Final Submittal
(Blue Paper)

VOGTLE EXAM 2002-301
50-424 AND 50-425

NOVEMBER 26, &
DECEMBER 2 - 13, 2002

FINAL RO/SRO
WRITTEN EXAM HANDOUTS
AND PROCTOR NOTES

References

1. 008AK1.01 – Common
   Steam Tables

2. 076AA2.02 – SRO
   Tech Spec 3.4.16 "RCS Specific Activity" including figure 3.4.16-1 (Provide the complete section)

3. G2.2.22 Common
   Tech Spec 2.0 "Safety Limits" including figure 2.1.1-1

4. G2.4.11 Common
   18009-C "Steam Generator Tube Leak"

5. 011EA1.04 – SRO
   19111-C Steps 5 & 6

6. 055K5.03S – SRO
   COLR Units 1 & 2 (Remove the RIL curves)

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

In MODES 1 and 2, the combination of THERMAL POWER, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the SLs specified in Figure 2.1.1-1.

2.1.2 RCS Pressure SL

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

2.2 SL Violations

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

2.2.2 If SL 2.1.2 is violated:

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

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

2.2.3 Within 1 hour notify the NRC Operations Center, in accordance with 10 CFR 50.72.

2.2.4 Within 24 hours, notify the General Manager-Nuclear Plant and Vice President-Nuclear.

2.2.5 Within 30 days a Licensee Event Report (LER) shall be prepared and submitted to the NRC pursuant to 10 CFR 50.73.

2.2.6 Operation of the unit shall not be resumed until authorized by the NRC.

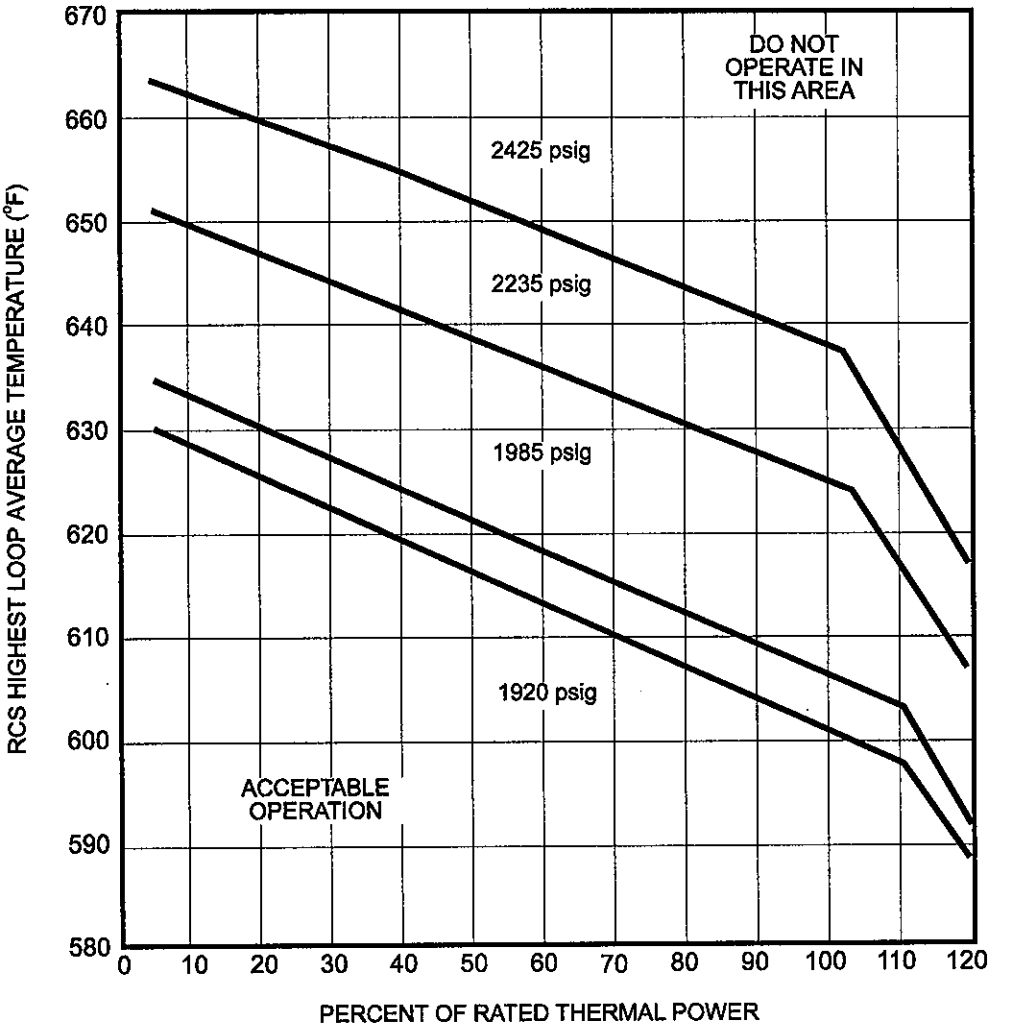


Figure 2.1.1-1
Reactor Core Safety Limits

3.4 REACTOR COOLANT SYSTEM (RCS)

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

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

a. Pressurizer pressure ≥ 2199 psig;

b. RCS average temperature ≤ 592.5 °F; and

c. RCS total flow rate ≥ 384,509 gpm.

APPLICABILITY: MODE 1.

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

a. THERMAL POWER ramp > 5% RTP per minute; or

b. THERMAL POWER step > 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more RCS DNB parameters not within limits.	A.1 Restore RCS DNB parameter(s) to within limit.	2 hours
B. RCS total flow rate degraded.	B.1. Perform SR 3.4.1.4.	7 days
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 2.	6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.1.1	Verify pressurizer pressure is ≥ 2199 psig.	12 hours
SR 3.4.1.2	Verify RCS average temperature is ≤ 592.5°F.	12 hours
SR 3.4.1.3	Monitor RCS total flow rate for degradation.	12 hours
SR 3.4.1.4	----------NOTE---------- Not required to be performed until 7 days after ≥ 90% RTP. ---------- Verify by precision heat balance that RCS total flow rate is ≥ 384,509 gpm.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.2 RCS Minimum Temperature for Criticality

LCO 3.4.2 Each RCS loop average temperature (T_{avg}) shall be ≥ 551°F.

APPLICABILITY: MODE 1,
MODE 2 with k_{eff} ≥ 1.0.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. T_{avg} in one or more RCS loops not within limit.	A.1 Be in MODE 3.	30 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.2.1	Verify RCS T_{avg} in each loop ≥ 551°F.	Once within 30 minutes and every 30 minutes thereafter when the T_{avg} - T_{ref} deviation alarm is not reset and any RCS loop T_{avg} < 561°F

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. ----------NOTE---------- Required Action A.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1	Restore parameter(s) to within limits.	30 minutes
	AND		
	A.2	Determine RCS is acceptable for continued operation.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5 with RCS pressure < 500 psig.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ----------NOTE---------- Required Action C.2 shall be completed whenever this Condition is entered. ---------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limits. AND C.2 Determine RCS is acceptable for continued operation.	Immediately Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	----------NOTE---------- Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. ---------- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates are within the limits specified in the PTLR.	30 minutes

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.4 RCS Loops - MODES 1 and 2

LCO 3.4.4 Four RCS loops shall be OPERABLE and in operation.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of LCO not met.	A.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.4.1	Verify each RCS loop is in operation.	12 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops - MODE 3

LCO 3.4.5 Two RCS loops shall be OPERABLE, and either:

a. Two RCS loops shall be in operation when the Rod Control System is capable of rod withdrawal; or

b. One RCS loop shall be in operation when the Rod Control System is not capable of rod withdrawal.

----------NOTE----------
All reactor coolant pumps may be de-energized for ≤ 1 hour per 8 hour period provided:

a. No operations are permitted that would cause reduction of the RCS boron concentration; and

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

APPLICABILITY: MODE 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RCS loop inoperable.	A.1 Restore required RCS loop to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 4.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One required RCS loop not in operation, and reactor trip breakers closed and Rod Control System capable of rod withdrawal.	C.1	Restore required RCS loop to operation.	1 hour
	OR		
	C.2	De-energize all control rod drive mechanisms (CRDMs).	1 hour
D. Two required RCS loops inoperable. OR No RCS loop in operation.	D.1	De-energize all CRDMs.	Immediately
	AND		
	D.2	Suspend all operations involving a reduction of RCS boron concentration.	Immediately
	AND		
	D.3	Initiate action to restore one RCS loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.5.1	Verify required RCS loops are in operation.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.4.5.2	Verify steam generator secondary side water levels are above the highest point of the steam generator U-tubes for required RCS loops.	12 hours
SR 3.4.5.3	Verify correct breaker alignment and indicated power are available to the required pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops - MODE 4

LCO 3.4.6 Two loops consisting of any combination of RCS loops and residual heat removal (RHR) loops shall be OPERABLE, and one loop shall be in operation.

---NOTES---

1. All reactor coolant pumps (RCPs) and RHR pumps may be de-energized for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause reduction of the RCS boron concentration; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. An RCP shall not be started unless the secondary side water temperature of each steam generator (SG) is < 50°F above each of the RCS cold leg temperatures. With no RCP running, this value is reduced to 25°F at an RCS temperature of 350°F and varies linearly to 50°F at an RCS temperature of 200°F.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RCS loop inoperable. AND Two RHR loops inoperable.	A.1 Initiate action to restore a second loop to OPERABLE status.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One required RHR loop inoperable. AND Two required RCS loops inoperable.	B.1 Be in MODE 5.	24 hours
C. Both required RCS or RHR loops inoperable. OR No RCS or RHR loop in operation.	C.1 Suspend all operations involving a reduction of RCS boron concentration. AND C.2 Initiate action to restore one loop to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify one RHR or RCS loop is in operation.	12 hours
SR 3.4.6.2	Verify SG secondary side water levels are above the highest point of the steam generator U-tubes for required RCS loops.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.6.3	Verify correct pump breaker alignment and indicated power are available to the required pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops — MODE 5, Loops Filled

LCO 3.4.7 One residual heat removal (RHR) loop shall be OPERABLE and in operation, and either:

a. One additional RHR loop shall be OPERABLE; or

b. The secondary side water level of at least two steam generators (SGs) shall be above the highest point of the steam generator U-tubes.

