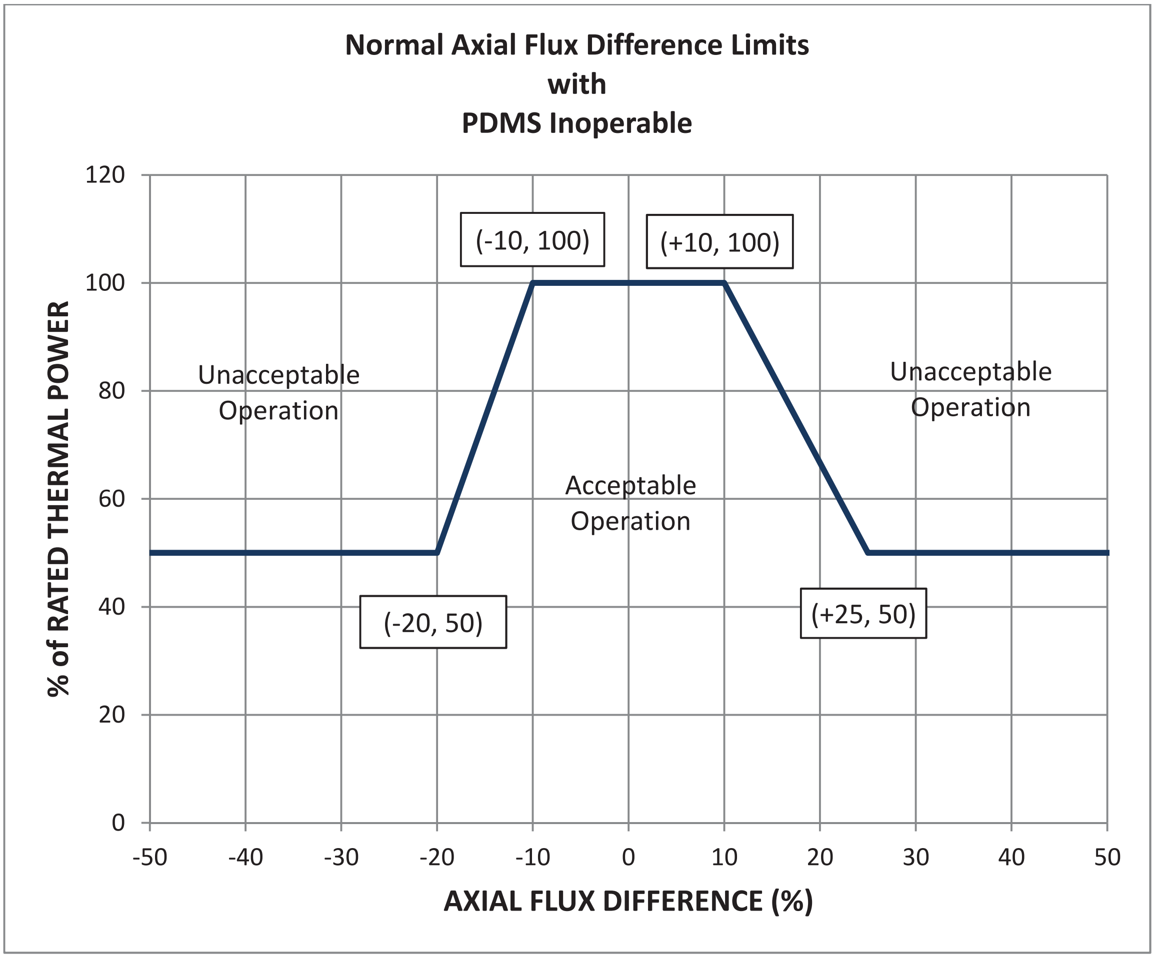
The Axial Power Shape Limiting DNBR ($DNBR_{APSL}$) is applicable with THERMAL POWER ≥ 50% RTP when PDMS is OPERABLE.

2.9.2 PDMS Alarms:

DNBR Warning Setpoint = 2% DNBR Margin
DNBR Alarm Setpoint = 0% DNBR Margin

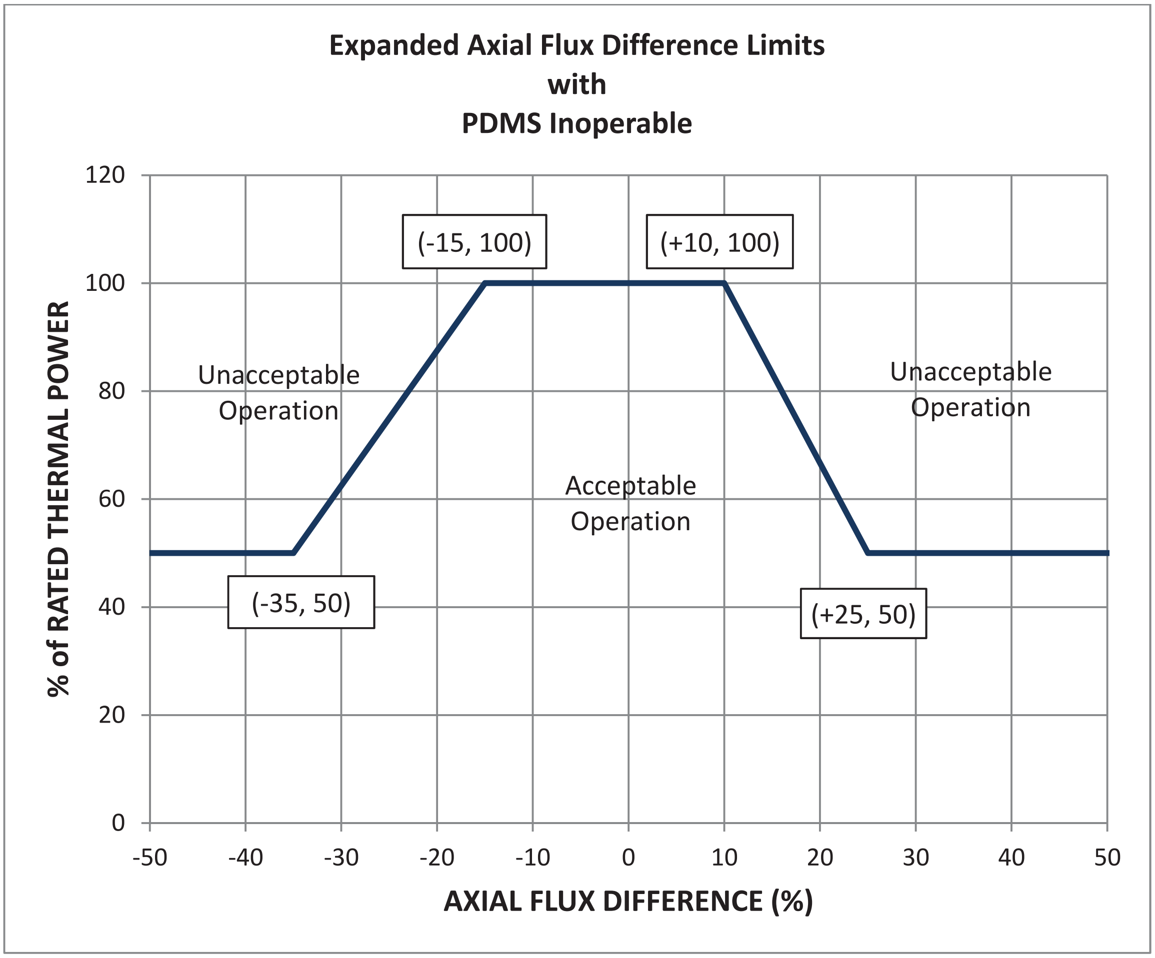
CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

Figure 2.8.1.a:
Normal Axial Flux Difference Limits
as a Function of Rated Thermal Power



CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

Figure 2.8.1.b:
Expanded Axial Flux Difference Limits
as a Function of Rated Thermal Power



CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

2.10 Reactor Trip System (RTS) Instrumentation (LCO 3.3.1) - Overtemperature ΔT Setpoint Parameter Values

2.10.1 The Overtemperature ΔT reactor trip setpoint K_1 shall be equal to 1.325.

2.10.2 The Overtemperature ΔT reactor trip setpoint T_{avg} coefficient K_2 shall be equal to 0.0297 / °F.

2.10.3 The Overtemperature ΔT reactor trip setpoint pressure coefficient K_3 shall be equal to 0.00135 / psi.

2.10.4 The nominal T_{avg} at RTP (indicated) T′ shall be less than or equal to 588.0 °F.

2.10.5 The nominal RCS operating pressure (indicated) P′ shall be equal to 2235 psig.

2.10.6 The measured reactor vessel ΔT lead/lag time constant τ_1 shall be equal to 8 sec.

2.10.7 The measured reactor vessel ΔT lead/lag time constant τ_2 shall be equal to 3 sec.

2.10.8 The measured reactor vessel ΔT lag time constant τ_3 shall be less than or equal to 2 sec.

2.10.9 The measured reactor vessel average temperature lead/lag time constant τ_4 shall be equal to 33 sec.

2.10.10 The measured reactor vessel average temperature lead/lag time constant τ_5 shall be equal to 4 sec.

2.10.11 The measured reactor vessel average temperature lag time constant τ_6 shall be less than or equal to 2 sec.

2.10.12 The f_1 (ΔI) “positive” breakpoint shall be +10% ΔI.

2.10.13 The f_1 (ΔI) “negative” breakpoint shall be -18% ΔI.

2.10.14 The f_1 (ΔI) “positive” slope shall be +3.47% / % ΔI.

2.10.15 The f_1 (ΔI) “negative” slope shall be -2.61% / % ΔI.

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

2.11 Reactor Trip System (RTS) Instrumentation (LCO 3.3.1) - Overpower ΔT Setpoint Parameter Values

2.11.1 The Overpower ΔT reactor trip setpoint K_4 shall be equal to 1.072.

2.11.2 The Overpower ΔT reactor trip setpoint T_{avg} rate/lag coefficient K_5 shall be equal to 0.02 / °F for increasing T_{avg}.

2.11.3 The Overpower ΔT reactor trip setpoint T_{avg} rate/lag coefficient K_5 shall be equal to 0 / °F for decreasing T_{avg}.

2.11.4 The Overpower ΔT reactor trip setpoint T_{avg} heatup coefficient K_6 shall be equal to 0.00245 / °F when $T > T''$.

2.11.5 The Overpower ΔT reactor trip setpoint T_{avg} heatup coefficient K_6 shall be equal to 0 / °F when $T \leq T''$.

2.11.6 The nominal T_{avg} at RTP (indicated) T'' shall be less than or equal to 588.0 °F.

2.11.7 The measured reactor vessel ΔT lead/lag time constant τ_1 shall be equal to 8 sec.

2.11.8 The measured reactor vessel ΔT lead/lag time constant τ_2 shall be equal to 3 sec.

2.11.9 The measured reactor vessel ΔT lag time constant τ_3 shall be less than or equal to 2 sec.

2.11.10 The measured reactor vessel average temperature lag time constant τ_6 shall be less than or equal to 2 sec.

2.11.11 The measured reactor vessel average temperature rate/lag time constant τ_7 shall be equal to 10 sec.

2.11.12 The f_2 (ΔI) “positive” breakpoint shall be 0 for all ΔI.

2.11.13 The f_2 (ΔI) “negative” breakpoint shall be 0 for all ΔI.

2.11.14 The f_2 (ΔI) “positive” slope shall be 0 for all ΔI.

2.11.15 The f_2 (ΔI) “negative” slope shall be 0 for all ΔI.

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 1 CYCLE 20

2.12 Reactor Coolant System (RCS) Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (LCO 3.4.1)

2.12.1 The pressurizer pressure shall be greater than or equal to 2209 psig.

2.12.2 The RCS average temperature (T_{avg}) shall be less than or equal to 593.1 °F.

2.12.3 The RCS total flow rate shall be greater than or equal to 386,000 gpm.

2.13 Boron Concentration

2.13.1 The refueling boron concentration shall be greater than or equal to the applicable value given in the Table below (LCO 3.9.1). The reported "prior to initial criticality" value also bounds the end-of-cycle requirements for the previous cycle.

2.13.2 To maintain keff ≤ 0.987 with all shutdown and control rods fully withdrawn in MODES 3, 4, or 5 (TRM TLCO 3.1.g Required Action B.2 and TRM TLCO 3.1.k.2), the Reactor Coolant System boron concentration shall be greater than or equal to the applicable value given in the Table below.

COLR Section	Conditions	Boron Concentration (ppm)
2.13.1	a) prior to initial criticality	1723
	b) for cycle burnups ≥ 0 MWD/MTU and < 16000 MWD/MTU	1823
	c) for cycle burnups ≥ 16000 MWD/MTU	1486
2.13.2	a) prior to initial criticality	1780
	b) for cycle burnups ≥ 0 MWD/MTU and < 16000 MWD/MTU	2014
	c) for cycle burnups ≥ 16000 MWD/MTU	1610

CORE OPERATING LIMITS REPORT (COLR)

FOR

BRAIDWOOD UNIT 2 CYCLE 19

EXELON TRACKING ID:

COLR BRAIDWOOD 2 REVISION 9

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Braidwood Station Unit 2 Cycle 19 has been prepared in accordance with the requirements of Technical Specification 5.6.5 (ITS).

The Technical Specification Safety Limits and Limiting Conditions for Operation (LCOs) affected by this report are listed below:

SL	2.1.1	Reactor Core Safety Limits (SLs)
LCO	3.1.1	SHUTDOWN MARGIN (SDM)
LCO	3.1.3	Moderator Temperature Coefficient (MTC)
LCO	3.1.4	Rod Group Alignment Limits
LCO	3.1.5	Shutdown Bank Insertion Limits
LCO	3.1.6	Control Bank Insertion Limits
LCO	3.1.8	PHYSICS TESTS Exceptions – MODE 2
LCO	3.2.1	Heat Flux Hot Channel Factor ($F_Q(Z)$)
LCO	3.2.2	Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)
LCO	3.2.3	AXIAL FLUX DIFFERENCE (AFD)
LCO	3.2.5	Departure from Nucleate Boiling Ratio (DNBR)
LCO	3.3.1	Reactor Trip System (RTS) Instrumentation
LCO	3.3.9	Boron Dilution Protection System (BDPS)
LCO	3.4.1	Reactor Coolant System (RCS) Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
LCO	3.9.1	Boron Concentration

The portions of the Technical Requirements Manual (TRM) affected by this report are listed below:

TRM TLCO 3.1.b	Boration Flow Paths – Operating
TRM TLCO 3.1.d	Charging Pumps – Operating
TRM TLCO 3.1.f	Borated Water Sources – Operating
TRM TLCO 3.1.g	Position Indication System – Shutdown
TRM TLCO 3.1.h	Shutdown Margin (SDM) – MODE 1 and MODE 2 with keff ≥ 1.0
TRM TLCO 3.1.i	Shutdown Margin (SDM) – MODE 5
TRM TLCO 3.1.j	Shutdown and Control Rods
TRM TLCO 3.1.k	Position Indication System – Shutdown (Special Test Exception)

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

2.0 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented in the following subsections. These limits are applicable for the entire cycle unless otherwise identified. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 5.6.5.

2.1 Reactor Core Safety Limits (SLs) (SL 2.1.1)

2.1.1 In MODES 1 and 2, the combination of Thermal Power, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the limits specified in Figure 2.1.1.

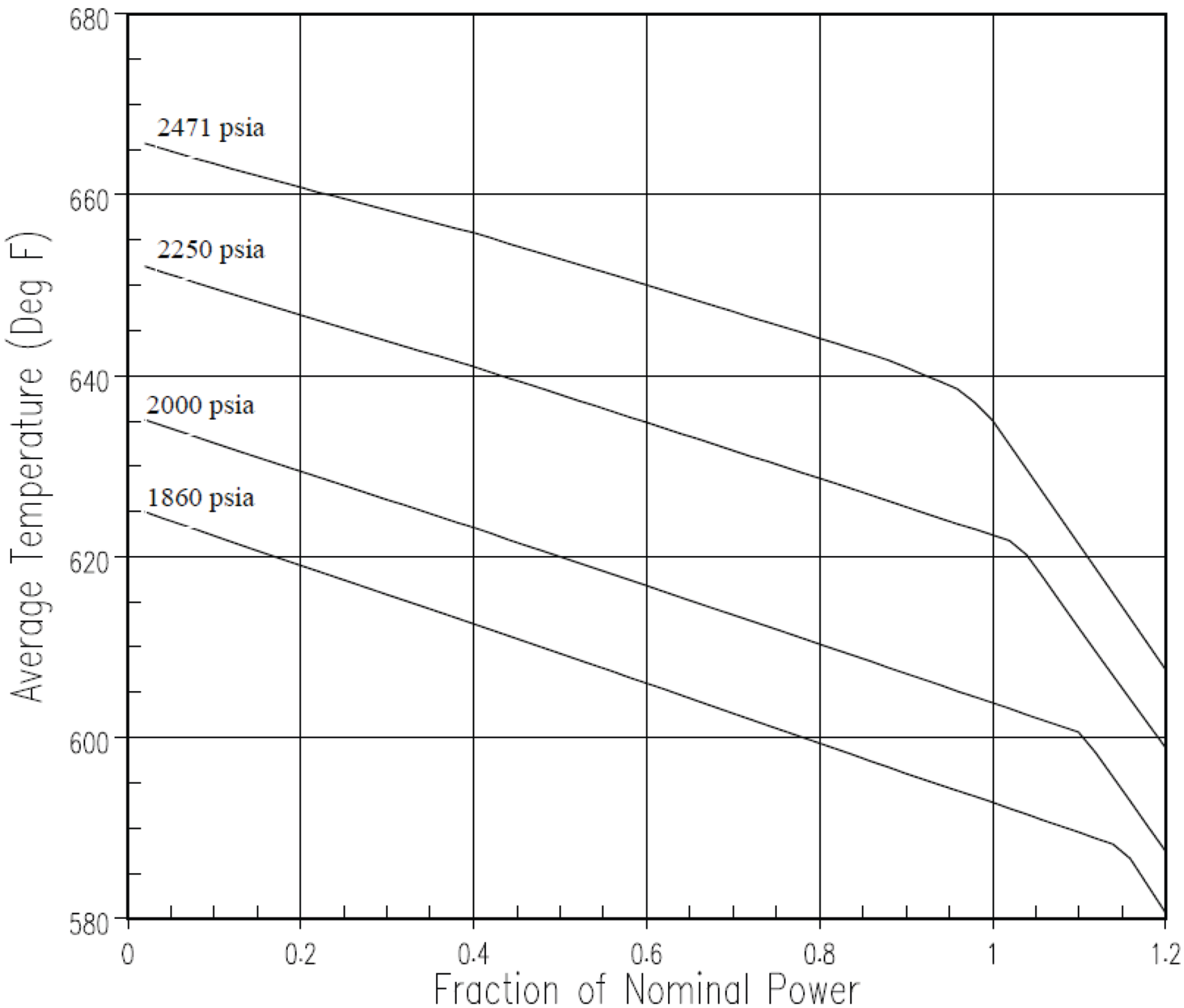


Figure 2.1.1: Reactor Core Limits

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

2.2 SHUTDOWN MARGIN (SDM)

The SDM limit for MODES 1, 2, 3, and 4 is:

2.2.1 The SDM shall be greater than or equal to 1.3% $\Delta k/k$ (LCOs 3.1.1, 3.1.4, 3.1.5, 3.1.6, 3.1.8, 3.3.9; TRM TLCOs 3.1.b, 3.1.d, 3.1.f, 3.1.h, and 3.1.j).

The SDM limit for MODE 5 is:

2.2.2 SDM shall be greater than or equal to 1.3% $\Delta k/k$ (LCO 3.1.1, LCO 3.3.9; TRM TLCOs 3.1.i and 3.1.j).

2.3 Moderator Temperature Coefficient (MTC) (LCO 3.1.3)

The Moderator Temperature Coefficient (MTC) limits are:

2.3.1 The BOL/ARO/HZP-MTC upper limit shall be $+2.296 \times 10^{-5}$ $\Delta k/k/°F$.

2.3.2 The EOL/ARO/HFP-MTC lower limit shall be -4.6×10^{-4} $\Delta k/k/°F$.

2.3.3 The EOL/ARO/HFP-MTC Surveillance limit at 300 ppm shall be -3.7×10^{-4} $\Delta k/k/°F$.

2.3.4 The EOL/ARO/HFP-MTC Surveillance limit at 60 ppm shall be -4.3×10^{-4} $\Delta k/k/°F$.

where: BOL stands for Beginning of Cycle Life
ARO stands for All Rods Out
HZP stands for Hot Zero Thermal Power
EOL stands for End of Cycle Life
HFP stands for Hot Full Thermal Power

2.4 Shutdown Bank Insertion Limits (LCO 3.1.5)

2.4.1 All shutdown banks shall be fully withdrawn to at least 224 steps.

2.5 Control Bank Insertion Limits (LCO 3.1.6)

2.5.1 The control banks, with Bank A greater than or equal to 224 steps, shall be limited in physical insertion as shown in Figure 2.5.1.

2.5.2 Each control bank shall be considered fully withdrawn from the core at greater than or equal to 224 steps.

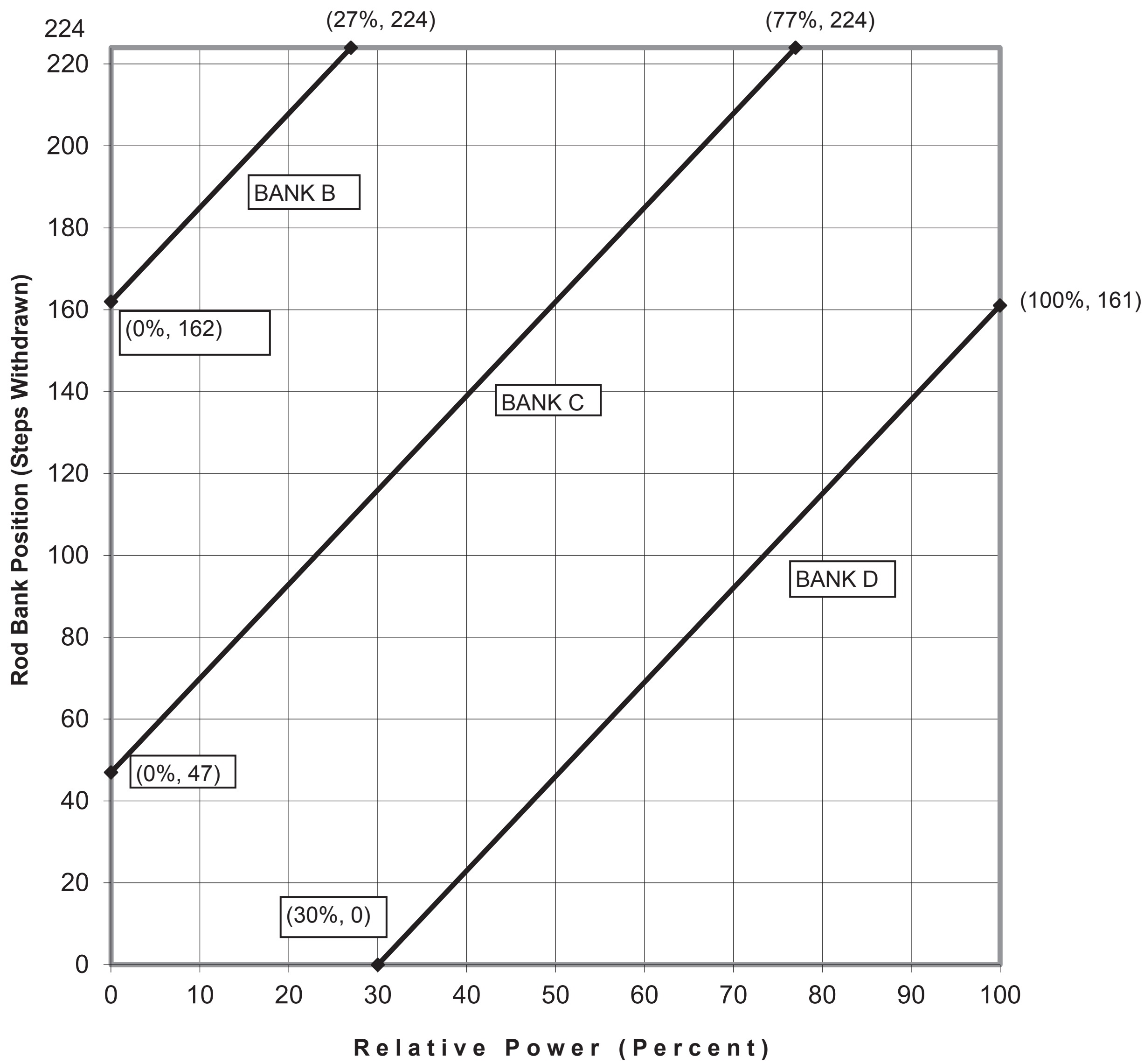
2.5.3 The control banks shall be operated in sequence by withdrawal of Bank A, Bank B, Bank C and Bank D. The control banks shall be sequenced in reverse order upon insertion.

2.5.4 Each control bank not fully withdrawn from the core shall be operated with the following overlap limits as a function of park position:

Park Position (step)	Overlap Limit (step)
226	111
227	112
228	113
229	114

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

Figure 2.5.1:
Control Bank Insertion Limits Versus Percent Rated Thermal Power



CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

2.6 Heat Flux Hot Channel Factor ($F_Q(Z)$) (LCO 3.2.1)

2.6.1 Total Peaking Factor:

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} x K(Z) \quad \text{for P} \leq 0.5$$

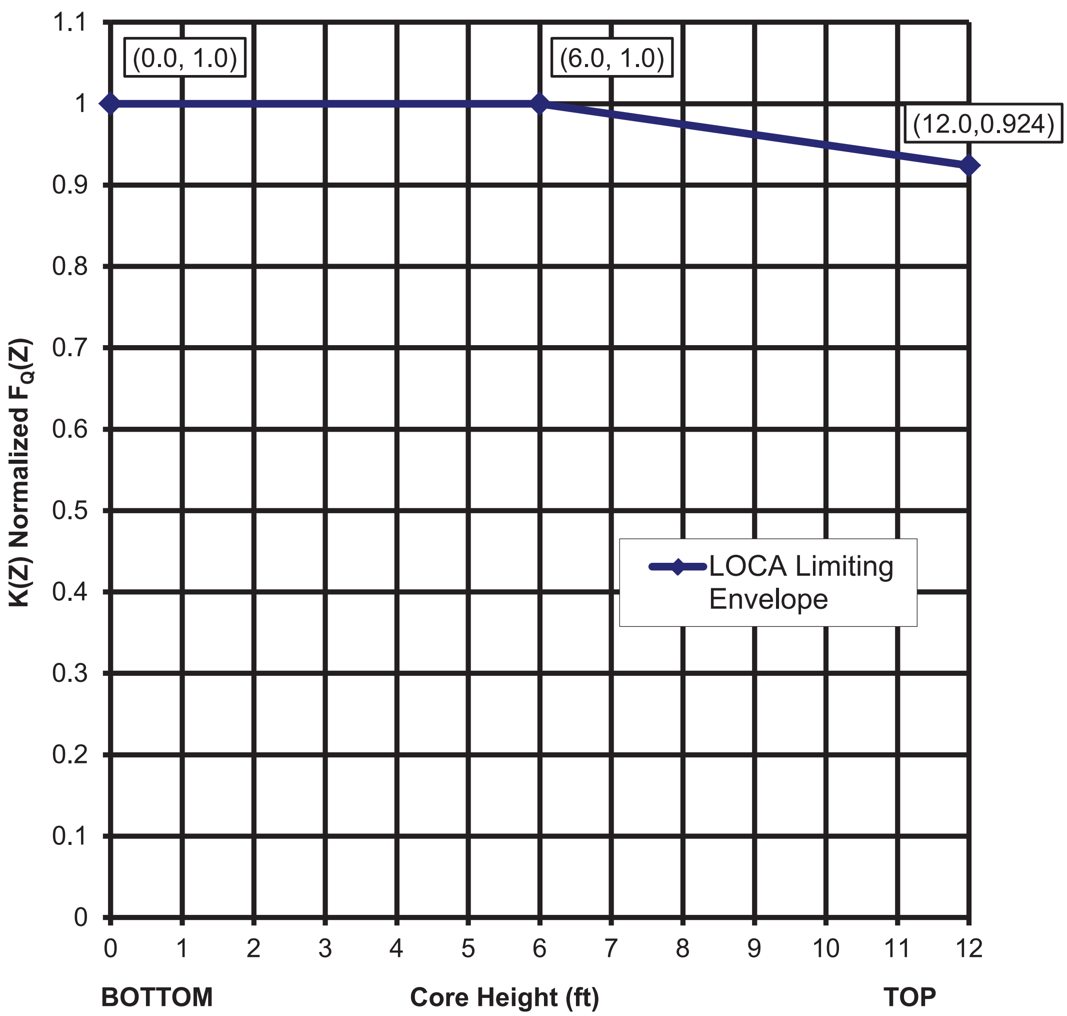
$$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} x K(Z) \quad \text{for P} > 0.5$$

where: P = the ratio of THERMAL POWER to RATED THERMAL POWER

F_Q^{RTP} = 2.60

K(Z) is provided in Figure 2.6.1.

Figure 2.6.1
K(Z) - Normalized $F_Q(Z)$ as a Function of Core Height



CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

2.6.2 W(Z) Values:

a) When the Power Distribution Monitoring System (PDMS) is OPERABLE, W(Z) = 1.00000 for all axial points.

b) When PDMS is inoperable, W(Z) is provided as:

1) Table 2.6.2.a are the normal operation W(Z) values for the full cycle and correspond to the AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits provided in Figure 2.8.1.a. The normal operation W(Z) values have been determined at burnups of 150, 6000, 14000, and 20000 MWD/MTU.

2) The EOL-only normal operation W(Z) values provided in Table 2.6.2.b may be used for cycle burnups $\geq$ 18000 MWD/MTU. The EOL-only W(Z) values correspond to the REDUCED AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits provided in Figure 2.8.1.b. The EOL-only normal operation W(Z) values have been determined at burnups of 18000 and 20000 MWD/MTU and the last column of W(Z) values is a duplicate of the 20000 MWD/MTU values. If invoked, the EOL-only W(Z) values are to be used for the remainder of the cycle unless superseded by a subsequent analysis.

Table 2.6.2.c shows the $F^C_Q(z)$ penalty factors that are greater than 2% per 31 Effective Full Power Days (EFPD). These values shall be used to increase the $F^W_Q(z)$ as per Surveillance Requirement 3.2.1.2. A 2% penalty factor shall be used at all cycle burnups that are outside the range of Table 2.6.2.c.