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

1. The RHR pump of the loop in operation may be de-energized for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause reduction of the RCS boron concentration; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. One required RHR loop may be inoperable for up to 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.

3. No reactor coolant pump shall be started unless the secondary side water temperature of each SG is < 50°F above each of the RCS cold leg temperatures.

4. All RHR loops may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One RHR loop inoperable. AND Required SGs secondary side water levels not within limits.	A.1	Initiate action to restore a second RHR loop to OPERABLE status. OR	Immediately
	A.2	Initiate action to restore required SG secondary side water levels to within limits.	Immediately
B. Required RHR loops inoperable. OR No RHR loop in operation.	B.1	Suspend all operations involving a reduction of RCS boron concentration. AND	Immediately
	B.2	Initiate action to restore one RHR loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Verify one RHR loop is in operation.	12 hours
SR 3.4.7.2	Verify SG secondary side water level is above the highest point of the steam generator U-tubes for the required SGs.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.7.3	Verify correct breaker alignment and indicated power are available to the required RHR pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops — MODE 5, Loops Not Filled

LCO 3.4.8 Two residual heat removal (RHR) loops shall be OPERABLE and one RHR loop shall be in operation. Each valve used to isolate unborated water sources shall be secured in the closed position.

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

1. All RHR pumps may be de-energized for ≤ 15 minutes when switching from one loop to another provided:

   a. The core outlet temperature is maintained > 10°F below saturation temperature.

   b. No operations are permitted that would cause a reduction of the RCS boron concentration; and

   c. No draining operations to further reduce the RCS water volume are permitted.

2. One RHR loop may be inoperable for ≤ 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.

3. Valves in the flowpath from the RMWST, through the chemical mixing tank, to the suction of the charging pumps may be open under administrative control provided the RCS is in compliance with the SHUTDOWN MARGIN requirements of LCO 3.1.1 and the high flux at shutdown alarm is OPERABLE.

APPLICABILITY: MODE 5 with RCS loops not filled.

(continued)

ACTIONS (continued)

NOTE
While this LCO is not met, entry into MODE 5 with RCS loops not filled is not permitted.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR loop inoperable.	A.1 Initiate action to restore RHR loop to OPERABLE status.	Immediately
B. Required RHR loops inoperable. OR No RHR loop in operation.	B.1 Suspend all operations involving reduction in RCS boron concentration. AND B.2 Initiate action to restore one RHR loop to OPERABLE status and to operation.	Immediately Immediately
C. One or more valves used to isolate unborated water sources not secured in closed position.	C.1 Initiate action to secure valve(s) in closed position.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.8.1	Verify one RHR loop is in operation.	12 hours
SR 3.4.8.2	Verify correct breaker alignment and indicated power are available to the required RHR pump that is not in operation.	7 days
SR 3.4.8.3	Verify each valve that isolates unborated water sources is secured in the closed position.	31 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level ≤ 92%; and

b. Two groups of pressurizer heaters OPERABLE with the capacity of each group ≥ 150 kW and capable of being powered from an emergency power supply.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Pressurizer water level not within limit.	A.1	Be in MODE 3 with reactor trip breakers open.	6 hours
	AND		
	A.2	Be in MODE 4.	12 hours
B. One required group of pressurizer heaters inoperable.	B.1	Restore required group of pressurizer heaters to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition B not met.	C.1	Be in MODE 3.	6 hours
	AND		
	C.2	Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.9.1	Verify pressurizer water level is ≤ 92%.	12 hours
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters is ≥ 150 kW.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Safety Valves

LCO 3.4.10 Three pressurizer safety valves shall be OPERABLE with lift settings ≥ 2410 psig and ≤ 2510 psig.

APPLICABILITY: MODES 1, 2, and 3.

---NOTE---
The lift settings are not required to be within the LCO limits during MODE 3 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for 54 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One pressurizer safety valve inoperable.	A.1	Restore valve to OPERABLE status.	15 minutes
B. Required Action and associated Completion Time not met. OR Two or more pressurizer safety valves inoperable.	B.1 AND B.2	Be in MODE 3. Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.10.1	Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be within ± 1%.	In accordance with the Inservice Testing Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

---NOTES---

1. Separate Condition entry is allowed for each PORV.
2. LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more PORVs inoperable and capable of being manually cycled.	A.1	Close and maintain power to associated block valve.	1 hour
B. One PORV inoperable and not capable of being manually cycled.	B.1	Close associated block valve.	1 hour
	AND		
	B.2	Remove power from associated block valve.	1 hour
	AND		
	B.3	Restore PORV to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One block valve inoperable.	C.1	Place associated PORV in manual control.	1 hour
	AND		
	C.2	Restore block valve to OPERABLE status.	72 hours
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1	Be in MODE 3.	6 hours
	AND		
	D.2	Be in MODE 4.	12 hours
E. Two PORVs inoperable and not capable of being manually cycled.	E.1	Close associated block valves.	1 hour
	AND		
	E.2	Remove power from associated block valves.	1 hour
	AND		
	E.3	Be in MODE 3.	6 hours
	AND		
	E.4	Be in MODE 4.	12 hours
F. More than one block valve inoperable.	F.1	Place associated PORVs in manual control.	1 hour
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
F. (continued)	F.2	Restore one block valve to OPERABLE status.	2 hours
	AND		
	F.3	Restore remaining block valve to OPERABLE status.	72 hours
G. Required Action and associated Completion Time of Condition F not met.	G.1	Be in MODE 3.	6 hours
	AND		
	G.2	Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	----------NOTE---------- Not required to be performed with block valve closed in accordance with the Required Action of Conditions A, B, or E. ----------	
	Perform a complete cycle of each block valve.	92 days
SR 3.4.11.2	Perform a complete cycle of each PORV.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Cold Overpressure Protection Systems (COPS)

LCO 3.4.12 A COPS shall be OPERABLE with all safety injection pumps incapable of injecting into the RCS and the accumulators isolated and either a or b below.

a. Two RCS relief valves, as follows:

1. Two power operated relief valves (PORVs) with lift settings within the limits specified in the PTLR, or

2. Two residual heat removal (RHR) suction relief valves with setpoints ≥ 440 psig and ≤ 460 psig, or

3. One PORV with a lift setting within the limits specified in the PTLR and one RHR suction relief valve with a setpoint within specified limits.

b. The RCS depressurized and an RCS vent of ≥ 2.14 square inches (based on an equivalent length of 10 feet of pipe).

APPLICABILITY: MODE 4,
MODE 5,
MODE 6 when the reactor vessel head is on.

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

1. Accumulator isolation is only required when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.

2. The safety injection pumps are not required to be incapable of injecting into the RCS until 4 hours after entering MODE 4 from MODE 3 provided the temperature of one or more RCS cold legs has not decreased below 325°F.

ACTIONS

---NOTE---

1. While this LCO is not met, entry into MODE 6 with the reactor vessel head on from MODE 6, and entry into MODE 5 from MODE 6 with the reactor vessel head on is not permitted.

2. With one required PORV inoperable for the purpose of cold overpressure protection, entry into MODE 4 from MODE 3 is permitted provided that RCS temperature is maintained above 275°F, and, within 36 hours, either: the PORV is restored to OPERABLE status; or, an RHR suction relief valve is placed in service so that the requirements of LCO 3.4.12 are met. Otherwise, the reactor vessel must be depressurized and vented in accordance with Required Action F.1.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more safety injection pumps capable of injecting into the RCS.	A.1	Render all safety injection pumps incapable of injecting into the RCS.	4 hours
B. An accumulator not isolated when the accumulator pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	B.1	Isolate affected accumulator.	1 hour
C. Required Action and associated Completion Time of Condition B not met.	C.1	Increase RCS cold leg temperature to > 350°F.	12 hours
	OR		
	C.2	Depressurize affected accumulator to less than the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	12 hours
D. One required RCS relief valve inoperable in MODE 4.	D.1	Restore required RCS relief valve to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One required RCS relief valve inoperable in MODE 5 or 6.	E.1 Restore required RCS relief valve to OPERABLE status.	24 hours
F. Two required RCS relief valves inoperable. OR Required Action and associated Completion Time of Condition A, C, D, or E not met. OR COPS inoperable for any reason other than Condition A, B, D, or E.	F.1 Depressurize RCS and establish RCS vent size within specified limits.	12 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.12.1	Verify both safety injection pumps are incapable of injecting into the RCS.	Within 4 hours after entering MODE 4 from MODE 3 and prior to the temperature of one or more RCS cold legs decreasing below 325°F AND 12 hours thereafter.
SR 3.4.12.2	Verify each accumulator is isolated.	12 hours
SR 3.4.12.3	Verify RHR suction valves are open for each required RHR suction relief valve.	72 hours
SR 3.4.12.4	----------NOTE---------- Only required to be performed when complying with LCO 3.4.12.b. ---------- Verify RCS vent size within specified limits.	12 hours for unlocked open vent valve(s) AND 31 days for locked open vent valve(s)

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.4.12.5	Verify PORV block valve is open for each required PORV.	72 hours
SR 3.4.12.6	----------NOTE---------- Not required to be performed until 12 hours after decreasing RCS cold leg temperature to ≤ 350°F. ---------- Perform a COT on each required PORV, excluding actuation.	31 days
SR 3.4.12.7	Perform CHANNEL CALIBRATION for each required PORV actuation channel.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE;

d. 1 gpm total primary to secondary LEAKAGE through all steam generators (SGs); and

e. 500 gallons per day primary to secondary LEAKAGE through any one SG.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met. OR Pressure boundary LEAKAGE exists.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.13.1	----------NOTE---------- 1. Not required to be performed in MODE 3 or 4 until 12 hours of steady state operation. 2. Only required to be performed during steady state operation. ---------- Perform RCS water inventory balance.	Once within 12 hours after achieving steady state operation AND 72 hours thereafter
SR 3.4.13.2	Verify steam generator tube integrity is in accordance with the Steam Generator Tube Surveillance Program.	In accordance with the Steam Generator Tube Surveillance Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.14 Leakage from each RCS PIV shall be within limit.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except valves in the residual heat removal (RHR) flow path when in, or during the transition to or from the RHR mode of operation.