2.6.3 Uncertainty:

The uncertainty, U_{FQ}, to be applied to the Heat Flux Hot Channel Factor $F_Q(Z)$ shall be calculated by the following formula

$$U_{FQ} = U_{qu} \bullet U_e$$

where:

U_{qu} = Base F_Q measurement uncertainty = 1.05 when PDMS is inoperable
(U_{qu} is defined by PDMS when OPERABLE.)
U_e = Engineering uncertainty factor = 1.03

2.6.4 PDMS Alarms:

$F_Q(Z)$ Warning Setpoint = 2% $F_Q(Z)$ Margin
$F_Q(Z)$ Alarm Setpoint = 0% $F_Q(Z)$ Margin

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

Table 2.6.2.a

Full Cycle W(Z) versus Core Height for AFD Acceptable Operation Limits in Figure 2.8.1.a
(Top and Bottom 8% Excluded per WCAP-10216)

Height (feet)	150 MWD/MTU	6000 MWD/MTU	14000 MWD/MTU	20000 MWD/MTU
0.00 (core bottom)	1.3070	1.4779	1.4125	1.4005
0.20	1.2935	1.4452	1.3942	1.3797
0.40	1.2866	1.4387	1.4003	1.3715
0.60	1.2789	1.4258	1.3878	1.3623
0.80	1.2742	1.4024	1.3646	1.3449
1.00	1.2638	1.3684	1.3483	1.3311
1.20	1.2501	1.3528	1.3202	1.3130
1.40	1.2397	1.3367	1.3048	1.2982
1.60	1.2438	1.3242	1.2865	1.2795
1.80	1.2425	1.3042	1.2711	1.2624
2.00	1.2284	1.2825	1.2548	1.2443
2.20	1.2115	1.2573	1.2396	1.2270
2.40	1.1963	1.2339	1.2243	1.2150
2.60	1.1794	1.2075	1.2133	1.2004
2.80	1.1672	1.1882	1.2038	1.1865
3.00	1.1609	1.1836	1.1968	1.1718
3.20	1.1538	1.1770	1.1883	1.1761
3.40	1.1463	1.1725	1.1802	1.1822
3.60	1.1412	1.1664	1.1697	1.1862
3.80	1.1367	1.1619	1.1650	1.1901
4.00	1.1321	1.1553	1.1599	1.1921
4.20	1.1346	1.1477	1.1544	1.1926
4.40	1.1355	1.1402	1.1478	1.2017
4.60	1.1351	1.1306	1.1411	1.2094
4.80	1.1348	1.1220	1.1417	1.2150
5.00	1.1334	1.1124	1.1431	1.2185
5.20	1.1302	1.1018	1.1439	1.2205
5.40	1.1267	1.0927	1.1452	1.2221
5.60	1.1254	1.0908	1.1508	1.2395
5.80	1.1332	1.0972	1.1662	1.2549
6.00	1.1407	1.1030	1.1798	1.2662
6.20	1.1464	1.1106	1.1913	1.2747
6.40	1.1522	1.1173	1.1999	1.2794
6.60	1.1549	1.1229	1.2065	1.2801
6.80	1.1577	1.1276	1.2103	1.2799
7.00	1.1585	1.1327	1.2121	1.2748
7.20	1.1574	1.1384	1.2081	1.2657
7.40	1.1599	1.1447	1.2040	1.2547
7.60	1.1690	1.1490	1.1961	1.2388
7.80	1.1777	1.1532	1.1862	1.2229
8.00	1.1851	1.1565	1.1764	1.2056
8.20	1.1905	1.1633	1.1626	1.1877
8.40	1.1955	1.1713	1.1528	1.1799
8.60	1.1982	1.1780	1.1481	1.1714
8.80	1.2016	1.1883	1.1480	1.1664
9.00	1.2064	1.1979	1.1471	1.1610
9.20	1.2170	1.2118	1.1425	1.1673
9.40	1.2189	1.2195	1.1455	1.1990
9.60	1.2227	1.2279	1.1850	1.2440
9.80	1.2215	1.2326	1.2210	1.2820
10.00	1.2160	1.2352	1.2540	1.3170
10.20	1.2176	1.2445	1.2840	1.3470
10.40	1.2255	1.2551	1.3040	1.3720
10.60	1.2354	1.2641	1.3150	1.3950
10.80	1.2467	1.2737	1.3190	1.4130
11.00	1.2540	1.2816	1.3150	1.4240
11.20	1.2527	1.2903	1.2830	1.4130
11.40	1.2473	1.3007	1.2910	1.4010
11.60	1.2493	1.3055	1.2570	1.3842
11.80	1.2512	1.3107	1.2381	1.3762
12.00 (core top)	1.2567	1.3258	1.2269	1.3719

Note: W(Z) values at 20000 MWD/MTU may be applied to cycle burnups greater than 20000 MWD/MTU to prevent W(Z) function extrapolation

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

Table 2.6.2.b
EOL-only W(Z) versus Core Height
for AFD Acceptable Operation Limits in Figure 2.8.1.b
(Top and Bottom 8% Excluded per WCAP-10216)

Height (feet)	**18000 MWD/MTU**	**20000 MWD/MTU**	**25104 MWD/MTU**
0.00 (core bottom)	1.2413	1.2338	1.2338
0.20	1.2270	1.2184	1.2184
0.40	1.2268	1.2119	1.2119
0.60	1.2189	1.2055	1.2055
0.80	1.2037	1.1927	1.1927
1.00	1.1933	1.1820	1.1820
1.20	1.1748	1.1688	1.1688
1.40	1.1635	1.1572	1.1572
1.60	1.1531	1.1437	1.1437
1.80	1.1457	1.1343	1.1343
2.00	1.1395	1.1269	1.1269
2.20	1.1313	1.1179	1.1179
2.40	1.1257	1.1089	1.1089
2.60	1.1260	1.1096	1.1096
2.80	1.1246	1.1098	1.1098
3.00	1.1239	1.1129	1.1129
3.20	1.1244	1.1191	1.1191
3.40	1.1265	1.1249	1.1249
3.60	1.1354	1.1415	1.1415
3.80	1.1462	1.1571	1.1571
4.00	1.1562	1.1707	1.1707
4.20	1.1659	1.1842	1.1842
4.40	1.1739	1.1957	1.1957
4.60	1.1803	1.2052	1.2052
4.80	1.1851	1.2127	1.2127
5.00	1.1891	1.2181	1.2181
5.20	1.1913	1.2205	1.2205
5.40	1.1931	1.2221	1.2221
5.60	1.2061	1.2395	1.2395
5.80	1.2222	1.2549	1.2549
6.00	1.2352	1.2662	1.2662
6.20	1.2453	1.2747	1.2747
6.40	1.2518	1.2794	1.2794
6.60	1.2551	1.2801	1.2801
6.80	1.2566	1.2799	1.2799
7.00	1.2542	1.2748	1.2748
7.20	1.2465	1.2657	1.2657
7.40	1.2376	1.2547	1.2547
7.60	1.2242	1.2388	1.2388
7.80	1.2098	1.2229	1.2229
8.00	1.1947	1.2056	1.2056
8.20	1.1769	1.1877	1.1877
8.40	1.1668	1.1799	1.1799
8.60	1.1590	1.1714	1.1714
8.80	1.1552	1.1664	1.1664
9.00	1.1509	1.1610	1.1610
9.20	1.1509	1.1673	1.1673
9.40	1.1697	1.1990	1.1990
9.60	1.2148	1.2440	1.2440
9.80	1.2545	1.2820	1.2820
10.00	1.2910	1.3170	1.3170
10.20	1.3226	1.3470	1.3470
10.40	1.3462	1.3720	1.3720
10.60	1.3642	1.3950	1.3950
10.80	1.3756	1.4130	1.4130
11.00	1.3791	1.4240	1.4240
11.20	1.3556	1.4130	1.4130
11.40	1.3520	1.4010	1.4010
11.60	1.3246	1.3842	1.3842
11.80	1.3099	1.3762	1.3762
12.00 (core top)	1.3004	1.3719	1.3719

Note: W(Z) values at 20000 MWD/MTU may be applied to cycle burnups greater than 20000 MWD/MTU to prevent W(Z) function extrapolation

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

Table 2.6.2.c
Penalty Factors in Excess of 2% per 31 EFPD

Cycle Burnup (MWD/MTU)	Penalty Factor $F^C_Q(z)$
0	1.0200
490	1.0208
830	1.0400
1030	1.0450
1206	1.0470
1382	1.0480
1557	1.0478
1980	1.0465
3250	1.0218
3300	1.0200
13521	1.0200
13697	1.0204
13873	1.0236
14048	1.0237
14224	1.0232
14400	1.0226
14576	1.0220
14752	1.0213
14928	1.0205
15104	1.0200

Notes:

Linear interpolation is adequate for intermediate cycle burnups.

All cycle burnups outside the range of Table 2.6.2.c shall use a 2% penalty factor for compliance with the 3.2.1.2 Surveillance Requirements.

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

2.7 Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$) (LCO 3.2.2)

2.7.1 $F^N_{\Delta H} \leq F^{RTP}_{\Delta H}[1.0 + PF_{\Delta H}(1.0 - P)]$

where: P = the ratio of THERMAL POWER to RATED THERMAL POWER (RTP)
$F^{RTP}_{\Delta H}$ = 1.70
$PF_{\Delta H}$ = 0.3

2.7.2 Uncertainty:

The uncertainty, $U_{F\Delta H}$, to be applied to the Nuclear Enthalpy Rise Hot Channel Factor $F^N_{\Delta H}$ shall be calculated by the following formula:

$U_{F\Delta H} = U_{F\Delta Hm}$

where:

$U_{F\Delta Hm}$ = Base $F^N_{\Delta H}$ measurement uncertainty = 1.04 when PDMS is inoperable ($U_{F\Delta Hm}$ is defined by PDMS when OPERABLE.)

2.7.3 PDMS Alarms:

$F^N_{\Delta H}$ Warning Setpoint = 2% $F^N_{\Delta H}$ Margin
$F^N_{\Delta H}$ Alarm Setpoint = 0% $F^N_{\Delta H}$ Margin

2.8 AXIAL FLUX DIFFERENCE (AFD) (LCO 3.2.3)

2.8.1 When PDMS is inoperable, the AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits are provided in the Figures described below or the latest valid PDMS Surveillance Report, whichever is more conservative.

a) Figure 2.8.1.a is the full cycle AFD Acceptable Operation Limits associated with the full cycle W(Z) values in Table 2.6.2.a.

b) Figure 2.8.1.b is the Reduced AFD Acceptable Operation Limits which may be applied after 18000 MWD/MTU. The Reduced AFD Acceptable Operation Limits are associated with the EOL-only W(Z) values in Table 2.6.2.b. Prior to changing to Figure 2.8.1.b, confirm that the plant is within the specified AFD envelope.

2.8.2 When PDMS is OPERABLE, no AFD Acceptable Operation Limits are applicable.

2.9 Departure from Nucleate Boiling Ratio (DNBR) (LCO 3.2.5)

2.9.1 $DNBR_{APSL} \geq 1.563$

The Axial Power Shape Limiting DNBR ($DNBR_{APSL}$) is applicable with THERMAL POWER ≥ 50% RTP when PDMS is OPERABLE.

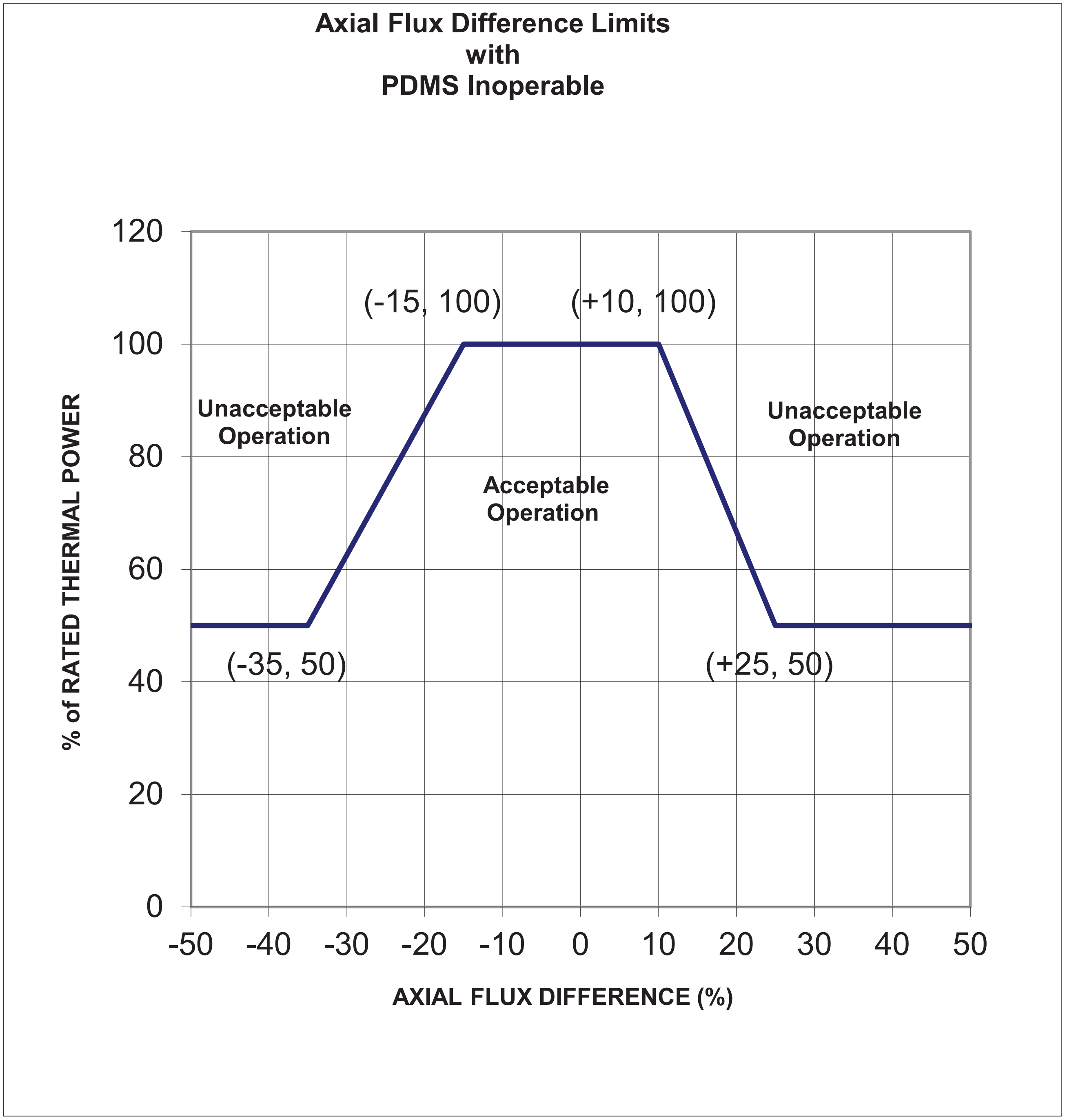
2.9.2 PDMS Alarms:

DNBR Warning Setpoint = 2% DNBR Margin
DNBR Alarm Setpoint = 0% DNBR Margin

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

Figure 2.8.1.a:
Axial Flux Difference Limits
as a Function of Rated Thermal Power

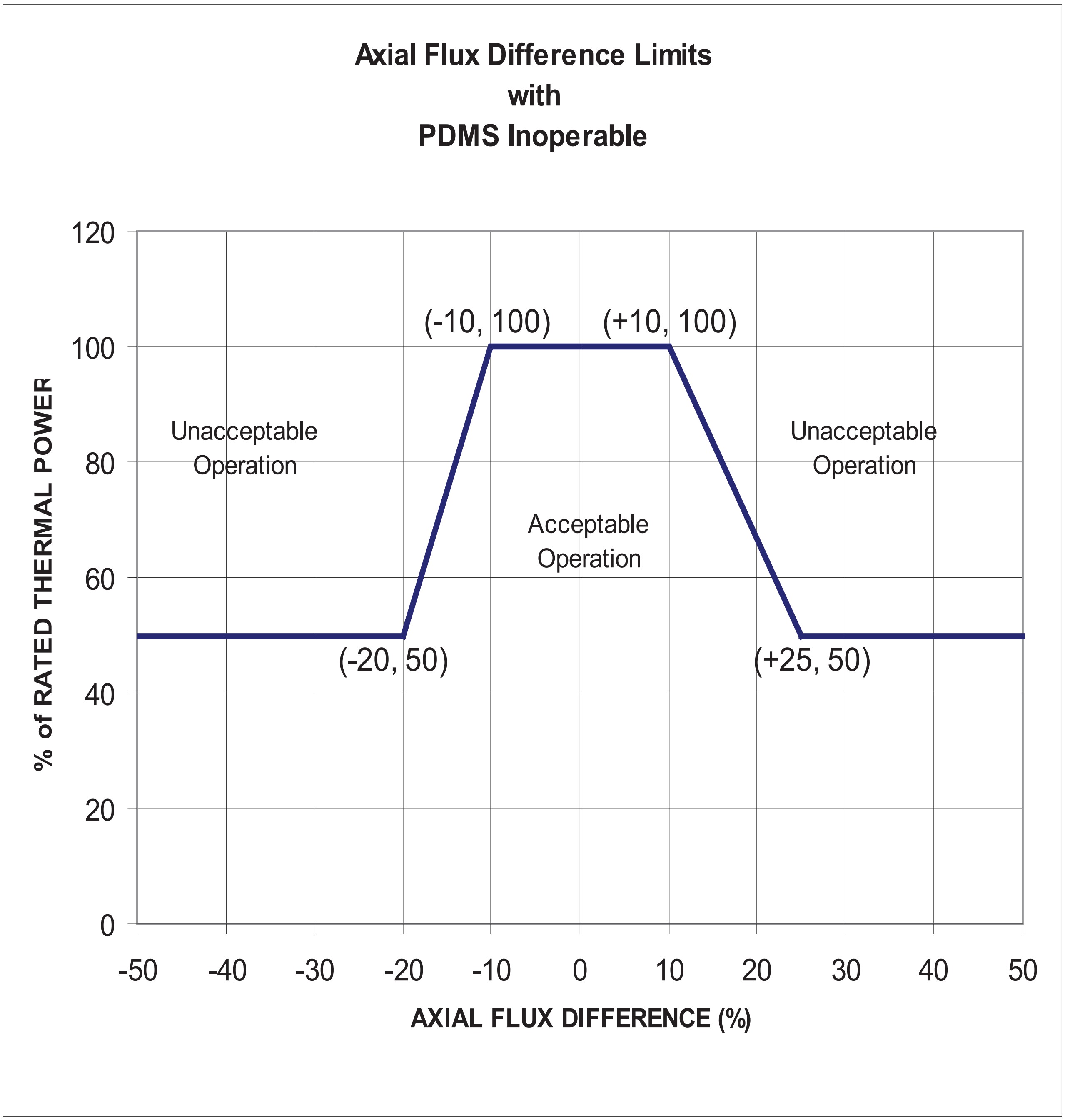
(Full Cycle)



CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

Figure 2.8.1.b:
Reduced Axial Flux Difference Limits
as a Function of Rated Thermal Power

(Cycle burnup ≥ 18000 MWD/MTU)



CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

2.10 Reactor Trip System (RTS) Instrumentation (LCO 3.3.1) - Overtemperature ΔT Setpoint Parameter Values

2.10.1 The Overtemperature ΔT reactor trip setpoint K_1 shall be equal to 1.325.

2.10.2 The Overtemperature ΔT reactor trip setpoint T_{avg} coefficient K_2 shall be equal to 0.0297 / °F.

2.10.3 The Overtemperature ΔT reactor trip setpoint pressure coefficient K_3 shall be equal to 0.00135 / psi.

2.10.4 The nominal T_{avg} at RTP (indicated) T′ shall be less than or equal to 588.0 °F.

2.10.5 The nominal RCS operating pressure (indicated) P′ shall be equal to 2235 psig.

2.10.6 The measured reactor vessel ΔT lead/lag time constant τ_1 shall be equal to 8 sec.

2.10.7 The measured reactor vessel ΔT lead/lag time constant τ_2 shall be equal to 3 sec.

2.10.8 The measured reactor vessel ΔT lag time constant τ_3 shall be less than or equal to 2 sec.

2.10.9 The measured reactor vessel average temperature lead/lag time constant τ_4 shall be equal to 33 sec.

2.10.10 The measured reactor vessel average temperature lead/lag time constant τ_5 shall be equal to 4 sec.

2.10.11 The measured reactor vessel average temperature lag time constant τ_6 shall be less than or equal to 2 sec.

2.10.12 The f_1 (ΔI) “positive” breakpoint shall be +10% ΔI.

2.10.13 The f_1 (ΔI) “negative” breakpoint shall be -18% ΔI.

2.10.14 The f_1 (ΔI) “positive” slope shall be +3.47% / % ΔI.

2.10.15 The f_1 (ΔI) “negative” slope shall be -2.61% / % ΔI.

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

2.11 Reactor Trip System (RTS) Instrumentation (LCO 3.3.1) - Overpower ΔT Setpoint Parameter Values

2.11.1 The Overpower ΔT reactor trip setpoint K_4 shall be equal to 1.072.

2.11.2 The Overpower ΔT reactor trip setpoint T_{avg} rate/lag coefficient K_5 shall be equal to 0.02 / °F for increasing $T_{avg.}$

2.11.3 The Overpower ΔT reactor trip setpoint T_{avg} rate/lag coefficient K_5 shall be equal to 0 / °F for decreasing $T_{avg.}$

2.11.4 The Overpower ΔT reactor trip setpoint T_{avg} heatup coefficient K_6 shall be equal to 0.00245 / °F when $T > T''$.

2.11.5 The Overpower ΔT reactor trip setpoint T_{avg} heatup coefficient K_6 shall be equal to 0 / °F when $T \leq T''$.

2.11.6 The nominal T_{avg} at RTP (indicated) T'' shall be less than or equal to 588.0 °F

2.11.7 The measured reactor vessel ΔT lead/lag time constant τ_1 shall be equal to 8 sec.

2.11.8 The measured reactor vessel ΔT lead/lag time constant τ_2 shall be equal to 3 sec.

2.11.9 The measured reactor vessel ΔT lag time constant τ_3 shall be less than or equal to 2 sec.

2.11.10 The measured reactor vessel average temperature lag time constant τ_6 shall be less than or equal to 2 sec.

2.11.11 The measured reactor vessel average temperature rate/lag time constant τ_7 shall be equal to 10 sec.

2.11.12 The f_2 (ΔI) “positive” breakpoint shall be 0 for all ΔI.

2.11.13 The f_2 (ΔI) “negative” breakpoint shall be 0 for all ΔI.

2.11.14 The f_2 (ΔI) “positive” slope shall be 0 for all ΔI.

2.11.15 The f_2 (ΔI) “negative” slope shall be 0 for all ΔI.

CORE OPERATING LIMITS REPORT (COLR) for BRAIDWOOD UNIT 2 CYCLE 19

2.12 Reactor Coolant System (RCS) Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (LCO 3.4.1)

2.12.1 The pressurizer pressure shall be greater than or equal to 2209 psig.

2.12.2 The RCS average temperature (T_{avg}) shall be less than or equal to 593.1 °F.

2.12.3 The RCS total flow rate shall be greater than or equal to 386,000 gpm.

2.13 Boron Concentration

2.13.1 The refueling boron concentration shall be greater than or equal to the applicable value given in the Table below (LCO 3.9.1). The reported “prior to initial criticality” value also bounds the end-of-cycle requirements for the previous cycle.

2.13.2 To maintain keff ≤ 0.987 with all shutdown and control rods fully withdrawn in MODES 3, 4, or 5 (TRM TLCO 3.1.g Required Action B.2 and TRM TLCO 3.1.k.2), the Reactor Coolant System boron concentration shall be greater than or equal to the applicable values given in the Table below.

COLR Section	**Conditions**	**Boron Concentration (ppm)**
2.13.1	a) prior to initial criticality	1671
	b) for cycle burnups ≥ 0 MWD/MTU and < 16000 MWD/MTU	1809
	c) for cycle burnups ≥ 16,000 MWD/MTU	1452
2.13.2	a) prior to initial criticality	1738
	b) all other times in life	1995

BRAIDWOOD UNIT 1

PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

Revision 8

BRAIDWOOD - UNIT 1
PRESSURE AND TEMPERATURE LIMITS REPORT

Table of Contents

Section		Page
1.0	Introduction	1
2.0	RCS Pressure and Temperature Limits	1
	2.1 RCS Pressure and Temperature (P/T) Limits (LCO 3.4.3)	1
3.0	Low Temperature Over Pressure Protection and Boltup	7
	3.1 LTOP System Setpoints (LCO 3.4.12)	7
	3.2 LTOP Enable Temperature	7
	3.3 Reactor Vessel Boltup Temperature (Non-Technical Specification)	7
4.0	Reactor Vessel Material Surveillance Program	10
5.0	Supplemental Data Tables	12
6.0	References	18

List of Figures

Figure		Page
2.1	Braidwood Unit 1 Reactor Coolant System Heatup Limitations (Heatup Rate of 100°F/hr) Applicable for 32 EFPY (Without Margins for Instrumentation Errors)	3
2.2	Braidwood Unit 1 Reactor Coolant System Cooldown Limitations (Cooldown Rates of 0, 25, 50, and 100°F/hr) Applicable for 32 EFPY (Without Margins for Instrumentation Errors)	4
3.1	Braidwood Unit 1 Nominal PORV Setpoints for the Low Temperature Overpressure Protection (LTOP) System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)	8

List of Tables

Table		Page
2.1a	Braidwood Unit 1 Heatup Data Points at 32 EFPY (Without Margins for Instrumentation Errors)	5
2.1b	Braidwood Unit 1 Cooldown Data Points at 32 EFPY (Without Margins for Instrumentation Errors)	6
3.1	Data Points for Braidwood Unit 1 Nominal PORV Setpoints for the LTOP System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)	9
4.1	Braidwood Unit 1 Surveillance Capsule Withdrawal Summary	11
5.1	Braidwood Unit 1 Calculation of Chemistry Factors Using Surveillance Capsule Data	13
5.2	Braidwood Unit 1 Reactor Vessel Material Properties	14
5.3	Summary of Braidwood Unit 1 Adjusted Reference Temperature (ART) Values at 1/4T and 3/4T Locations for 32 EFPY	15
5.4	Braidwood Unit 1 Calculation of Adjusted Reference Temperatures (ARTs) at 32 EFPY at the Limiting Reactor Vessel Material, Nozzle Shell Forging 5P-7016	16
5.5	RT_{PTS} Calculation for Braidwood Unit 1 Beltline Region Materials at EOL (32 EFPY)	17

BRAIDWOOD - UNIT 1
PRESSURE AND TEMPERATURE LIMITS REPORT

1.0 Introduction

This Pressure and Temperature Limits Report (PTLR) for Braidwood Unit 1 has been prepared in accordance with the requirements of Braidwood Technical Specification (TS) 5.6.6, "Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)". Revisions to the PTLR shall be provided to the NRC after issuance.

The Technical Specifications (TS) addressed in this report are listed below:

LCO 3.4.3 RCS Pressure and Temperature (P/T) Limits; and
LCO 3.4.12 Low Temperature Overpressure Protection (LTOP) System.

2.0 RCS Pressure and Temperature Limits

The PTLR limits for Braidwood Unit 1 were developed using a methodology specified in the Technical Specifications. The methodology listed in WCAP-14040-NP-A, Revision 2 (Reference 1) was used with the following exceptions:

a) Optional use of ASME Code Section XI, Appendix G, Article G-2000, 1996 Addenda,
b) Use of ASME Code Case N-640, “Alternative Reference Fracture Toughness for Development of P-T Limit Curves, Section XI, Division 1”,
c) Use of ASME Code Case N-588, “Alternative to Reference Flaw Orientation of Appendix G for Circumferential Welds in Reactor Vessel, Section XI, Division 1”, and
d) Elimination of the flange requirements documented in WCAP-16143-P.

These exceptions to the methodology in WCAP 14040-NP-A, Revision 2 have been reviewed and accepted by the NRC in References 2, 8, 9 and 10.

WCAP 15364, Revision 2 (Reference 11), provides the basis for the Braidwood Unit 1 P/T curves, along with the best estimate chemical compositions, fluence projections and adjusted reference temperatures used to determine these limits. WCAP-16143-P, Reference 12, documents the technical basis for the elimination of the flange requirements.

2.1 RCS Pressure and Temperature (P/T) Limits (LCO 3.4.3)

2.1.1 The RCS temperature rate-of-change limits defined in WCAP-15364, Revision 2 (Reference 11) are:

a. A maximum heatup of 100°F in any 1-hour period,

b. A maximum cooldown of 100°F in any 1-hour period, and

c. A maximum temperature change of less than or equal to 10°F in any 1-hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves.

2.1.2 The RCS P/T limits for heatup, inservice hydrostatic and leak testing, and criticality are specified by Figure 2.1 and Table 2.1a. The RCS P/T limits for cooldown are shown in Figure 2.2 and Table 2.1b. These limits are defined in WCAP-15364, Revision 2 (Reference 11). Consistent with the methodology described in Reference 1 and exceptions noted in Section 2.0, the RCS P/T limits for heatup and cooldown shown in Figures 2.1 and 2.2 are provided without margins for instrument error. These limits were developed using ASME Boiler and Pressure Vessel Code Section XI, Appendix G, Article G2000, 1996 Addenda. The criticality limit curve specifies pressure-temperature limits for core operation to provide additional margin during actual power production as specified in 10 CFR 50, Appendix G.

The P/T limits for core operation (except for low power physics testing) are that the reactor vessel must be at a temperature equal to or higher than the minimum temperature required for the inservice hydrostatic test, and at least 40°F higher than the minimum permissible temperature in the corresponding P/T curve for heatup and cooldown.

MATERIAL PROPERTY BASIS

LIMITING MATERIAL: NOZZLE SHELL FORGING 5P-7016
LIMITING ART VALUES AT 32 EFPY: 1/4T, 48°F
3/4T, 35°F

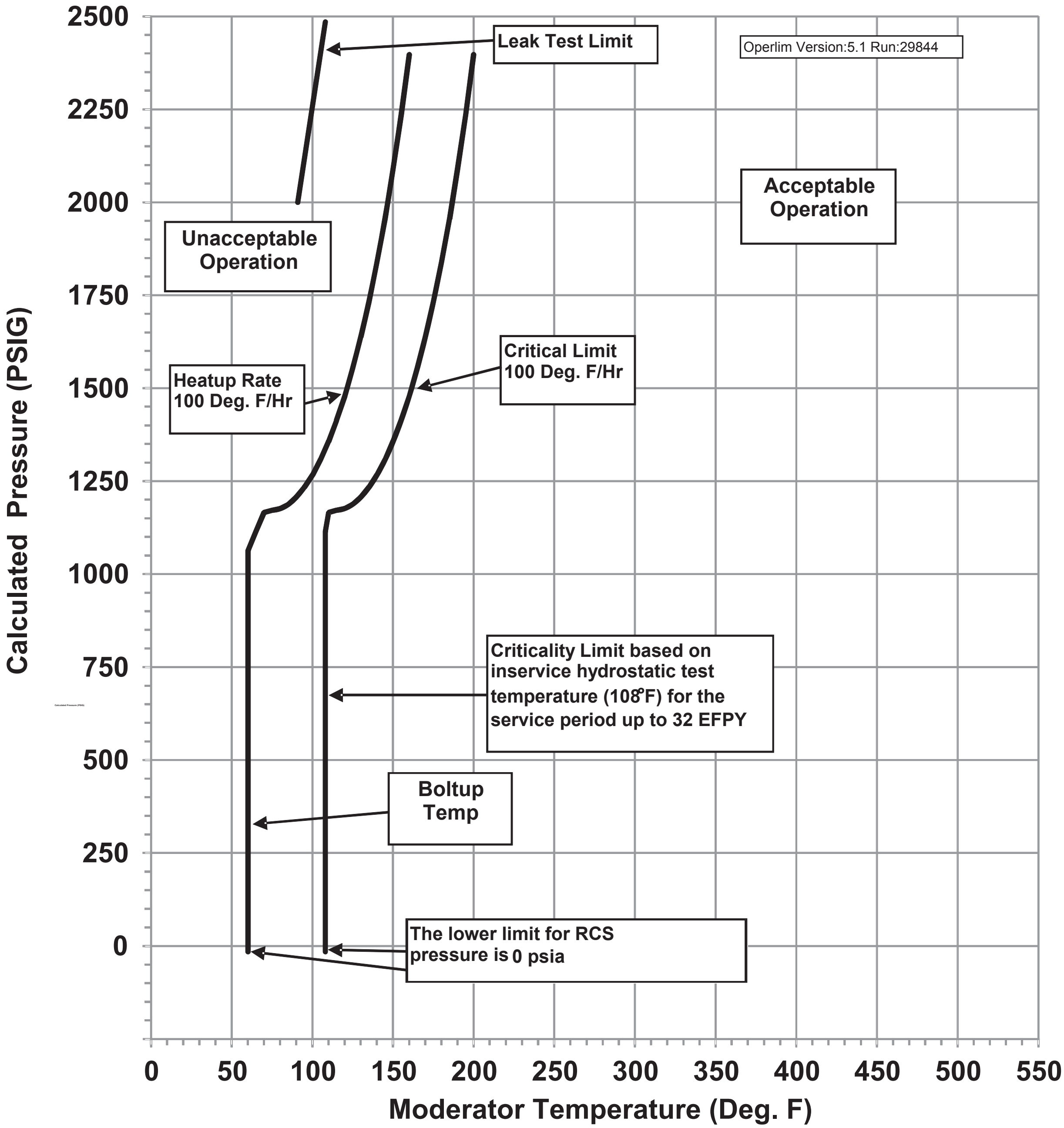


Figure 2.1
Braidwood Unit 1 Reactor Coolant System Heatup Limitations (Heatup Rate of 100°F/hr) Applicable for 32 EFPY (Without Margins for Instrumentation Errors)