ACTIONS

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

1. Separate Condition entry is allowed for each flow path.
2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more RCS PIVs not within limit.	----------NOTE---------- Each valve used to satisfy Required Action A.1 and Required Action A.2 must have been verified to meet SR 3.4.14.1 and be in the reactor coolant pressure boundary or the high pressure portion of the system. ----------	(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.1	Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve.	4 hours
	AND		
	A.2	Isolate the high pressure portion of the affected system from the low pressure portion by use of a second closed manual, deactivated automatic, or check valve.	72 hours
B. Required Action and associated Completion Time for Condition A not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5.	36 hours
C. RHR System suction isolation valve interlock function inoperable.	C.1	Isolate the affected penetration by use of one closed manual or deactivated automatic valve.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.14.1	----------NOTES---------- 1. Not required to be performed in MODES 3 and 4. 2. Not required to be performed on the RCS PIVs located in the RHR flow path when in the shutdown cooling mode of operation. 3. RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided. ----------	
	Verify leakage from each RCS PIV is equivalent to ≤ 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure ≥ 2215 psig and ≤ 2255 psig.	In accordance with the Inservice Testing Program, and 18 months AND Prior to entering MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months (except for valves HV-8701A/B and HV-8702A/B) AND (continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.14.1 (continued)		For systems rated at less than 50% RCS design pressure, within 24 hours following valve actuation (except for valves HV-8701A/B and HV-8702A/B).
SR 3.4.14.2	Verify RHR System suction isolation valve interlock prevents the valves from being opened with a simulated or actual RCS pressure signal ≥ 450 psig.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.15 RCS Leakage Detection Instrumentation

LCO 3.4.15 The following RCS leakage detection instrumentation shall be OPERABLE:

a. The containment normal sumps level and reactor cavity sump monitors;

b. One containment atmosphere radioactivity monitor (gaseous or particulate); and

c. Either the containment air cooler condensate flow rate or a containment atmosphere gaseous or particulate radioactivity monitoring system not taken credit for in item b.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One containment sump monitor inoperable.	----------NOTE---------- LCO 3.0.4 is not applicable. ----------	
	A.1 Perform SR 3.4.13.1.	Once per 24 hours
B. Two or more containment sump monitors inoperable	----------NOTE---------- LCO 3.0.4 is not applicable. ----------	
	B.1 Perform SR 3.4.13.1	Once per 24 hours
	AND	
	B.2 Restore at least two containment sump monitors to OPERABLE status.	30 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Required containment atmosphere radioactivity monitor(s) inoperable.	----------NOTE---------- LCO 3.0.4 is not applicable. ----------		
	C.1.1	Analyze grab samples of the containment atmosphere.	Once per 24 hours
	OR		
	C.1.2	Perform SR 3.4.13.1.	Once per 24 hours
	AND		
	C.2.1	Restore required containment atmosphere radioactivity monitor(s) to OPERABLE status.	30 days
	OR		
	C.2.2	Verify containment air cooler condensate flow rate monitor is OPERABLE.	30 days
D. Required containment air cooler condensate flow rate monitor inoperable.	D.1	Perform SR 3.4.15.2.	Once per 8 hours
	OR		
	D.2	Perform SR 3.4.13.1.	Once per 24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required containment atmosphere radioactivity monitor inoperable. AND Required containment air cooler condensate flow rate monitor inoperable.	E.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status. OR E.2 Restore required containment air cooler condensate flow rate monitor to OPERABLE status.	30 days 30 days
F. Required Action and associated Completion Time not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours
G. All required leakage detection systems inoperable.	G.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	Perform CHANNEL CHECK of containment normal sumps level and reactor cavity sump level monitors.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.15.2	Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	12 hours
SR 3.4.15.3	Perform COT of the required containment atmosphere radioactivity monitor.	92 days
SR 3.4.15.4	Perform CHANNEL CALIBRATION of the containment sump monitors.	18 months
SR 3.4.15.5	Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	18 months
SR 3.4.15.6	Perform CHANNEL CALIBRATION of the required containment air cooler condensate flow rate monitor.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Specific Activity

LCO 3.4.16 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS average temperature (T_{avg}) ≥ 500°F.

ACTIONS

----------Note----------
LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. DOSE EQUIVALENT I-131 > 1.0 µCi/gm.	A.1	Verify DOSE EQUIVALENT I-131 within the acceptable region of Figure 3.4.16-1.	Once per 4 hours
	AND		
	A.2	Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
B. Gross specific activity of the reactor coolant not within limit.	B.1	Perform SR 3.4.16.2.	4 hours
	AND		
	B.2	Be in MODE 3 with T_{avg} < 500°F.	6 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A not met. OR DOSE EQUIVALENT I-131 in the unacceptable region of Figure 3.4.16-1.	C.1 Be in MODE 3 with T_{avg} < 500°F.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	Verify reactor coolant gross specific activity ≤ 100/$\bar{E}$ µCi/gm.	7 days
SR 3.4.16.2	----------NOTE---------- Only required to be performed in MODE 1. ---------- Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ 1.0 µCi/gm.	14 days AND Between 2 and 6 hours after a THERMAL POWER change of ≥ 15% RTP within a 1 hour period

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.16.3	----------NOTE---------- Not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours. ---------- Determine $\bar{E}$ from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.	184 days

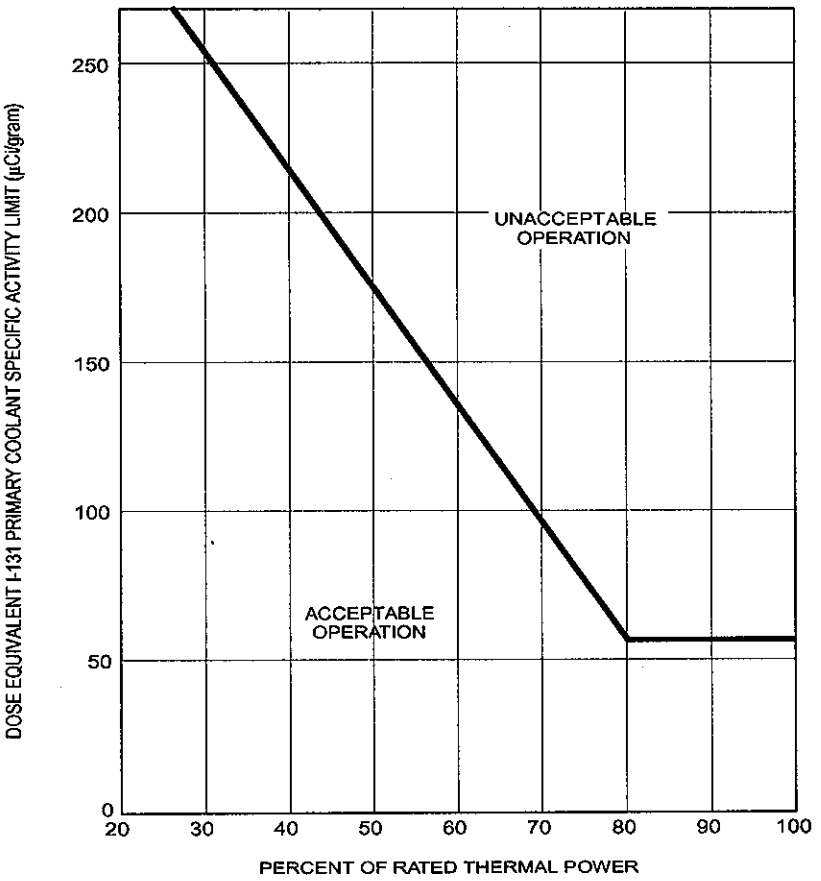


FIGURE 3.4.16-1
REACTOR COOLANT DOSE EQUIVALENT I-131 REACTOR COOLANT SPECIFIC ACTIVITY LIMIT VERSUS PERCENT OF RATED THERMAL POWER WITH THE REACTOR COOLANT SPECIFIC ACITVITY >1 mCi/gram DOSE EQUIVALENT I-131

Abnormal Operating Procedures

STEAM GENERATOR TUBE LEAK

PURPOSE

PRB REVIEW REQUIRED

Section A of this procedure is the entry point. It provides operator actions as a result of a confirmed Steam Generator Tube Leak (SGTL)that may require a controlled plant shutdown.

Section B of this procedure is entered from Section A and specifies actions to be taken while operating with a minor SGTL.

SYMPTOMS/ENTRY CONDITIONS

- ARP 17100 upon indication of a Steam Generator Tube Leak
- Report from Chemistry of secondary activity
- Leakage in excess of Technical Specification LCO 3.4.13
- Secondary specific activity in excess of Technical Specification LCO 3.7.16
- Any of the following symptoms:

  PRZR level lowering.

  Charging flow higher than normal.

  Unexplained/unexpected rise in VCT makeup frequency.

  Steam flow greater than feed flow with constant SG level.

  - AND -

  Confirmation of increasing radiation levels indicated on one or more of the following PERMS channels:

  Primary to Secondary Leak Monitors (RE-0724, RE-0810)

  Condenser Air Ejector and Steam Packing Exhauster (RE-12839C)

  SGBD Process Monitor (RE-00019)

  SGBD Effluent Monitor (RE-00021)

  Main Steam Line (RE-13119, RE-13120, RE-13121, RE-13122)

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
IMMEDIATE OPERATOR ACTIONS	
A1. Control charging to the normal charging path and letdown to maintain PRZR level and pressure: a. Adjust FV-0121 and HV-0182 to maximize charging.	A1. IF the unit is in Mode 1 or 2 or Mode 3 greater than 1000 psig AND PRZR level or pressure cannot be maintained, THEN trip the reactor and go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION.

CAUTION: Only one CCP should be operated at a time if the NCP is in service due to limited miniflow cooling capacity.

b. Start an additional charging pump if required.

SUBSEQUENT OPERATOR ACTIONS

A2. Reduce letdown to 45 GPM by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM, if required.

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:

- RCS degas should be initiated if cooldown to Mode 5 is anticipated.
- The need for additional personnel and resources should be evaluated when commencing unit shutdown due to steam generator tube leakage.

A3. Determine if unit shutdown is required:

a. Check leakrate within the following limits:

1) Leakrate <5 gpm as determined by [charging-(letdown+ seal leakoff)] mismatch.