MATERIAL PROPERTY BASIS LIMITING MATERIAL: NOZZLE FORGING 5P-7016 LIMITING ART VALUES AT 32 EFPY: 1/4T, 48°F 3/4T, 35°F

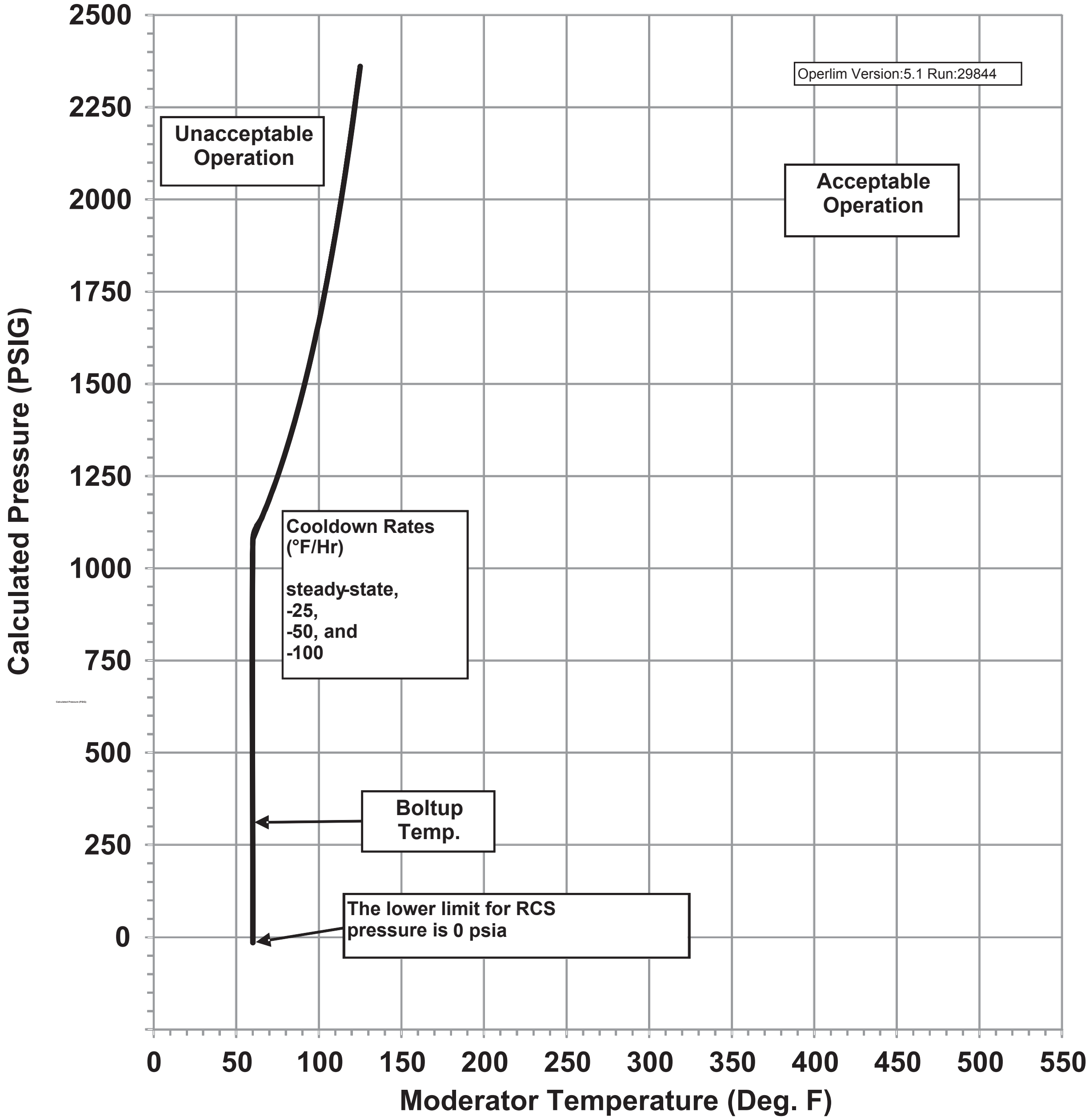


Figure 2.2
Braidwood Unit 1 Reactor Coolant System Cooldown Limitations (Cooldown Rates of 0, 25, 50 and 100°F/hr) Applicable for 32 EFPY (Without Margins for Instrumentation Errors)

Table 2.1a
Braidwood Unit 1 Heatup Data Points at 32 EFPY
(Without Margins for Instrumentation Errors)

Heatup Curve					
100 F Heatup		Criticality Limit		Leak Test Limit	
T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)
60	Note 1	108	Note 1	91	2000
60	1064	108	1114	108	2485
65	1114	110	1166		
70	1166	115	1172		
75	1172	120	1176		
80	1176	125	1188		
85	1188	130	1207		
90	1207	135	1234		
95	1234	140	1267		
100	1267	145	1308		
105	1308	150	1357		
110	1357	155	1414		
115	1414	160	1479		
120	1479	165	1554		
125	1554	170	1638		
130	1638	175	1732		
135	1732	180	1838		
140	1838	185	1956		
145	1956	190	2088		
150	2088	195	2235		
155	2235	200	2397		
160	2397				

Note 1:The Minimum acceptable pressure is 0 psia

Table 2.1b
Braidwood Unit 1 Cooldown Data Points at 32 EFPY
(Without Margins for Instrumentation Errors)

Cooldown Curves							
Steady State		25 °F Cooldown		50 °F Cooldown		100 °F Cooldown	
T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)
60	Note 1	60	Note 1	60	Note 1	60	Note 1
60	1082	60	1078	60	1078*	60	1078*
65	1133	65	1133	65	1133	65	1133
70	1188	70	1188	70	1188	70	1188
75	1250	75	1250	75	1250	75	1250
80	1318	80	1318	80	1318	80	1318
85	1393	85	1393	85	1393	85	1393
90	1476	90	1476	90	1476	90	1476
95	1568	95	1568	95	1568	95	1568
100	1669	100	1669	100	1669	100	1669
105	1781	105	1781	105	1781	105	1781
110	1905	110	1905	110	1905	110	1905
115	2042	115	2042	115	2042	115	2042
120	2194	120	2194	120	2194	120	2194
125	2361	125	2361	125	2361	125	2361

* Refer to Reference 13

Note 1:The Minimum acceptable pressure is 0 psia

3.0 Low Temperature Overpressure Protection and Boltup

This section provides the Braidwood Unit 1 power operated relief valve lift settings, low temperature overpressure protection (LTOP) system arming temperature, and minimum reactor vessel boltup temperature.

3.1 LTOP System Setpoints (LCO 3.4.12)

The power operated relief valves (PORVs) shall each have maximum lift settings in accordance with Figure 3.1 and Table 3.1. These limits are based on References 3 and 4.

The LTOP setpoints are based on P/T limits which were established in accordance with 10 CFR 50, Appendix G without allowance for instrumentation error and in accordance with the methodology described in Reference 1. The LTOP PORV nominal lift settings shown in Figure 3.1 and Table 3.1 account for appropriate instrument error.

3.2 LTOP Enable Temperature

Braidwood Unit 1 procedures governing the heatup and cooldown of the RCS require the arming of the LTOP System for RCS temperature of 350°F and below and disarming of LTOP for RCS temperature above 350°F.

Note that the last LTOP PORV segment in Table 3.1 extends to 400°F where the pressure setpoint is 2335 psig. This is intended to prohibit PORV lift for an inadvertent LTOP system arming at power.

3.3 Reactor Vessel Boltup Temperature (Non-Technical Specification)

The minimum boltup temperature for the Reactor Vessel Flange shall be ≥ 60°F. Boltup is a condition in which the Reactor Vessel head is installed with tension applied to any stud, and with the RCS vented to atmosphere.

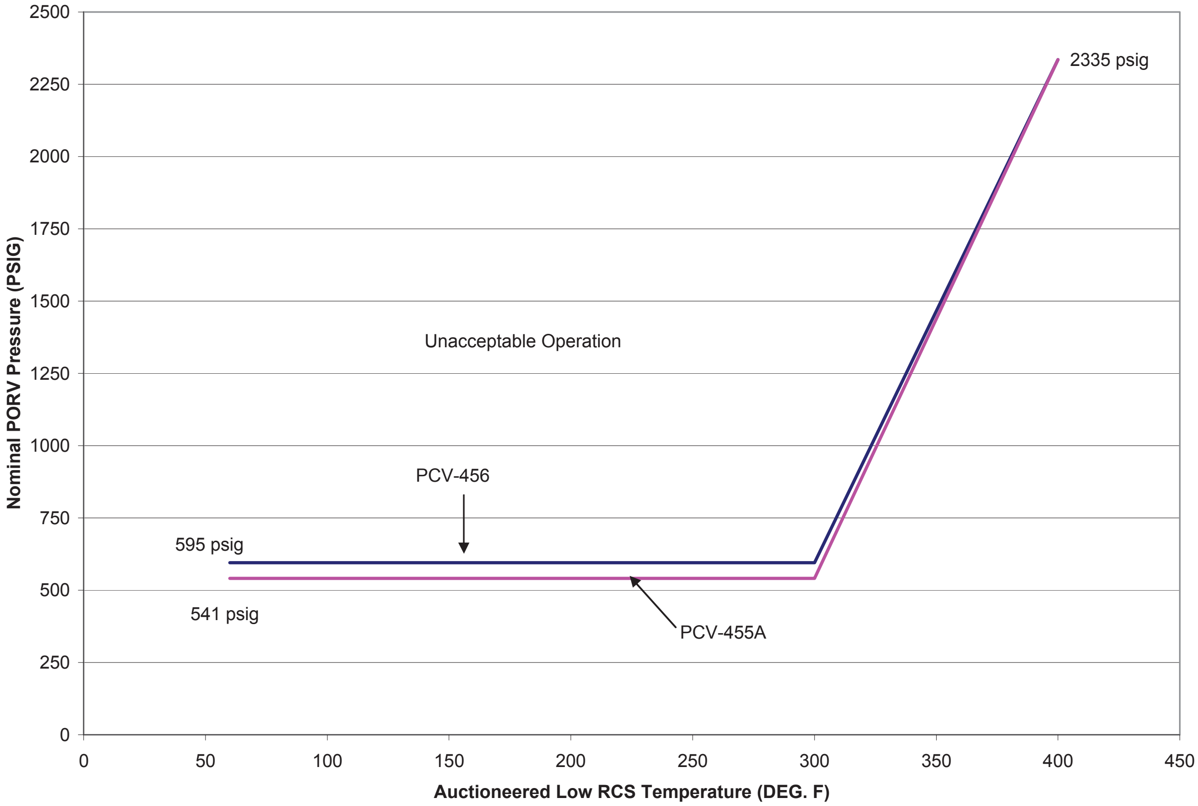


Figure 3.1
Braidwood Unit 1 Nominal PORV Setpoints for the Low Temperature Overpressure Protection (LTOP) System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)

Table 3.1
Data Points for Braidwood Unit 1 Nominal PORV Setpoints for the LTOP System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)

PCV-455A

(1TY-0413M)	
AUCTIONEERED LOW RCS TEMP. (DEG. F)	RCS PRESSURE (PSIG)
60	541
300	541
400	2335

PCV-456

(1TY-0413P)	
AUCTIONEERED LOW RCS TEMP. (DEG. F)	RCS PRESSURE (PSIG)
60	595
300	595
400	2335

Note: To determine nominal lift setpoints for RCS Pressure and RCS Temperatures greater than 300°F, linearly interpolate between the 300°F and 400°F data points shown above. (Setpoints extend to 400°F to prevent PORV liftoff from an inadvertent LTOP system arming while at power.)

4.0 Reactor Vessel Material Surveillance Program

The pressure vessel material surveillance program (Reference 5) is in compliance with Appendix H to 10 CFR 50, "Reactor Vessel Radiation Surveillance Program." The material test requirements and the acceptance standard utilize the reference nil-ductility temperature, RT_{NDT} , which is determined in accordance with ASME Boiler and Pressure Vessel Code Section III, NB-2331. The empirical relationship between RT_{NDT} and the fracture toughness of the reactor vessel steel is developed in accordance with Appendix G, "Protection Against Non-Ductile Failure," to Section XI of the ASME Boiler and Pressure Vessel Code. The surveillance capsule removal schedule meets the requirements of ASTM E185-82.

The third and final reactor vessel material irradiation surveillance specimens (Capsule W) have been removed and analyzed to determine changes in material properties. The surveillance capsule testing has been completed for the original operating period. The remaining three capsules, V, Y, and Z, were removed and placed in the spent fuel pool to avoid excessive fluence accumulation should they be needed to support life extension. The removal summary is provided in Table 4.1.

Table 4.1

Braidwood Unit 1 Capsule Withdrawal Summary[a]

Capsule	Capsule Location	Lead Factor	Withdrawal EFPY[b]	Fluence (n/cm^2, E>1.0 MeV)
U	58.5°	4.02	1.16	0.388×10^{19}
X	238.5°	4.06	4.30	1.17×10^{19}
W	121.5°	4.05	7.79	1.98×10^{19}
Z[c]	301.5°	4.09	12.01 (EOC 10)	2.79×10^{19}
V[c]	61.0°	3.92	17.69 (EOC 14)	3.71×10^{19}
Y[c]	241.0°	3.81	12.01 (EOC 10)	2.60×10^{19}

Notes:

(a) Source document is CN-AMLRS-10-7 (Reference 14), Table 5.7-3.
(b) Effective Full Power Years (EFPY) from plant startup.
(c) Standby Capsules Z, V, and Y were removed and placed in the spent fuel pool. No testing or analysis has been performed on these capsules. If license renewal is sought, one of these standby capsules may need to be tested to determine the effect of neutron irradiation on the reactor vessel surveillance materials during the period of extended operation.

5.0 Supplemental Data Tables

The following tables provide supplemental information on reactor vessel material properties and are provided to be consistent with Generic Letter 96-03. Some of the material property values shown were used as inputs to the P/T limits.

Table 5.1 shows the calculation of the surveillance material chemistry factors using surveillance capsule data.