1) CONFIRM the leak rate is due to SG tube leakage by observing higher than normal radiation on at least one of the following radiation monitors (Ref: Att A, Large Tube Leak):
RE-0724
RE-0810
RE-12839C
RE-0019
RE-0021
IF confirmed, THEN

a) Shutdown to Mode 3 within 1 hour using 18013-C RAPID POWER REDUCTION.

b) Continue with Step A4.

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
(Step 3 continued from previous page)	
2) Leak <150 gpd.	2) Be in Mode 3 within 6 hours by immediately initiating a shutdown per 12004-C, POWER OPERATION (MODE 1) (Ref: Att A Action Level 3) Continue with Step A4.
3) Leakrate <75 gpd.	3) IF 30 minutes after entering this procedure the rate of change of leakage is continuing to increase or has stabilized at a rate greater than or equal to 30 gpd/hr, THEN Reduce power to <50% within one hour per 18013-C, RAPID POWER REDUCTION AND be in Mode 3 within the next 2 hours. (Ref: Att A Action Level 3) Continue with Step A4. IF leakrate has remained ≥75 gpd for one hour, THEN be in Mode 3 within 24 hours per 12004-C, POWER OPERATION (MODE 1). (Ref: Att A Action Level 2) Continue with Step A4.

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
(Step 3 continued from previous page)	
4) Operations management has determined that the SG tube leakage does not warrant a unit shutdown.	4) IF Operations management determines that a unit shutdown is warranted: a) Initiate a shutdown to Mode 3 per 12004-C, POWER OPERATION (MODE 1). b) Continue with Step A4.
b. Go to Section B of this procedure.	

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
A4. Direct Chemistry and HP to sample for specific activity in the following locations and commence actions as defined in 49009-C, HP/CHEMISTRY STEAM GENERATOR TUBE LEAK ACTIONS. As a result, CHEMISTRY will: • Sample all SGs. • Sample TPCW downstream of SGBD Trim Heat Exchanger. • Perform a radiological release assessment per 36024-C RELEASE PERMIT CONTROLS FOR MAIN STEAM RELEASES DURING PERIODS OF PRIMARY TO SECONDARY LEAKAGE if it is necessary to operate the TDAFW pump (preferably before starting the pump.) HP will: • Monitor for secondary activity.	
A5. Identify the leaking SG by one or more of the following during shutdown, if possible: • SG level with relatively lower feedflow rate - STABLE or RISING. • Radiation monitor on a main steamline - HIGH or ALARMING. • Portable radiation survey of blowdown lines - HIGH ACTIVITY. • SG activity sample analyses - HIGH ACTIVITY.	

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE — RESPONSE NOT OBTAINED

CAUTION: Secondary Water Systems inventories should be limited and a separation between the units should be maintained to prevent contamination of the unaffected unit's secondary systems and limit cleanup.

NOTE:

- 91001-C EMERGENCY CLASSIFICATION AND IMPLEMENTING INSTRUCTIONS should be implemented at this time.
- HP and Chemistry should be notified when routing SJAE and SPE exhaust through HEPA filters.

A6. Minimize secondary system and environmental contamination by performing the following as conditions require:

- Dispatch an operator to place SJAE and SPE filtration units in filter mode per 13310, TURBINE BUILDING HVAC SYSTEM.
- Panel PTHV:

  UNIT 1 (TB-1-TG17)
  UNIT 2 (TB-1-TG4)

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
(Step 6 continued from previous page)	
• Isolate CSTs from the hotwell: • Place LIC-4415 in MANUAL and adjust to obtain 50% demand signal. • Verify LV-4415A - SHUT: UNIT 1 (TB-A-TH15) UNIT 2 (TB-A-TH6)	• Dispatch an operator to shut at least one Condensate Dump Valve Manual Isolation Valve: • UNIT 1 1-1305-U4-042 (TB-A-TH15) -OR- 1-1305-U4-043 (TB-A-TH15) • UNIT 2 2-1305-U4-042 (TB-A-TH6) -OR- 2-1305-U4-043 (TB-A-TH6)
• Prepare to transfer and process Turbine Building Drain Tank contents per 13211, TURBINE BUILDING DRAIN SYSTEM, as required. • Place HS-0877 in the RECIRC position to route turbine building sump effluent to the turbine building drain tanks.	

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE — RESPONSE NOT OBTAINED

(Step 6 continued from previous page)

NOTE: Hotwell level may be read at local site glasses LG-4303, LG-4304, and LG-4305 on north side of condensers if control room instrument LIC-4415 is offscale high.

- Control hotwell level to maintain less than or equal to 10 inches above normal operating level by draining to the Turbine Building sumps.
  - Consult with Chemistry and HP to determine and initiate actions required prior to draining potentially contaminated water to the Turbine Building sumps.
  - Route drain hoses from the following HDP NPSH VALVE INLET DRAIN valves to sumps and throttle as necessary to maintain hotwell level:
    - 1305-X4-895 (HDP A)
    - 1305-X4-896 (HDP A)
    - 1305-X4-898 (HDP B)
    - 1305-X4-899 (HDP B)
- Operate the condensate polishing demineralizers as recommended by Chemistry.

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

(Step 6 continued from previous page)
• Switch steam loads to aux steam:
  • Pressurize AUX STEAM HEADER from other unit.
  • Switch loads to auxiliary steam by initiating 13761, AUXILIARY STEAM SYSTEM.	

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
A7. Maintain VCT level using automatic or manual makeup control.	A7. If VCT level cannot be maintained, shift charging suction to the RWST: a. Open RWST TO CCP A&B SUCTION VALVES: • LV-0112D • LV-0112E b. Shut VCT OUTLET ISOLATION valves: • LV-0112B • LV-0112C c. Align RV TO RWST ISOLATION valves: • HV-8508A CCP-A - ENABLE PTL • HV-8508B CCP-B - ENABLE PTL d. Shut Charging normal mini flow valves: • HV-8110 CCP-A&B COMMON MINIFLOW • HV-8111A CCP-A MINIFLOW • HV-8111B CCP-B MINIFLOW e. Verify VCT diverts to HUT on HI level (97%).

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION: Use of SG ARVs should be avoided to preclude a potential radioactive release to the environment.

A8. Verify the following conditions:

a. Reactor - SHUTDOWN

b. RCS temperature - AT OR LESS THAN 557° F.

c. Leaking SG - IDENTIFIED

c. CONTINUE efforts to identify leaking SG per Steps A4 and A5.

WHEN leaking SG is identified,
THEN continue with Step A9.

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE — RESPONSE NOT OBTAINED

NOTE: Reference should be made to the table for valve numbers.

A9. Isolate the leaking SG.

- Shut blowdown valve(s).
- Raise SG ARV setpoint to 1160 psig. (Pot setting approximately 7.73)
- Shut steam supply to TDAFW pump, if applicable.
- Shut both MSIVs.
- Shut MSIV bypass valves.
- Shut MFIV.
- Shut MFIV bypass valve.
- Shut AFW valves.

VALVE NAME	SG 1	SG 2	SG 3	SG-4
Blowdown Valve	HV-7603A	HV-7603B	HV-7603C	HV-7603D
Steam Supply to TDAFW Pump	HV-3009	HV-3019	N/A	N/A
SG ARV	PV-3000	PV-3010	PV-3020	PV-3030E
MSIV	HV-3006A HV-3006B	HV-3016A HV-3016B	HV-3026A HV-3026B	HV-3036A HV-3036B
MSIV BYPASS Valves	HV-13005A HV-13005B HV-13005C	HV-13007A HV-13007B HV-13007C	HV-13008A HV-13008B HV-13008C	HV-13006A HV-13006B HV-13006C
MFIV	HV-5227	HV-5228	HV-5229	HV-5230
MFIV BYPASS Valve	HV-15196	HV-15197	HV-15198	HV-15199
SG AFW	HV-5122 HV-5139	HV-5125 HV-5132	HV-5127 HV-5134	HV-5120 HV-5137

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
A10. Sample TPCW system and verify radioactivity within allowable limits.	A10. Isolate TPCW to SGBD Trim Hx: UNIT 1 • 1-HV-6796 (AB-B03) • 1-HV-6795 (AB-B03 UNIT 2 • 2-HV-6796 (AB-B124) • 2-HV-6795 (AB-B124) Bypass flow to the SGBD Trim HX and reduce SGBD flow to maintain SGBD temperature per 13605, STEAM GENERATOR BLOWDOWN PROCESSING SYSTEM.
A11. Maintain RCS temperature using steam dumps.	A11. Maintain RCS temperature using SG ARVs on the non-leaking SGs.
A12. Maintain SG NR level using MDAFW pumps: a. Maintain intact SG(s) - AT 65%. b. Maintain leaking SG(s) - GREATER THAN 10%.	

NOTE:

- Steps 13 thru 15 should be performed expeditiously.
- Cooldown rate to 500°F shall not exceed 100°F/HR.

A13. Start RCS cooldown to 500°F by initiating 12006-C, UNIT COOLDOWN TO COLD SHUTDOWN.

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
A14. Verify affected SG ARV - SHUT.	A14. IF affected SG pressure less than 1160 psig, THEN shut SG ARV.

NOTE: During depressurization, at least 50°F of RCS subcooling should be maintained.

A15. WHEN RCS temperature reaches 500°F, THEN depressurize the RCS to 25-50 psig greater than the pressure of the leaking SG per 12006-C, UNIT COOLDOWN TO COLD SHUTDOWN.

NOTE:

- RCS pressure should be maintained between 25-50 psig above the leaking SG pressure to prevent flow from the SG to the RCS.
- The cooldown rate shall not exceed 100°F/HR.

A16. Maintain RCS cooldown and depressurization while observing the following:

- Maintain RCS pressure - BETWEEN 25 AND 50 PSIG GREATER THAN THE LEAKING SG PRESSURE.
- Cooldown to at least Mode 5 as necessary to support corrective actions for repair and secondary decontamination.

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE — RESPONSE NOT OBTAINED

A17. Monitor leaking SG level. Place SG Blowdown in service as required per 13605, STEAM GENERATOR BLOWDOWN PROCESSING SYSTEM to maintain leaking SG level on scale.

CAUTION: SGBD flow should not be dumped to the WWRB while using it to cool a leaking SG.