Table 5.2 provides the reactor vessel material properties table.

Table 5.3 provides a summary of the Braidwood Unit 1 adjusted reference temperature (ART) values at the 1/4T and 3/4T locations for 32 EFPY.

Table 5.4 shows the calculation of ARTs at 32 EFPY for the limiting Braidwood Unit 1 reactor vessel material, i.e. weld WF-562 (HT # 442011, Based on Surveillance Capsules U and X Data).

Table 5.5 provides the RT_{PTS} calculation for Braidwood Unit 1 Beltline Region Materials at EOL (32 EFPY), (Reference 7).

Table 5.1

Braidwood Unit 1 Calculation of Chemistry Factors Using Surveillance Capsule Data[a]

Material	Capsule	Capsule f[b] (n/cm^2, E > 1.0 MeV)	FF[c]	ΔRT_{NDT}[b] (°F)	FF*ΔRT_{NDT} (°F)	FF^2
Lower Shell Forging (Tangential)	U	0.388×10^{19}	0.738	5.78	4.26	0.54
	X	1.17×10^{19}	1.044	38.23	39.91	1.09
	W	1.98×10^{19}	1.186	24.14	28.64	1.41
Lower Shell Forging (Axial)	U	0.388×10^{19}	0.738	0.0[d]	0.00	0.54
	X	1.17×10^{19}	1.044	28.75	30.01	1.09
	W	1.98×10^{19}	1.186	37.11	44.03	1.41
				SUM:	146.85	6.08
	$CF_{LS\ Forging} = \sum(FF * \Delta RT_{NDT}) \div \sum(FF^2) = (146.85) \div (6.08) =$ **24.1°F**					
Braidwood Unit 1 Surveillance Weld Material	U	0.388×10^{19}	0.738	17.06	12.59	0.54
	X	1.17×10^{19}	1.044	30.15	31.47	1.09
	W	1.98×10^{19}	1.186	49.68	58.94	1.41
Braidwood Unit 2 Surveillance Weld Material	U	0.388×10^{19}	0.738	0.0[d]	0.00	0.54
	X	1.15×10^{19}	1.039	26.3	27.33	1.08
	W	2.07×10^{19}	1.198	23.9	28.63	1.44
				SUM:	158.96	6.10
	$CF_{Weld\ Metal} = \sum(FF * \Delta RT_{NDT}) \div \sum(FF^2) = (158.96) \div (6.10) =$ **26.1°F**					

__Notes__:

(a) Source document is CN-AMLRS-10-7 (Reference 14), Table 5.2-1.

(b) f = fluence; ΔRT_{NDT} values are the measured 30 ft-lb shift values taken from Reference 6.

(c) FF = fluence factor = $f^{(0.28 - 0.10*\log f)}$

(d) Measured ΔRT_{NDT} values were determined to be negative, but physically a reduction should not occur; therefore, conservative values of zero are used.

Table 5.2

Braidwood Unit 1 Reactor Vessel Material Properties

Material Description	Cu (%)	Ni (%)	Chemistry Factor	Initial RT_{NDT} (ºF)[a]
Closure Head Flange Heat # 5P7381/3P6406	0.11	0.67	--	-20
Vessel Flange Heat # 122N357V	--	0.77	--	-10
Nozzle Shell Forging * Heat # 5P-7016	0.04	0.73	26.0°F[b]	10
Intermediate Shell Forging * Heat # [49D383/49C344]-1-1	0.05	0.73	31.0°F[b]	-30
Lower Shell Forging * Heat # [49D867/49C813]-1-1	0.05	0.74	31.0°F[b] 24.1°F[c]	-20
Circumferential Weld * (Intermediate Shell to Lower Shell) WF-562 (HT# 442011)	0.03	0.67	41.0°F[b] 26.1°F[c]	40
Upper Circumferential Weld * (Nozzle Shell to Intermediate Shell) WF-645 (HT# H4498)	0.04	0.46	54.0°F[b]	-25

* Beltline Region Materials

a) The Initial RT_{NDT} values for the plates and welds are based on measured data.
b) Chemistry Factor calculated for Cu and Ni values per Regulatory Guide 1.99, Rev. 2, Position 1.1.
c) Chemistry Factor calculated for Cu and Ni values per Regulatory Guide 1.99, Rev. 2, Position 2.1.

Table 5.3

Summary of Braidwood Unit 1 Adjusted Reference Temperature (ART) Values at 1/4T and 3/4T Locations for 32 EFPY[(a)]

Reactor Vessel Material	Surface Fluence (n/cm2, E>1.0 MeV)	32 EFPY	
		1/4T ART (°F)	3/4T ART (°F)
Nozzle Shell Forging	0.586×10^{19}	47	34
Intermediate Shell Forging	1.76×10^{19}	33	15
Lower Shell Forging	1.76×10^{19}	43	25
→Using credible surveillance data	1.76×10^{19}	21	15
Nozzle to Intermediate Shell Forging Circ. Weld Seam (Heat # H4498)	0.586×10^{19}	52	25
Intermediate to Lower Shell Forging Circ. Weld Seam (Heat # 442011)	1.70×10^{19}	122	99
→Using credible surveillance data	1.70×10^{19}	93	78

Notes:

(a) The source document containing detailed calculations is CN-AMLRS-10-7 (Reference 14), Tables 5.3.1-1 and 5.3.1-2. The ART values summarized in this table utilize the most recent fluence projections and materials data, but were not used in development of the P/T limit curves. See Figures 2.1 and 2.2 of this PTLR for the ART values used in development of the P/T limit curves.

Table 5.4

Braidwood Unit 1 Calculation of Adjusted Reference Temperatures (ARTs) at 32 EFPY at the Limiting Reactor Vessel Material, Nozzle Shell Forging 5P-7016

Parameter	Values	
Operating Time	32 EFPY	
Location[a]	1/4T ART(°F)	3/4T ART(°F)
Chemistry Factor, CF (°F)	26.0	26.0
Fluence(f), n/cm^2 (E>1.0 Mev)[b]	3.65 x 10^{18}	1.32 x10^{18}
Fluence Factor, FF	0.772	0.475
ΔRT_{NDT}= CFxFF(°F)	18.8	12.4
Initial RT $_{NDT,}$, I(°F)	10	10
Margin, M (°F)	18.8	12.4
ART= I+(CF*FF)+M,°F per RG 1.99, Revision 2	48	35

(a) The Braidwood Unit 1 reactor vessel wall thickness is 8.5 inches at the beltline region.
(b) Fluence f, is based upon f_{surf} (E > 1.0 Mev) = 6.08 x 10^{18} at 32 EFPY (Reference 11).

Table 5.5

RT_{PTS} Calculation for Braidwood Unit 1 Beltline Region Materials at EOL (32 EFPY)[a,b]

Reactor Vessel Material	R.G. 1.99, Rev. 2 Position	CF (°F)	Fluence (n/cm², E>1.0 MeV)	FF	IRT_{NDT}[c] (°F)	ΔRT_{NDT} (°F)	σ_u[c] (°F)	σ_Δ[d] (°F)	Margin (°F)	RT_{PTS} (°F)
Nozzle Shell Forging	1.1	26	0.586×10^{19}	0.8504	10	22.1	0	11.1	22.1	54
Intermediate Shell Forging	1.1	31	1.76×10^{19}	1.1554	-30	35.8	0	17	34	40
Lower Shell Forging	1.1	31	1.76×10^{19}	1.1554	-20	35.8	0	17	34	50
→Using credible surveillance data	2.1	24.1	1.76×10^{19}	1.1554	-20	27.8	0	8.5	17	25
Nozzle to Intermediate Shell Forging Circ. Weld Seam (Heat # H4498)	1.1	54	0.586×10^{19}	0.8504	-25	45.9	0	23.0	45.9	67
Intermediate to Lower Shell Forging Circ. Weld Seam (Heat # 442011)	1.1	41	1.70×10^{19}	1.1461	40	47.0	0	23.5	47.0	134
→Using credible surveillance data	2.1	26.1	1.70×10^{19}	1.1461	40	29.9	0	14	28	98

Notes:

(a) The 10 CFR 50.61 methodology was utilized in the calculation of the RT_{PTS} values.
(b) The source document containing detailed calculations is CN-AMLRS-10-7 (Reference 14), Table 5.5-1.
(c) Initial RT_{NDT} values are based on measured data. Hence, $\sigma_u = 0$°F.
(d) Per the guidance of 10 CFR 50.61, the base metal $\sigma_\Delta = 17$°F for Position 1.1 (without surveillance data) and with credible surveillance data $\sigma_\Delta = 8.5$°F for Position 2.1; the weld metal $\sigma_\Delta = 28$°F for Position 1.1 (without surveillance data) and with credible surveillance data $\sigma_\Delta = 14$°F for Position 2.1. However, σ_Δ need not exceed $0.5 * \Delta RT_{NDT}$.

6.0 References

1. WCAP-14040-NP-A, Revision 2, “Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves,” J.D. Andrachek, et al., January 1996.

2. NRC Letter from R. A. Capra to O.D. Kingsley, Commonwealth Edison Company, “Byron Station Units 1 and 2 and Braidwood Station Units 1 and 2, Acceptance for referring of pressure temperature limits report, (M98799, M98800, M98801, and M98802),” January 21 1998.

3. Westinghouse Letter to Exelon Nuclear, CAE-10-MUR-197, Revision 0, "Low Temperature Overpressure Protection (LTOP) System Evaluation Final Letter Report," M.P. Rudakewiz, September 8, 2010.

4. Byron & Braidwood Design Information Transmittal DIT-BRW-2006-0051, “Transmittal of Braidwood Unit 1 and Unit 2 Temperature and Pressure Uncertainties for Low Temperature Overpressure System (LTOPS) Power Operated Relief Valves (PORVS),” Nathan (Joe) Wolff Jr., July 18, 2006.

5. WCAP-9807, “Commonwealth Edison Company, Braidwood Station Unit 1 Reactor Vessel Radiation Surveillance Program,” S.E. Yanichko, et al., February 1981.

6. WCAP-15316, Revision 1, “Analysis of Capsule W from Commonwealth Edison Company Braidwood Unit 1 Reactor Vessel Radiation Surveillance Program,” E. Terek, et al., December 1999.

7. WCAP-15365, Revision 1, “Evaluation of Pressurized Thermal Shock for Braidwood Unit 1,” J.H. Ledger, January 2002.

8. NRC Letter from G. F. Dick, Jr., NRR, to C. Crane, Exelon Generation Company, LLC, “Issuance of Amendments: Revised Pressure-Temperature Limits Methodology; Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2,” dated October 4, 2004.

9. NRC Letter from M. Chawla to O.D. Kingsley, Exelon Generation Company, LLC, “Issuance of exemption from the Requirements of 10 CFR 50 Part 60 and Appendix G for Byron Station, Units 1 and 2, and Braidwood Stations, Units 1 and 2,” dated August 8, 2001.

10. NRC Letter from R. F. Kuntz, NRR, to C. M. Crane, Exelon Generation Company, LLC, “Byron Station, Unit Nos. 1 and 2, and Braidwood Station, Unit Nos. 1 and 2 - Issuance of Amendments Re: Reactor Coolant System Pressure and Temperature Limits Report (TAC Nos. MC8693, MC8694, MC8695, and MC8696),” November 27, 2006.

11. WCAP-15364, Revision 2, "Braidwood Unit 1 Heatup and Cooldown Limit Curves for Normal Operation," T.J. Laubham, November 2003.

12. WCAP-16143-P, Revision 1, "Reactor Vessel Closure Head/Vessel Flange Requirements Evaluation for Byron/Braidwood Units 1 and 2," W. Bamford, et al., October 2014.

13. Westinghouse Letter to Exelon Nuclear, CCE-07-24, "Braidwood Unit 1 and 2 RCS HU/CD Limit Curve Table Values," dated February 15, 2007.

14. Westinghouse Calculation Note CN-AMLRS-10-7, Revision 0, "Braidwood Units 1 and 2 Measurement Uncertainty Recapture (MUR) Uprate: Reactor Vessel Integrity Evaluations," A.E. Leicht, September 2010.

BRAIDWOOD UNIT 2

PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

Revision 7

BRAIDWOOD - UNIT 2
PRESSURE AND TEMPERATURE LIMITS REPORT

Table of Contents

Section		Page
1.0	Introduction	1
2.0	RCS Pressure Temperature Limits	1
	2.1 RCS Pressure and Temperature (P/T) Limits (LCO 3.4.3)	1
3.0	Low Temperature Over Pressure Protection and Boltup	7
	3.1 LTOP System Setpoints (LCO 3.4.12)	7
	3.2 LTOP Enable Temperature	7
	3.3 Reactor Vessel Boltup Temperature (Non-Technical Specification)	7
4.0	Reactor Vessel Material Surveillance Program	10
5.0	Supplemental Data Tables	12
6.0	References	18

BRAIDWOOD - UNIT 2
PRESSURE AND TEMPERATURE LIMITS REPORT

List of Figures

Figure		Page
2.1	Braidwood Unit 2 Reactor Coolant System Heatup Limitations (Heatup Rate of 100°F/hr) Applicable for 32 EFPY (Without Margins for Instrumentation Errors)	3
2.2	Braidwood Unit 2 Reactor Coolant System Cooldown Limitations (Cooldown Rates of 0, 25, 50 and 100°F/hr) Applicable to 32 EFPY (Without Margins for Instrumentation Errors)	4
3.1	Braidwood Unit 2 Nominal PORV Setpoints for the Low Temperature Overpressure Protection (LTOP) System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)	8

List of Tables

Table		Page
2.1a	Braidwood Unit 2 Heatup Data at 32 EFPY (Without Margins for Instrumentation Errors)	5
2.1b	Braidwood Unit 2 Cooldown Data Points 32 EFPY (Without Margins for Instrumentation Errors)	6
3.1	Data Points for Braidwood Unit 2 Nominal PORV Setpoints for the LTOP System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)	9
4.1	Braidwood Unit 2 Capsule Withdrawal Summary	11
5.1	Braidwood Unit 2 Calculation of Chemistry Factors Using Surveillance Capsule Data	13
5.2	Braidwood Unit 2 Reactor Vessel Material Properties	14
5.3	Summary of Braidwood Unit 2 Adjusted Reference Temperature (ART) Values at 1/4T and 3/4T Locations for 32 EFPY	15
5.4	Braidwood Unit 2 Calculation of Adjusted Reference Temperature (ARTs) at 32 EFPY at the Limiting Reactor Vessel Material, Nozzle Shell Forging 5P-7056	16
5.5	RT_{PTS} Calculation for Braidwood Unit 2 Beltline Region Materials at EOL (32 EFPY)	17

BRAIDWOOD - UNIT 2
PRESSURE AND TEMPERATURE LIMITS REPORT

1.0 Introduction

This Pressure and Temperature Limits Report (PTLR) for Braidwood Unit 2 has been prepared in accordance with the requirements of Braidwood Technical Specification (TS) 5.6.6, "Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)". Revisions to the PTLR shall be provided to the NRC after issuance.

The Technical Specifications addressed in this report are listed below:

LCO 3.4.3 RCS Pressure and Temperature (P/T) Limits; and
LCO 3.4.12 Low Temperature Overpressure Protection (LTOP) System.

2.0 RCS Pressure Temperature Limits

The PTLR limits for Braidwood Unit 2 were developed using a methodology specified in the Technical Specifications. The methodology listed in WCAP-14040-NP-A, Revision 2 (Reference 1) was used with the following exception:

a) Optional use of ASME Code Section XI, Appendix G, Article G-2000, 1996 Addenda,
b) Use of ASME Code Case N-640, “Alternative Reference Fracture Toughness for Development of P-T Limit Curves, Section XI, Division 1”, and
c) Use of ASME Code Case N-588, “Alternative to Reference Flaw Orientation of Appendix G for Circumferential Welds in Reactor Vessel, Section XI, Division 1”, and
d) Elimination of the flange requirements documented in WCAP-16143-P.