A18. Cool down leaking SG:

a. Feed with AFW and cycle level between 43% and 81% NR.

b. Maximize blowdown flow from leaking SG.

A OPERATION WITH A CONFIRMED TUBE LEAK REQUIRING PLANT SHUTDOWN

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
A19. Evaluate long term plant status:	
a. Consult TSC for subsequent recovery actions.	
b. Maintain the condensate system on long cycle recirculation per 13615, CONDENSATE AND FEEDWATER SYSTEM.	
c. Per Chemistry direction, place the condensate demineralizers in service per 13616, CONDENSATE DEMINERALIZER SYSTEM to aid in secondary plant cleanup.	
d. Contaminated resin should be processed in accordance with 13618, CONDENSATE SPENT RESIN PROCESSING SYSTEM.	
e. Contaminated resin should be transferred in accordance with 13223, SECONDARY SPENT RESIN PROCESSING.	
f. Monitor levels in the Secondary Systems for need to process contaminated inventory.	

END OF SUB-PROCEDURE TEXT

B OPERATION WITH A MINOR TUBE LEAK

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
B1. Monitor RCS leak rate: Initiate RCS leakrate calculations using 14905, RCS LEAKAGE CALCULATION (INVENTORY BALANCE). Direct Chemistry and HP to commence actions as defined in 49009-C, HP/CHEMISTRY STEAM GENERATOR TUBE LEAK ACTIONS. As a result, CHEMISTRY will: • Sample all SGs. • Sample TPCW downstream of SGBD Trim Heat Exchanger. • Quantify leak rate. • Identify leaking SG. • Perform a radiologicall release assessment per 36024-C RELEASE PERMIT CONTROLS FOR MAIN STEAM RELEASES DURING PERIODS OF PRIMARY TO SECONDARY LEAKAGE if it is necessary to operate the TDAFW pump (preferably before starting the pump.) HP will: • Monitor for secondary activity.	

B OPERATION WITH A MINOR TUBE LEAK

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
B2. Minimize secondary system and environmental contamination by performing the following:	
a. Place the SJAE/SPE filtration units in filter mode per 13310, TURBINE BUILDING HVAC SYSTEM. • Panel PTHV UNIT 1 (TB1-TB17) UNIT 2 (TB1-TG4)	
b. Isolate CSTs from the hotwell: • Place LIC-4415 in MANUAL and adjust to obtain 50% demand signal. • Verify LV-4415A - SHUT: UNIT 1 (TB-A-TH15) UNIT 2 (TB-A-TH6)	b. Dispatch an operator to shut at least one Condensate Dump Valve Manual Isolation Valve: • UNIT 1 1-1305-U4-042 (TB-A-TH15) -OR- 1-1305-U4-043 (TB-A-TH15) • UNIT 2 2-1305-U4-042 (TB-A-TH6) -OR- 2-1305-U4-043 (TB-A-TH6)
c. Operate the condensate polishing demineralizers as recommended by Chemistry.	
d. Place HS-0877 in the RECIRC position to route turbine sump effluent to the turbine building drain tanks.	

B OPERATION WITH A MINOR TUBE LEAK

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

(Step 2 continued from previous page)

e. Switch steam loads to aux steam:

- Pressurize AUX STEAM HEADER from other unit.
- Switch loads to auxiliary steam by initiating 13761, AUXILIARY STEAM SYSTEM.

f. Control hotwell level to maintain less than or equal to 10 inches above normal operating level by draining to the Turbine Building sumps.

1) Route drain hoses from the following HDP NPSH VALVE INLET DRAIN valves to sumps and throttle as necessary to maintain hotwell level:

- 1305-X4-895 (HDP A)
- 1305-X4-896 (HDP A)
- 1305-X4-898 (HDP B)
- 1305-X4-899 (HDP B)

B OPERATION WITH A MINOR TUBE LEAK

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE: RE-0724 and RE-0810 should be monitored once per 15 minutes until leakrate is stable (<10% change) for one hour; then monitoring can be reduced to once per 2 hours. When leakrate is stable for 24 hours monitoring can be reduced to once per shift.	
B3. Monitor primary to secondary leakage using RE-0724 and RE-0810.	B3. IF unable to monitor primary-to-secondary leakage using RE-0724 or RE-0810 on the Plant Computer or PDC: a. IF leakrate is stable, THEN ensure Chemistry samples SGs at a minimum of every four hours, and trend the results. Continue with Step B4. b. IF the leakrate is unstable or increasing, THEN be in Mode 3 within 24 hours per 12004-C, POWER OPERATION (MODE 1) Go to Step A4.
B4. Refer to ATTACHMENT A for definitions and actions corresponding to primary to secondary leakrate.	
B5. Control blowdown flow from the affected SG per 13605, STEAM GENERATOR BLOWDOWN as requested by Chemistry.	

B OPERATION WITH A MINOR TUBE LEAK

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
B6. IF Operations management has determined that the SG tube leakage does not warrant a unit shutdown, THEN repeat the steps of this section starting with Step B1.	B6. IF Operations management has determined that a unit shutdown is warranted, THEN: a. Initiate a shutdown to Mode 3 per 12004-C, POWER OPERATION (MODE 1). b. Continue with Step A4.

END OF SUB-PROCEDURE TEXT

ATTACHMENT A

DEFINITIONS AND ACTIONS CORRESPONDING TO

PRIMARY TO SECONDARY LEAKRATES

Normal Operation: The plant condition in which no primary to secondary leakage is detected in routine surveillance (<5gpd).

No Operable Continuous Radiation Monitor (RE-0724 and RE-0810 inop): This describes the condition where there is no continuous radiation monitor providing continuous automatic monitoring of primary-to secondary leakage.

Increased Monitoring: This describes the condition in which leakage has been detected and quantified but is not in a range that can be accurately monitored by most radiation monitors (≥5 gpd but <30 gpd).

Action: Ensure radiation monitors RE-0724, RE-0810, RE-12839C, RE-0019, and RE-0021 are in service. If any are not in service, ensure corrective action to return monitor(s) to service receives top priority (Frequency of monitoring per note prior to Step B3).

Action Level 1: Action Level 1 defines a plant condition in which leakage has increased to a condition that should be frequently monitored by the RMS with frequent benchmarking by laboratory analysis (≥30 gpd but ≤75 gpd).

Actions:

- Monitor primary to secondary leak rate by devoting an IPC terminal to the trending of RE-0724 and RE-0810 (preferred) and their rates of change and/or RE-12839C or RE-0019 or RE-0021 (Frequency of monitoring per note prior to Step B3.)
- At each shift briefing review which procedures are to be utilized by Operations, Chemistry, and HP in the event primary to secondary leakage worsens.

Action Level 2: Action Level 2 defines a plant condition in which leakage has increased to a condition that suggests that the underlying flaw has grown to an undesirably large size and that the unit should be shut down in a controlled manner (≥75 gpd for ≥1 hour and the rate of change is <30 gpd/hr).

Action: Unit shutdown is required. Go to Step A1 of this procedure and commence shutdown as directed by Step A3.

ATTACHMENT A (cont'd)

Action Level 3: This action level describes a condition that suggests the leak is increasing rapidly and the unit should be promptly shut down (leak is significant and may get worse).

Action: Unit shutdown is required. Go to Step A1 of this procedure and commence shutdown as directed by Step A3.

Large Tube Leak: Describes a condition where the SG tube leakage is within the capability of one charging pump but is causing a noticeable mismatch between charging and letdown and rapid unit shutdown is warranted (≥5 gpm).

Action: A rapid unit shutdown is required. Go to Step A1 of this procedure and commence shutdown as directed by Step A3 using 18013-C "Rapid Power Reduction".

END OF ATTACHMENT A

ACTION/EXPECTED RESPONSE — RESPONSE NOT OBTAINED

NOTE: Step 5 is not applicable to a LOCA outside containment.

5. Determine containment spray requirements:

a. Check spray pump suction - FROM RWST.

- HV-9017A - CNMT SPRAY PMP-A RWST SUCT ISO VLV - OPEN
- HV-9017B - CNMT SPRAY PMP-B RWST SUCT ISO VLV - OPEN

a. IF spray pump suction from sump, THEN go to Step 7.

b. Determine number of spray pumps required from Table:

RWST LEVEL	CONTAINMENT PRESSURE	FAN COOLERS IN SLOW	SPRAY PUMPS REQUIRED
GREATER THAN 39%	GREATER THAN 52 PSIG	N/A	2
	BETWEEN 21.5 PSIG AND 52 PSIG	0	2
		4	1
		8	0
	LESS THAN 21.5 PSIG	N/A	0
BETWEEN 10% AND 39%	GREATER THAN 52 PSIG	N/A	2
	BETWEEN 21.5 PSIG AND 52 PSIG	3	1
		6	0
	LESS THAN 21.5 PSIG	N/A	0
LESS THAN 10%	N/A	N/A	0

c. Check spray pumps running - EQUAL TO NUMBER REQUIRED.

c. Reset containment spray. Operate spray pumps and discharge valves as required.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE: Step 6 is not applicable to a LOCA outside containment.	
* 6. Check if containment spray should be aligned for recirculation:	
a. Check spray pumps - RUNNING.	a. Go to Step 7.
b. Check containment emergency sump levels - greater than or equal to 13.5 inches: • LI-764 -OR- • LI-765	b. WHEN containment emergency sump level indicators LI-764 or LI-765 greater than or equal to 13.5 inches, THEN perform Step 6c. Continue with Step 7.
c. Initiate ATTACHMENT B, CONTAINMENT SPRAY SWITCHOVER FROM INJECTION TO RECIRCULATION.	
7. Makeup to RWST as necessary: • Initiate 13701, BORIC ACID SYSTEM. -OR- • Initiate ATTACHMENT A, Makeup From Spent Fuel Pool.	

VOGTLE ELECTRIC GENERATING PLANT (VEGP) UNIT 1 CYCLE 11

CORE OPERATING LIMITS REPORT

REVISION 0

MARCH 2002

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for VEGP UNIT 1 CYCLE 11 has been prepared in accordance with the requirements of Technical Specification 5.6.5.

The Technical Requirement affected by this report is listed below:

13.1.1	SHUTDOWN MARGIN - MODES 1 and 2

The Technical Specifications affected by this report are listed below:

3.1.1	SHUTDOWN MARGIN - MODES 3, 4 and 5
3.1.3	Moderator Temperature Coefficient
3.1.5	Shutdown Bank Insertion Limits
3.1.6	Control Bank Insertion Limits
3.2.1	Heat Flux Hot Channel Factor - $F_Q(Z)$
3.2.2	Nuclear Enthalpy Rise Hot Channel Factor - $F^N_{\Delta H}$
3.2.3	Axial Flux Difference
3.9.1	Boron Concentration

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 have been developed using NRC-approved methodologies, including those specified in Technical Specification 5.6.5.

2.1 SHUTDOWN MARGIN - MODES 1 AND 2 (Technical Requirement 13.1.1)

2.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.30 percent Δk/k.

2.2 SHUTDOWN MARGIN - MODES 3, 4 AND 5 (Specification 3.1.1)

2.2.1 The SHUTDOWN MARGIN shall be greater than or equal to the limits shown in Figures 1 and 2.

2.3 Moderator Temperature Coefficient (Specification 3.1.3)

2.3.1 The Moderator Temperature Coefficient (MTC) limits are:

The BOL/ARO/HZP - MTC shall be less positive than $+0.7 \times 10^{-4}$ Δk/k/°F for power levels up to 70 percent RTP with a linear ramp to 0 Δk/k/°F at 100 percent RTP.

The EOL/ARO/RTP-MTC shall be less negative than -5.50×10^{-4} Δk/k/°F.[1]

2.3.2 The MTC Surveillance limits are:

The 300 ppm/ARO/RTP-MTC should be less negative than or equal to -4.75×10^{-4} Δk/k/°F.[1]

The 60 ppm/ARO/RTP-MTC should be less negative than -5.35×10^{-4} Δk/k/°F.[1]

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
RTP stands for RATED THERMAL POWER

2.4 Shutdown Bank Insertion Limits (Specification 3.1.5)

2.4.1 The shutdown banks shall be withdrawn to a position greater than or equal to 225 steps.

2.5 Control Bank Insertion Limits (Specification 3.1.6)

2.5.1 The control banks shall be limited in physical insertion as shown in Figure 3.

[1] Applicable for full-power T-average of 586.4°F to 587.4°F.

2.6 Heat Flux Hot Channel Factor - $F_Q(Z)$ (Specification 3.2.1)

2.6.1 $$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} * K(Z) \quad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} * K(Z) \quad \text{for } P \leq 0.5$$

where: $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

2.6.2 $F_Q^{RTP} = 2.50$

2.6.3 K(Z) is provided in Figure 4.

2.6.4 $$F_Q(Z) \leq E_Q \frac{RTP}{P * W(Z)} * K(Z) \quad \text{for } P > 0.5$$

$$F_Q(Z) \leq E_Q \frac{RTP}{0.5 * W(Z)} * K(Z) \quad \text{for } P \leq 0.5$$

2.6.5 W(Z) values are provided in Figures 6 through 9.

2.6.6 The $F_Q(Z)$ penalty factors are provided in Table 1.

2.7 Nuclear Enthalpy Rise Hot Channel Factor - $F^N_{\Delta H}$ (Specification 3.2.2)

2.7.1 $F^N_{\Delta H} \leq F^{RTP}_{\Delta H} * (1 + PF_{\Delta H} * (1-P))$

where: $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

2.7.2 $F^{RTP}_{\Delta H} = 1.65$

2.7.3 $PF_{\Delta H} = 0.3$

2.8 Axial Flux Difference (Specification 3.2.3)

2.8.1 The Axial Flux Difference (AFD) acceptable operation limits are provided in Figure 5.

2.9 Boron Concentration (Specification 3.9.1)

2.9.1 The boron concentration shall be greater than or equal to 1970 ppm.[1]

[1]This concentration bounds the condition of $k_{eff} \leq 0.95$ (all rods in less the most reactive rod) and subcriticality (all rods out) over the entire cycle. This concentration includes additional boron to address uncertainties and B^{10} depletion.

COLR for VEGP UNIT 1 CYCLE 11

TABLE 1

$F_Q(Z)$ PENALTY FACTOR

Cycle Burnup (MWD/MTU)	$F_Q(Z)$ Penalty Factor
30	1.020
150	1.030
363	1.029
576	1.025
789	1.022
1002	1.020

Notes:

1. The Penalty Factor, to be applied to $F_Q(Z)$ in accordance with SR 3.2.1.2, is the maximum factor by which $F_Q(Z)$ is expected to increase over a 39 EFPD interval (surveillance interval of 31 EFPD plus the maximum allowable extension not to exceed 25% of the surveillance interval per SR 3.0.2) starting from the burnup at which the $F_Q(Z)$ was determined.

2. Linear interpolation is adequate for intermediate cycle burnups.

3. For all cycle burnups outside the range of the table, a penalty factor of 1.020 shall be used.

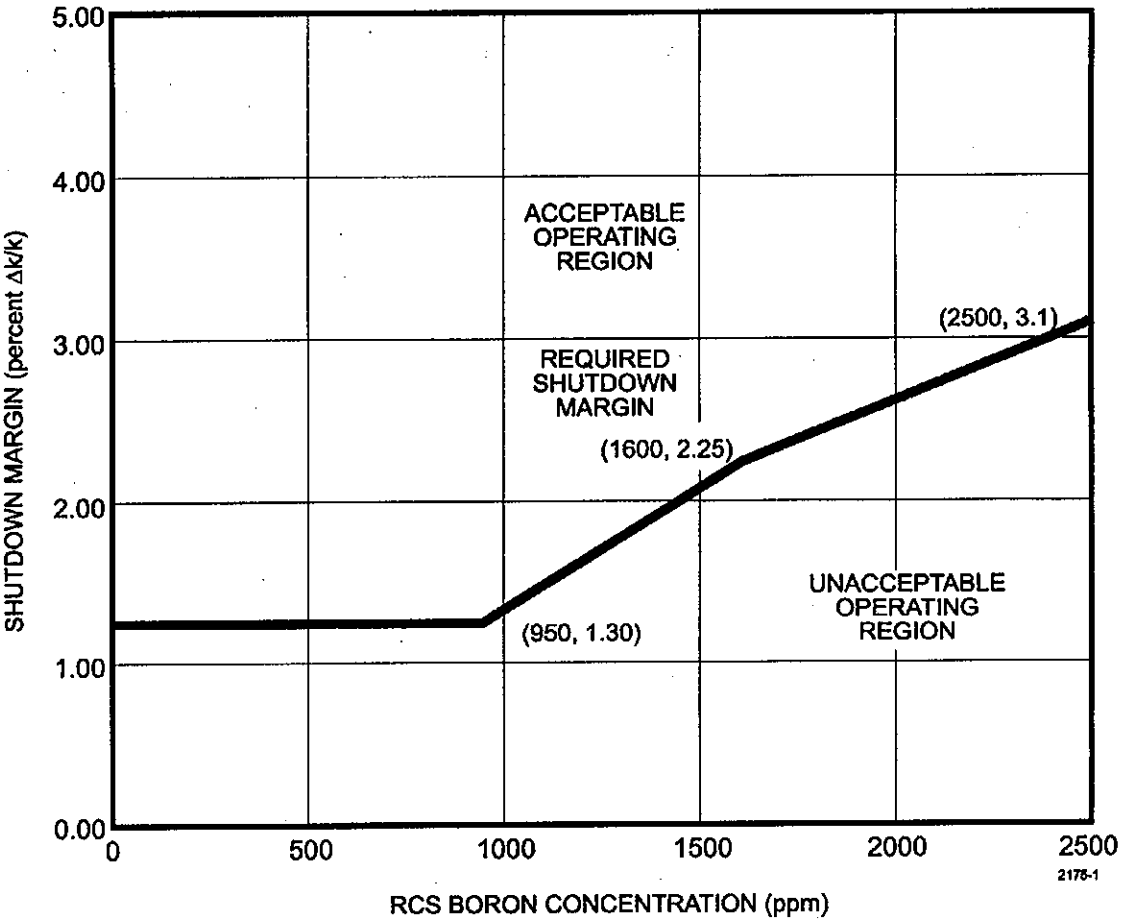


FIGURE 1

REQUIRED SHUTDOWN MARGIN FOR MODES 3 AND 4 (MODE 4 WITH AT LEAST ONE REACTOR COOLANT PUMP RUNNING)