This exception to the methodology in WCAP 14040-NP-A, Revision 2 has been reviewed and accepted by the NRC in References 2, 7, 9, and 10.

WCAP 15373, Revision 2 (Reference 11), provides the basis for the Braidwood Unit 2 P/T curves, along with the best estimate chemical compositions, fluence projections and adjusted reference temperatures used to determine these limits. WCAP-16143-P, Reference 12, documents the technical basis for the elimination of the flange requirements.

2.1 RCS Pressure and Temperature (P/T) Limits (LCO 3.4.3)

2.1.1 The RCS temperature rate-of-change limits defined in Reference 11 are:

a. A maximum heatup of 100°F in any 1-hour period.

b. A maximum cooldown of 100°F in any 1-hour period, and

c. A maximum temperature change of less than or equal to 10°F in any 1-hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves.

2.1.2 The RCS P/T limits for heatup, inservice hydrostatic and leak testing, and criticality are specified by Figure 2.1 and Table 2.1a. The RCS P/T limits for cooldown are shown in Figure 2.2 and Table 2.1b. These limits are defined in WCAP-15373, Revision 2 (Reference 11). Consistent with the methodology described in Reference 1, with the exception noted in Section 2.0, the RCS P/T limits for heatup and cooldown shown in Figures 2.1 and 2.2 are provided without margins for instrument error. These limits were developed using ASME Boiler and Pressure Vessel Code Section XI, Appendix G, Article G2000, 1996 Addenda. The criticality limit curve specifies pressure-temperature limits for core operation to provide additional margin during actual power production as specified in 10 CFR 50, Appendix G.

The P/T limits for core operation (except for low power physics testing) are that the reactor vessel must be at a temperature equal to or higher than the minimum temperature required for the inservice hydrostatic test, and at least 40°F higher than the minimum permissible temperature in the corresponding P/T curve for heatup and cooldown.

<u>Material Property Basis</u>
Limiting Material: Circumferential Weld WF-562 & Nozzle Shell Forging
Limiting ART Values at 32 EFPY 1/4T 93°F (N-588) & 67°F ('96 App. G)
3/4T 79°F (N-588) & 54°F ('96 App. G)

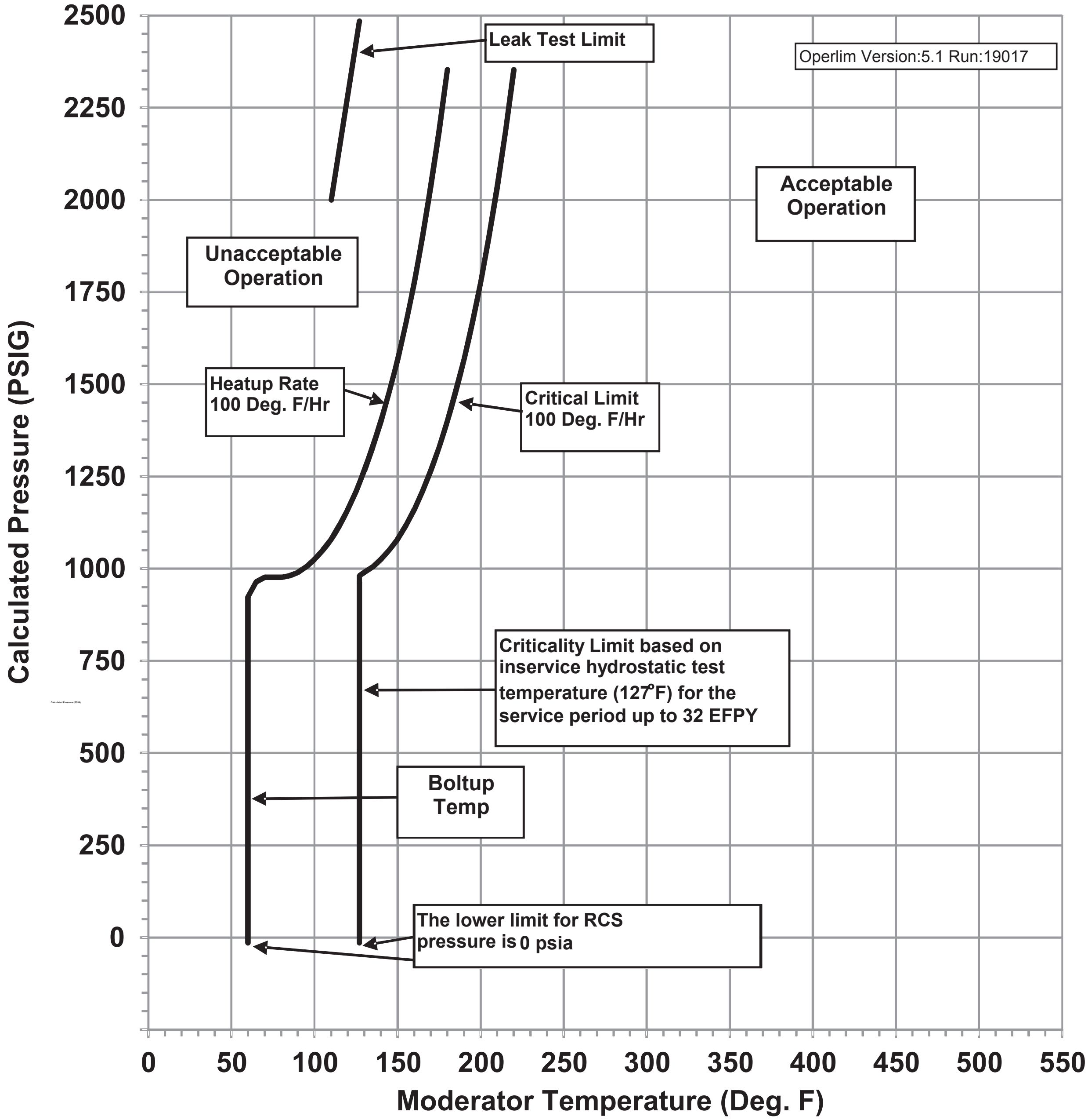


Figure 2.1

Braidwood Unit 2 Reactor Coolant System Heatup Limitations (Heatup Rate of 100°F/hr) Applicable to 32 EFPY (Without Margins for Instrumentation Errors)

Material Property Basis
Limiting Material: Circumferential Weld WF-562 & Nozzle Shell Forging
Limiting ART Values at 32 EFPY 1/4T 93°F (N-588) & 67°F ('96 App. G)
3/4T 79°F (N-588) & 54°F ('96 App. G)

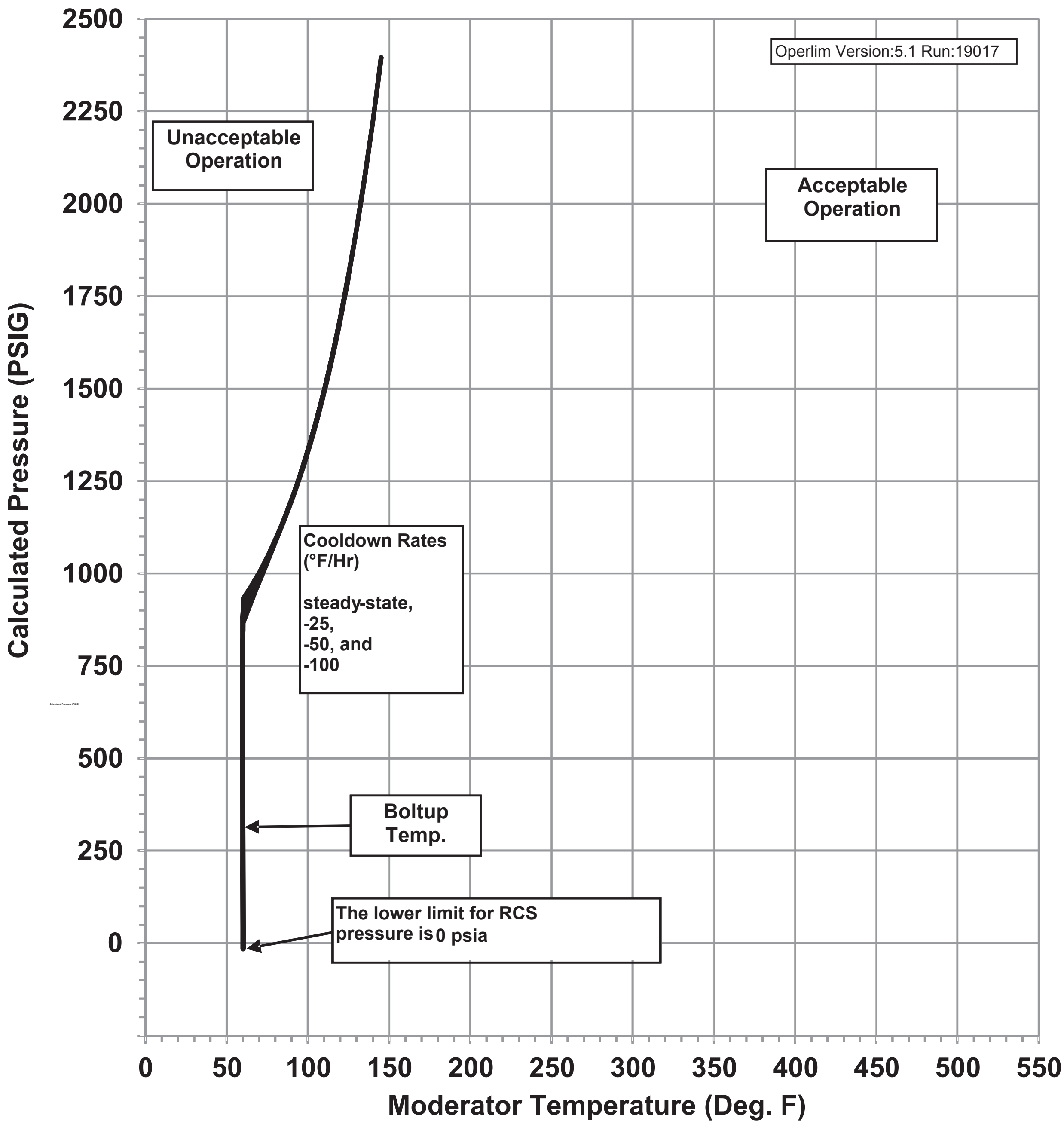


Figure 2.2

Braidwood Unit 2 Reactor Coolant System Cooldown Limitations (Cooldown Rates of 0, 25, 50 and 100°F/hr) Applicable to 32 EFPY (Without Margins of Instrumentation Errors)

Table 2.1a
Braidwood Unit 2 Heatup Data Points at 32 EFPY
(Without Margins for Instrumentation Errors)

Heatup Curve					
100 F Heatup		Criticality Limit		Leak Test Limit	
T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)
60	Note 1	127	Note 1	110	2000
60	924	127	965	127	2485
65	965	127	977*		
70	977	127	977		
75	977	127	981		
80	977	130	990		
85	981	135	1005		
90	990	140	1025		
95	1005	145	1051		
100	1025	150	1081		
105	1051	155	1118		
110	1081	160	1161		
115	1118	165	1210		
120	1161	170	1266		
125	1210	175	1329		
130	1266	180	1400		
135	1329	185	1480		
140	1400	190	1569		
145	1480	195	1668		
150	1569	200	1778		
155	1668	205	1901		
160	1778	210	2036		
165	1901	215	2186		
170	2036	220	2353		
175	2186				
180	2353				

* Refer to Reference 13

Note 1: The Minimum acceptable pressure is 0 psia

Table 2.1b
Braidwood Unit 2 Cooldown Data at 32 EFPY
(Without Margins for Instrumentation Errors)

Cooldown Curves							
Steady State		25 °F Cooldown		50 °F Cooldown		100 °F Cooldown	
T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)
60	Note 1	60	Note 1	60	Note 1	60	Note 1
60	931	60	908	60	889	60	866
65	965	65	946	65	932	65	921
70	1003	70	989	70	980	70	980
75	1045	75	1036	75	1033	75	1033
80	1092	80	1088	80	1088	80	1088
85	1143	85	1143	85	1143	85	1143
90	1200	90	1200	90	1200	90	1200
95	1263	95	1263	95	1263	95	1263
100	1332	100	1332	100	1332	100	1332
105	1409	105	1409	105	1409	105	1409
110	1494	110	1494	110	1494	110	1494
115	1587	115	1587	115	1587	115	1587
120	1691	120	1691	120	1691	120	1691
125	1805	125	1805	125	1805	125	1805
130	1932	130	1932	130	1932	130	1932
135	2071	135	2071	135	2071	135	2071
140	2226	140	2226	140	2226	140	2226
145	2396	145	2396	145	2396	145	2396

Note 1: The Minimum acceptable pressure is 0 psia

3.0 Low Temperature Overpressure Protection and Boltup

This section provides the Braidwood Unit 2 power operated relief valve lift settings, low temperature overpressure protection (LTOP) system arming temperature, and minimum reactor vessel boltup temperature.

3.1 LTOP System Setpoints (LCO 3.4.12).

The power operated relief valves (PORVs) shall each have nominal lift settings in accordance with Figure 3.1 and Table 3.1. These limits are based on References 3 and 8.

The LTOP setpoints are based on P/T limits that were established in accordance with 10 CFR 50, Appendix G without allowance for instrumentation error. The LTOP setpoints were developed using the methodology described in Reference 1. The LTOP PORV nominal lift settings shown in Figure 3.1 and Table 3.1 account for appropriate instrument error.

3.2 LTOP Enable Temperature

Braidwood Unit 2 procedures governing the heatup and cooldown of the RCS require the arming of the LTOP System for RCS temperature of 350°F and below and disarming of LTOP for RCS temperature above 350°F.

Note that the last LTOP PORV segment in Table 3.1 extends to 400°F where the pressure setpoint is 2335 psig. This is intended to prohibit PORV lift for an inadvertent LTOP system arming at power.

3.3 Reactor Vessel Boltup Temperature (Non-Technical Specification)

The minimum boltup temperature for the Reactor Vessel Flange shall be ≥ 60°F. Boltup is a condition in which the Reactor Vessel head is installed with tension applied to any stud, and with the RCS vented to atmosphere.