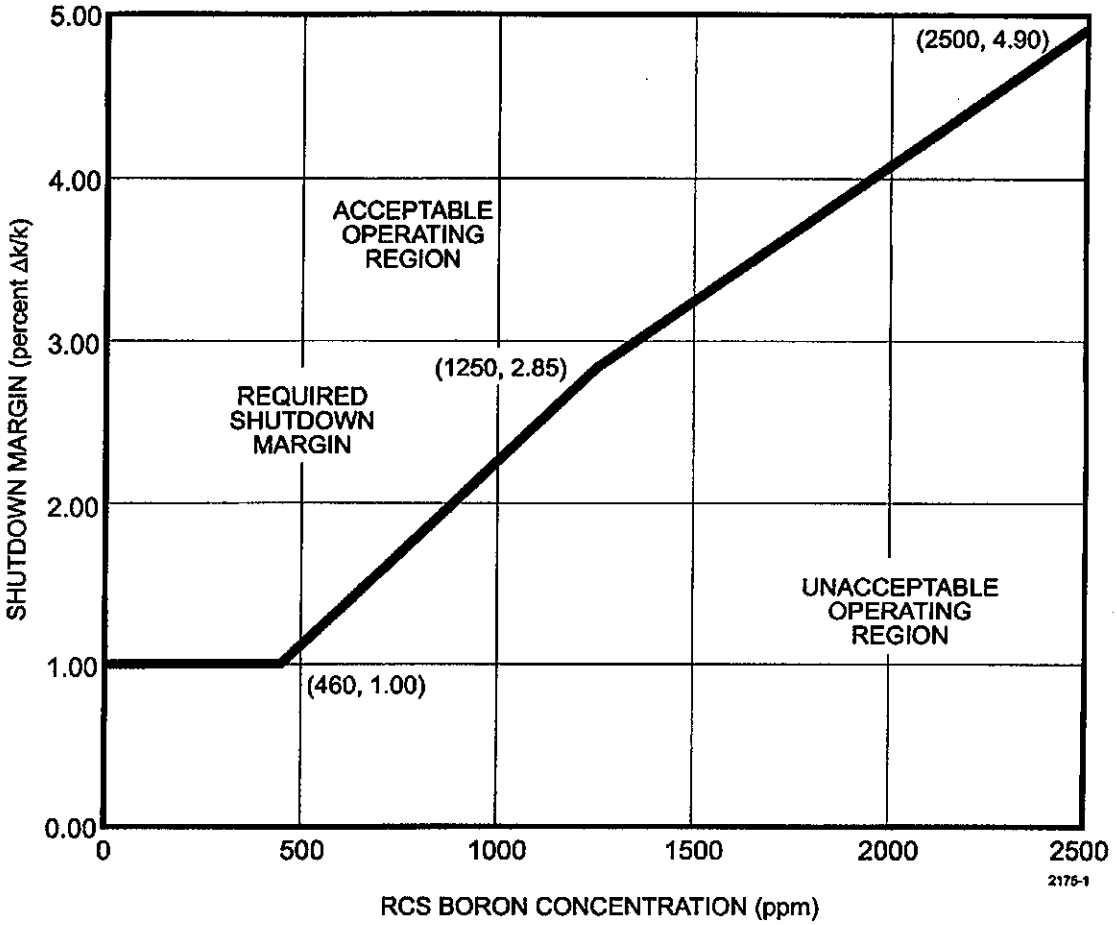


FIGURE 2

REQUIRED SHUTDOWN MARGIN FOR MODES 4 AND 5 (MODE 4 WITH NO REACTOR COOLANT PUMPS RUNNING)

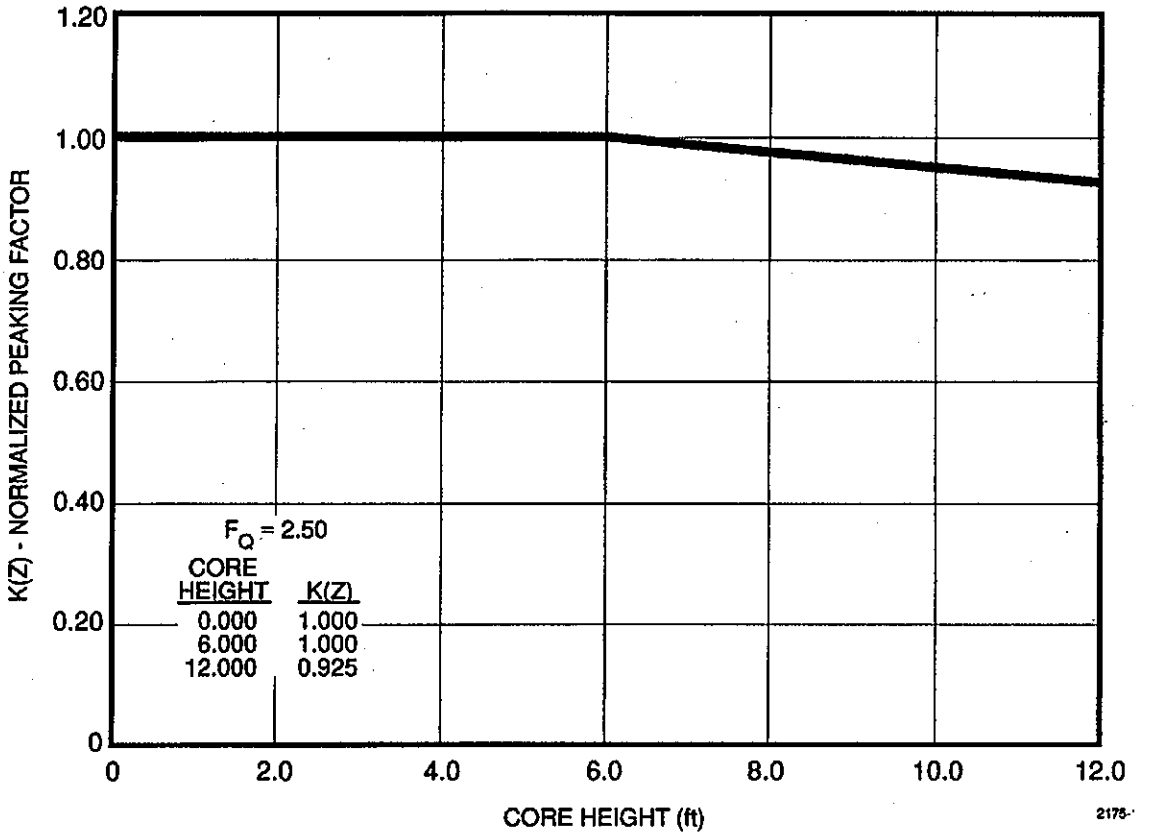


FIGURE 4

K(Z) - NORMALIZED $F_Q(Z)$ AS A FUNCTION OF CORE HEIGHT

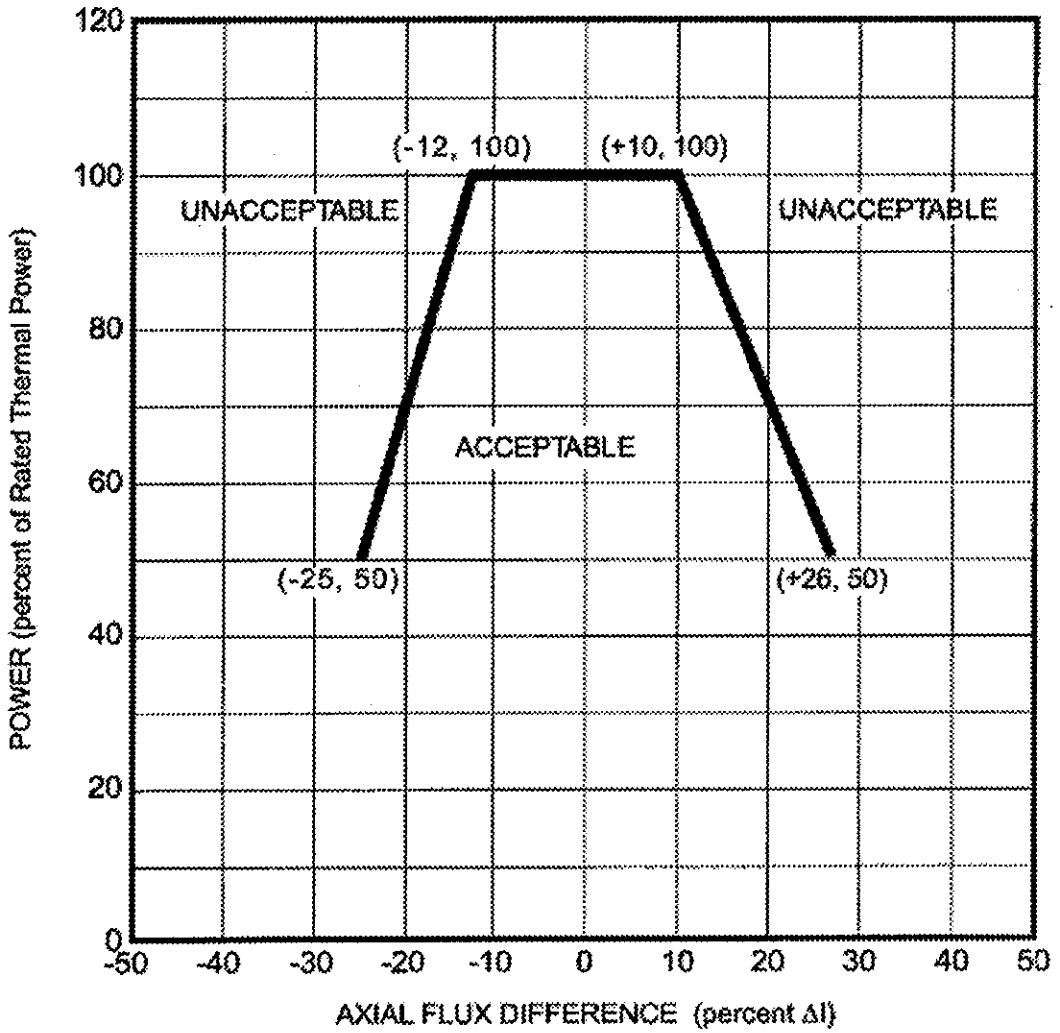
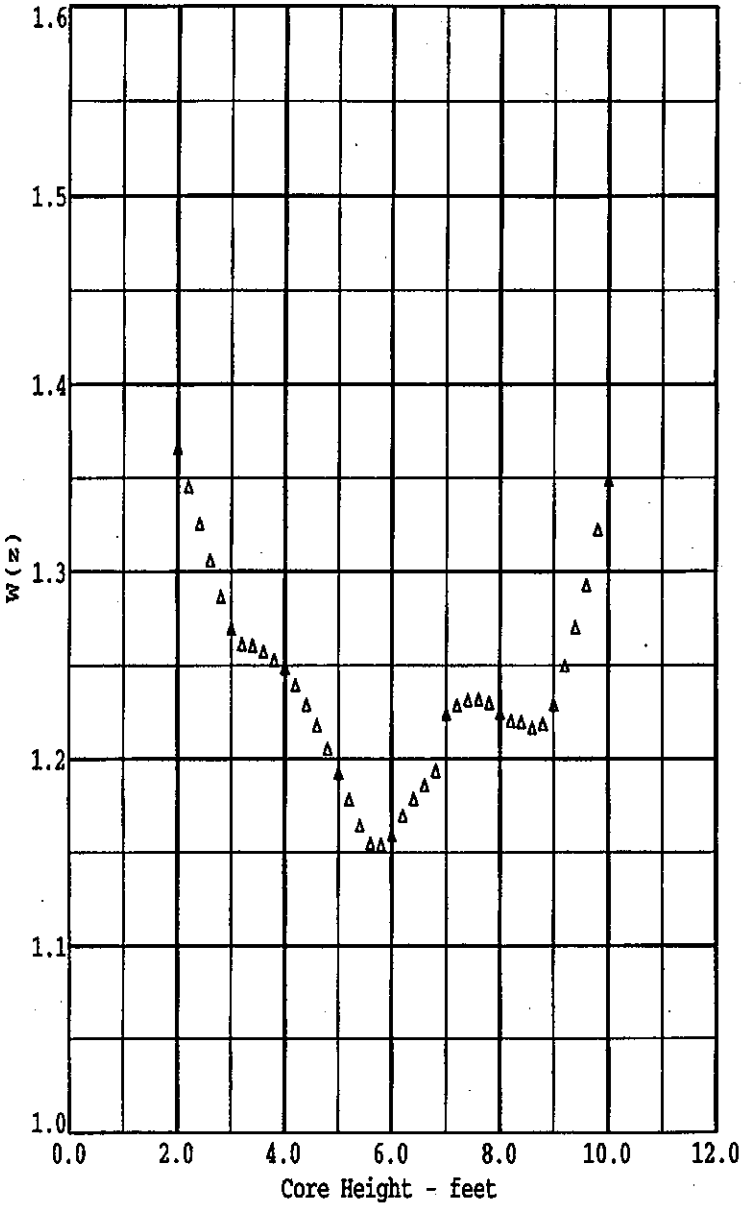