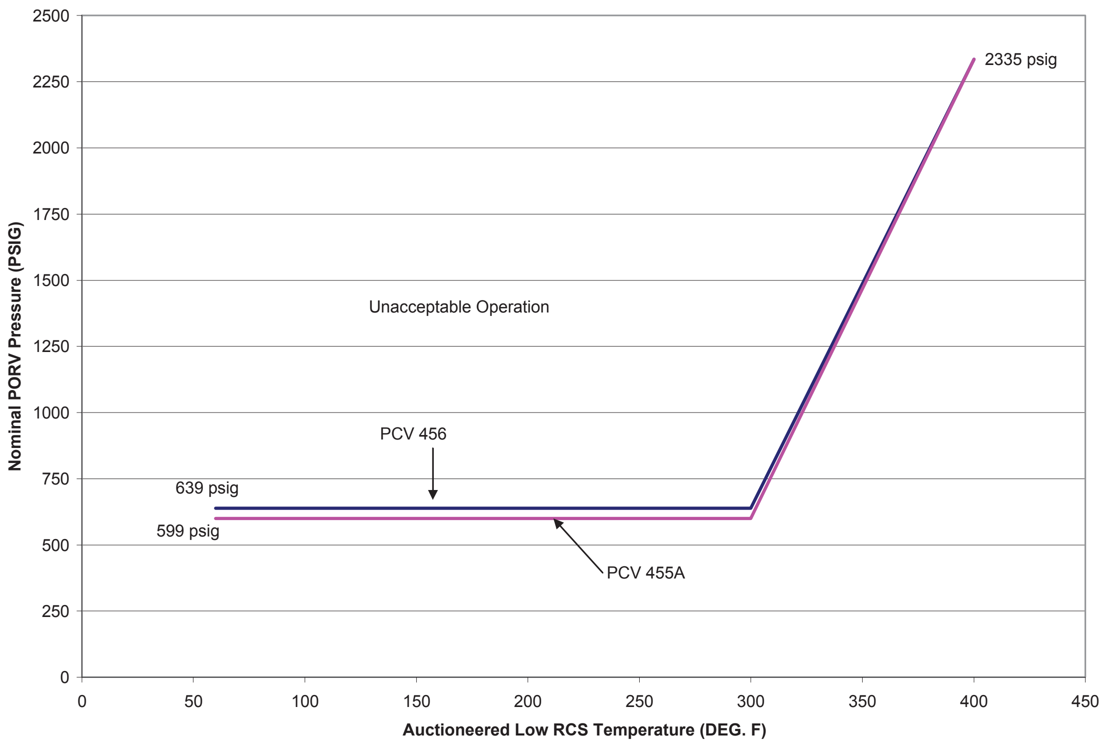


Figure 3.1
Braidwood Unit 2 Nominal PORV Setpoints for the Low Temperature Overpressure Protection (LTOP) System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)

Table 3.1
Data Points for Braidwood Unit 2 Nominal PORV Setpoints for the LTOP System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)

PCV-455A

RCS TEMP. (DEG. F)	RCS Pressure (PSIG)
60	599
300	599
400	2335

PCV-456

RCS TEMP. (DEG. F)	RCS Pressure (PSIG)
60	639
300	639
400	2335

Note: To determine nominal lift setpoints for RCS Pressure and RCS Temperatures greater than 300°F, linearly interpolate between the 300°F and 400°F data points shown above. (Setpoints extend to 400°F to prevent PORV liftoff from an inadvertent LTOP system arming while at power).

4.0 Reactor Vessel Material Surveillance Program

The pressure vessel material surveillance program (Reference 4) is in compliance with Appendix H to 10 CFR 50, "Reactor Vessel Radiation Surveillance Program." The material test requirements and the acceptance standards utilize the reference nil-ductility temperature, RT_{NDT} , which is determined in accordance with ASME Boiler and Pressure Vessel Code, Section III, NB-2331. The empirical relationship between RT_{NDT} and the fracture toughness of the reactor vessel steel is developed in accordance with Appendix G, "Protection Against Non-Ductile Failure," to Section XI of the ASME Boiler and Pressure Vessel Code. The surveillance capsule removal schedule meets the requirements of ASTM E185-82.

The third and final reactor vessel material irradiation surveillance specimens (Capsule W) have been removed and analyzed to determine changes in material properties. The surveillance capsule testing has been completed for the original operating period. The remaining three capsules, V, Y, and Z, were removed and placed in the spent fuel pool to avoid excessive fluence accumulation should they be needed to support life extension. The removal summary is provided in Table 4.1.

Table 4.1

Braidwood Unit 2 Capsule Withdrawal Summary[a]

Capsule	Capsule Location	Lead Factor	Withdrawal EFPY[b]	Fluence (n/cm^2, E>1.0 MeV)
U	58.5°	4.08	1.18	0.388×10^{19}
X	238.5°	4.03	4.24	1.15×10^{19}
W	121.5°	4.06	8.56	2.07×10^{19}
Z[c]	301.5°	4.14	12.78 (EOC 10)	2.83×10^{19}
V[c]	61.0°	3.92	18.42 (EOC 14)	3.73×10^{19}
Y[c]	241.0°	3.89	12.78 (EOC 10)	2.66×10^{19}

Notes:

(a) Source document is CN-AMLRS-10-7 (Reference 14), Table 5.7-4.
(b) Effective Full Power Years (EFPY) from plant startup.
(c) Standby Capsules Z, V, and Y were removed and placed in the spent fuel pool. No testing or analysis has been performed on these capsules. If license renewal is sought, one of these standby capsules may need to be tested to determine the effect of neutron irradiation on the reactor vessel surveillance materials during the period of extended operation.

5.0 Supplemental Data Tables

The following tables provide supplemental information on reactor vessel material properties and are provided to be consistent with Generic Letter 96-03. Some of the material property values shown were used as inputs to the P/T limits.

Table 5.1 shows the calculation of the surveillance material chemistry factors using surveillance capsule data.

Table 5.2 provides the reactor vessel material properties table.

Table 5.3 provides a summary of the Braidwood Unit 2 adjusted reference temperature (ART) values at the 1/4T and 3/4T locations for 32 EFPY.

Table 5.4 shows the calculation of ARTs at 32 EFPY for the limiting Braidwood Unit 2 reactor vessel material.

Table 5.5 provides the RT_{PTS} Calculation for Braidwood Unit 2 Beltline Region Materials at EOL (32 EFPY), (Reference 6).

Table 5.1

Braidwood Unit 2 Calculation of Chemistry Factors Using Surveillance Capsule Data[a]

Material	Capsule	Capsule f[b] (n/cm^2, E > 1.0 MeV)	FF[c]	ΔRT_{NDT}[b] (°F)	FF*ΔRT_{NDT} (°F)	FF^2
Lower Shell Forging (Tangential)	U	0.388×10^{19}	0.738	0.0[d]	0.00	0.54
	X	1.15×10^{19}	1.039	0.0[d]	0.00	1.08
	W	2.07×10^{19}	1.198	4.53	5.43	1.44
Lower Shell Forging (Axial)	U	0.388×10^{19}	0.738	0.0[d]	0.00	0.54
	X	1.15×10^{19}	1.039	33.94	35.26	1.08
	W	2.07×10^{19}	1.198	33.2	39.78	1.44
				SUM:	80.47	6.12
	$CF_{LS\ Forging} = \Sigma(FF * \Delta RT_{NDT}) \div \Sigma(FF^2) = (80.47) \div (6.12) =$ **13.2°F**					
Braidwood Unit 1 Surveillance Weld Material	U	0.388×10^{19}	0.738	17.06	12.59	0.54
	X	1.17×10^{19}	1.044	30.15	31.47	1.09
	W	1.98×10^{19}	1.186	49.68	58.94	1.41
Braidwood Unit 2 Surveillance Weld Material	U	0.388×10^{19}	0.738	0.0[d]	0.00	0.54
	X	1.15×10^{19}	1.039	26.3	27.33	1.08
	W	2.07×10^{19}	1.198	23.9	28.63	1.44
				SUM:	158.96	6.10
	$CF_{Weld\ Metal} = \Sigma(FF * \Delta RT_{NDT}) \div \Sigma(FF^2) = (158.96) \div (6.10) =$ **26.1°F**					

__Notes__:

(a) Source document is CN-AMLRS-10-7 (Reference 14), Table 5.2-2.

(b) f = fluence; ΔRT_{NDT} values are the measured 30 ft-lb shift values taken from Reference 5.

(c) FF = fluence factor = $f^{(0.28 - 0.10*\log f)}$

(d) Measured ΔRT_{NDT} values were determined to be negative, but physically a reduction should not occur; therefore, conservative values of zero are used.

Table 5.2				
Braidwood Unit 2 Reactor Vessel Material Properties				
Material Description	Cu (%)	Ni (%)	Chemistry Factor	Initial RT_{NDT} (ºF)[a]
Closure Head Flange Heat # 3P6566/5P7547/4P6986 Serial # 2031-V-1	--	0.75	--	20
Vessel Flange Heat # 124P455	0.07	0.70	--	20
Nozzle Shell Forging * Heat # 5P-7056	0.04	0.90	26.0°F[b]	30
Intermediate Shell Forging * Heat # [49D963/49C904]-1-1	0.03	0.71	20.0°F[b]	-30
Lower Shell Forging * Heat # [50D102/50C97]-1-1	0.06	0.76	37.0°F[b] 13.2°F[c]	-30
Circumferential Weld * (Intermediate Shell to Lower Shell) Weld Seam WF-562 Heat # 442011	0.03	0.67	41.0F[b] 26.1F[c]	40
Circumferential Weld * (Nozzle Shell to Intermediate Shell) Weld Seam WF-645 Heat # H4498	0.04	0.46	54.0°F[b]	-25

* Beltline Region Materials

a) The Initial RT_{NDT} values for the plates and welds are based on measured data.
b) Chemistry Factor calculated for Cu and Ni values per Regulatory Guide 1.99, Rev. 2, Position 1.1.
c) Chemistry Factor calculated for Cu and Ni values per Regulatory Guide 1.99, Rev. 2, Position 2.1

Table 5.3

Summary of Braidwood Unit 2 Adjusted Reference Temperature (ART) Values at 1/4T and 3/4T Locations for 32 EFPY[(a)]

Reactor Vessel Material	Surface Fluence (n/cm^2, E>1.0 MeV)	32 EFPY	
		1/4T ART (°F)	3/4T ART (°F)
Nozzle Shell Forging	0.559×10^{19}	66	54
Intermediate Shell Forging	1.73×10^{19}	10	-1
Lower Shell Forging	1.73×10^{19}	41	24
→Using non-credible surveillance data	1.73×10^{19}	-3	-11
Nozzle to Intermediate Shell Forging Circ. Weld Seam (Heat # H4498)	0.559×10^{19}	51	24
Intermediate to Lower Shell Forging Circ. Weld Seam (Heat # 442011)	1.67×10^{19}	122	99
→Using credible surveillance data	1.67×10^{19}	92	78

__Notes__:

(a) The source document containing detailed calculations is CN-AMLRS-10-7 (Reference 14), Tables 5.3.1-3 and 5.3.1-4. The ART values summarized in this table utilize the most recent fluence projections and materials data, but were not used in development of the P/T limit curves. See Figures 2.1 and 2.2 of this PTLR for the ART values used in development of the P/T limit curves.

Table 5.4

Braidwood Unit 2 Calculation of Adjusted Reference Temperatures (ARTs) at 32 EFPY at the Limiting Reactor Vessel Material, Nozzle Shell Forging 5P-7056

Parameter	Values	
Operating Time	32 EFPY	
Location[a]	1/4T ART (°F)	3/4T ART(°F)
Chemistry Factor, CF (°F)	26.0	26.0
Fluence(f), n/cm^2 (E>1.0 Mev)[b]	3.40×10^{18}	1.23×10^{18}
Fluence Factor, FF	0.703	0.460
ΔRT_{NDT}= CFxFF(°F)	18.3	12.0
Initial RT $_{NDT,}$, I(°F)	30	30
Margin, M(°F)	18.3	12.0
ART= I+(CF*FF)+M, °F per RG 1.99, Revision 2	67	54

a) The Braidwood Unit 2 reactor vessel wall thickness is 8.5 inches at the beltline region.
b) Fluence, f, is the calculated peak clad/base metal interface fluence (E>1.0 Mev) =5.67×10^{18} n/cm^2 at 32 EFPY (Reference 11).

Table 5.5

RT_{PTS} Calculation for Braidwood Unit 2 Beltline Region Materials at EOL (32 EFPY)[a,b]

Reactor Vessel Material	R.G. 1.99, Rev. 2 Position	CF (°F)	Fluence (n/cm^2, E>1.0 MeV)	FF	IRT_{NDT}[c] (°F)	ΔRT_{NDT} (°F)	σ_u[c] (°F)	σ_Δ[d] (°F)	Margin (°F)	RT_{PTS} (°F)
Nozzle Shell Forging	1.1	26	0.559×10^{19}	0.8373	30	21.8	0	10.9	21.8	74
Intermediate Shell Forging	1.1	20	1.73×10^{19}	1.1508	-30	23.0	0	11.5	23.0	16
Lower Shell Forging	1.1	37	1.73×10^{19}	1.1508	-30	42.6	0	17	34	47
→Using non-credible surveillance data	2.1	13.2	1.73×10^{19}	1.1508	-30	15.2	0	7.6	15.2	0
Nozzle to Intermediate Shell Forging Circ. Weld Seam (Heat # H4498)	1.1	54	0.559×10^{19}	0.8373	-25	45.2	0	22.6	45.2	65
Intermediate to Lower Shell Forging Circ. Weld Seam (Heat # 442011)	1.1	41	1.67×10^{19}	1.1413	40	46.8	0	23.4	46.8	134
→Using credible surveillance data	2.1	26.1	1.67×10^{19}	1.1413	40	29.8	0	14	28	98

Notes:

(a) The 10 CFR 50.61 methodology was utilized in the calculation of the RT_{PTS} values.
(b) The source document containing detailed calculations is CN-AMLRS-10-7 (Reference 14), Table 5.5-2.
(c) Initial RT_{NDT} values are based on measured data. Hence, $\sigma_u = 0$°F.
(d) Per the guidance of 10 CFR 50.61, the base metal $\sigma_\Delta = 17$°F for Position 1.1 (without surveillance data) and for Position 2.1 with non-credible surveillance data; the weld metal $\sigma_\Delta = 28$°F for Position 1.1 (without surveillance data) and with credible surveillance data $\sigma_\Delta = 14$°F for Position 2.1. However, σ_Δ need not exceed $0.5 \cdot \Delta RT_{NDT}$.

6.0 References

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2. NRC Letter from R. A. Capra to O.D. Kingsley, Commonwealth Edison Company, "Byron Station Units 1 and 2 and Braidwood Station Units 1 and 2, Acceptance for referring of pressure temperature limits report, (M98799, M98800, M98801, and M98802)," January 21, 1998.

3. Westinghouse Letter to Exelon Nuclear, CAE-10-MUR-197, Revision 0, "Low Temperature Overpressure Protection (LTOP) System Evaluation Final Letter Report," M.P. Rudakewiz, September 8, 2010.

4. WCAP-11188, "Commonwealth Edison Company, Braidwood Station Unit 2 Reactor Vessel Surveillance Program," December 1986.

5. WCAP-15369, "Analysis of Capsule W from the Commonwealth Edison Company Braidwood Unit 2 Reactor Vessel Radiation Surveillance Program," March 2000.

6. WCAP-15381, "Evaluation of Pressurized Thermal Shock for Braidwood Unit 2", T.J. Laubham, September 2000.

7. NRC Letter from G. F. Dick, Jr., NRR, to C. Crane, Exelon Generation Company, LLC, "Issuance of Amendments: Revised Pressure-Temperature Limits Methodology; Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2," dated October 4, 2004.

8. Byron & Braidwood Design Information Transmittal DIT-BRW-2006-0051, "Transmittal of Braidwood Unit 1 and Unit 2 Temperature and Pressure Uncertainties for Low Temperature Overpressure System (LTOPS) Power Operated Relief Valves (PORVS)," Nathan (Joe) Wolff Jr., July 18, 2006.

9. NRC Letter from M. Chawla to O.D. Kingsley, Exelon Generation Company, LLC, "Issuance of exemption from the Requirements of 10 CFR 50 Part 60 and Appendix G for Byron Station, Units 1 and 2, and Braidwood Stations, Units 1 and 2," dated August 8, 2001.

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11. WCAP-15373, Revision 2, "Braidwood Unit 2 Heatup and Cooldown Limits for Normal Operation," T.J. Laubham et al., November 2003.

12. WCAP-16143-P, Revision 1, “Reactor Vessel Closure Head/Vessel Flange Requirements Evaluation for Byron/Braidwood Units 1 and 2,” W. Bamford, et al., October 2014.

13. Westinghouse Letter to Exelon Nuclear, CCE-07-24, “Braidwood Unit 1 and 2 RCS HU/CD Limit Curve Table Values,” dated February 15, 2007.

14. Westinghouse Calculation Note CN-AMLRS-10-7, Revision 0, "Braidwood Units 1 and 2 Measurement Uncertainty Recapture (MUR) Uprate: Reactor Vessel Integrity Evaluations," A.E. Leicht, September 2010, and Westinghouse evaluation MCOE-LTR-13-102 Rev. 0, “Byron and Braidwood Closure Head/Vessel Flange Region: MUR Uprate Assessment,” November 2013.