FIGURE 5

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF % OF RATED THERMAL POWER FOR RAOC



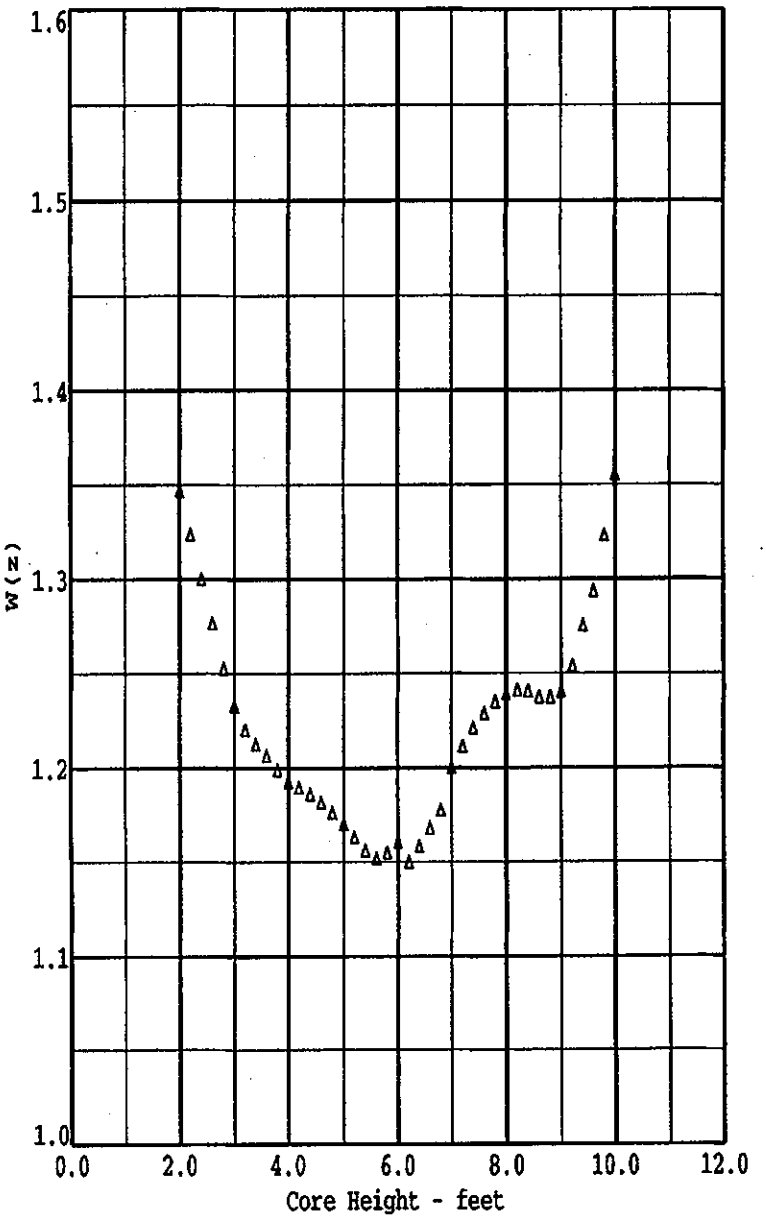
This figure is referred to by Specification B3.2.1

	Axial Point	Elevation (feet)	BOL W(Z)
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
*	6	11.00	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.3488
	12	9.80	1.3221
	13	9.60	1.2927
	14	9.40	1.2699
	15	9.20	1.2496
	16	9.00	1.2289
	17	8.80	1.2186
	18	8.60	1.2164
	19	8.40	1.2196
	20	8.20	1.2203
	21	8.00	1.2243
	22	7.80	1.2299
	23	7.60	1.2317
	24	7.40	1.2313
	25	7.20	1.2286
	26	7.00	1.2240
	27	6.80	1.1935
	28	6.60	1.1859
	29	6.40	1.1784
	30	6.20	1.1696
	31	6.00	1.1592
	32	5.80	1.1539
	33	5.60	1.1546
	34	5.40	1.1643
	35	5.20	1.1783
	36	5.00	1.1924
	37	4.80	1.2053
	38	4.60	1.2176
	39	4.40	1.2290
	40	4.20	1.2393
	41	4.00	1.2484
	42	3.80	1.2526
	43	3.60	1.2570
	44	3.40	1.2602
	45	3.20	1.2609
	46	3.00	1.2694
	47	2.80	1.2865
	48	2.60	1.3060
	49	2.40	1.3252
	50	2.20	1.3451
	51	2.00	1.3659
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

These W(Z) values are consistent with Figure 5 and are valid over the HFP T_{avg} temperature range from 586.4°F to 587.4°F.

FIGURE 6 RAOC W(Z) AT 150 MWD/MTU



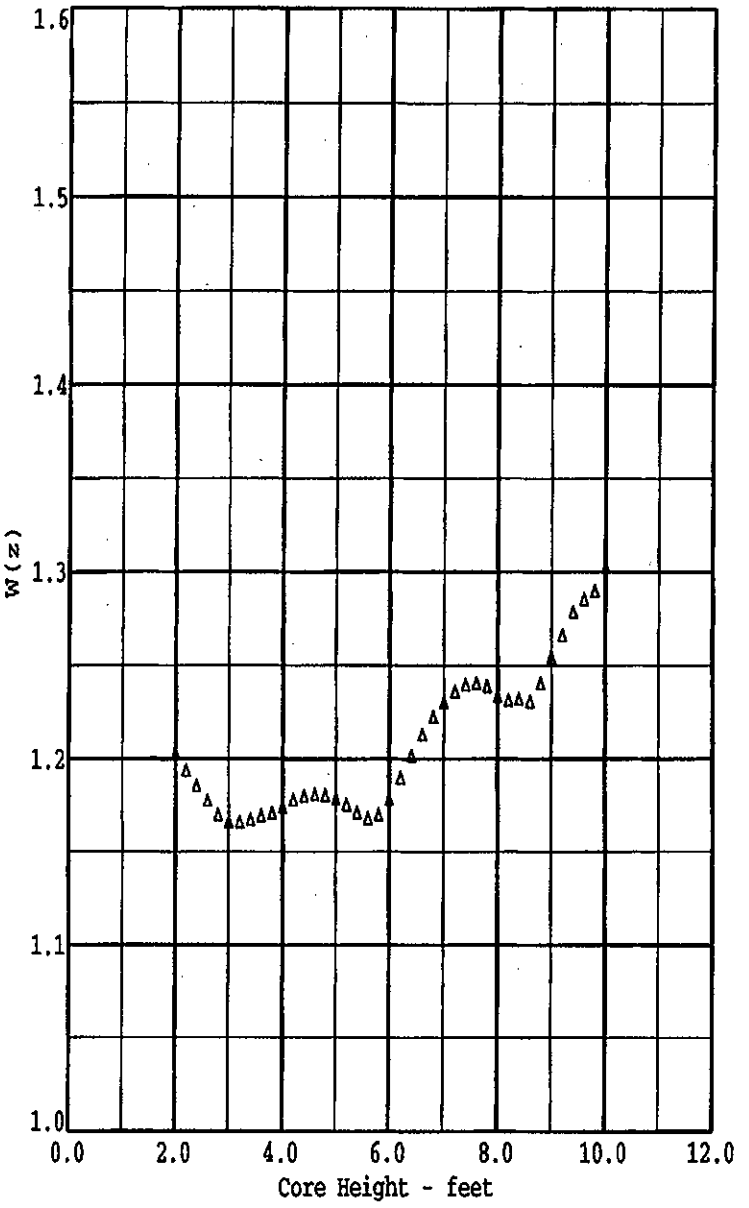
This figure is referred to by Specification B3.2.1

	Axial Point	Elevation (feet)	MOL-1 W(Z)
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
*	6	11.00	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.3554
	12	9.80	1.3231
	13	9.60	1.2937
	14	9.40	1.2756
	15	9.20	1.2540
	16	9.00	1.2404
	17	8.80	1.2374
	18	8.60	1.2374
	19	8.40	1.2406
	20	8.20	1.2412
	21	8.00	1.2392
	22	7.80	1.2351
	23	7.60	1.2290
	24	7.40	1.2211
	25	7.20	1.2114
	26	7.00	1.2001
	27	6.80	1.1776
	28	6.60	1.1680
	29	6.40	1.1582
	30	6.20	1.1499
	31	6.00	1.1606
	32	5.80	1.1548
	33	5.60	1.1516
	34	5.40	1.1560
	35	5.20	1.1633
	36	5.00	1.1702
	37	4.80	1.1763
	38	4.60	1.1816
	39	4.40	1.1861
	40	4.20	1.1896
	41	4.00	1.1924
	42	3.80	1.1987
	43	3.60	1.2063
	44	3.40	1.2125
	45	3.20	1.2202
	46	3.00	1.2329
	47	2.80	1.2525
	48	2.60	1.2766
	49	2.40	1.3002
	50	2.20	1.3236
	51	2.00	1.3469
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

These W(Z) values are consistent with Figure 5 and are valid over the HFP T_{avg} temperature range from 586.4°F to 587.4°F.

FIGURE 7 RAOC W(Z) AT 4000 MWD/MTU



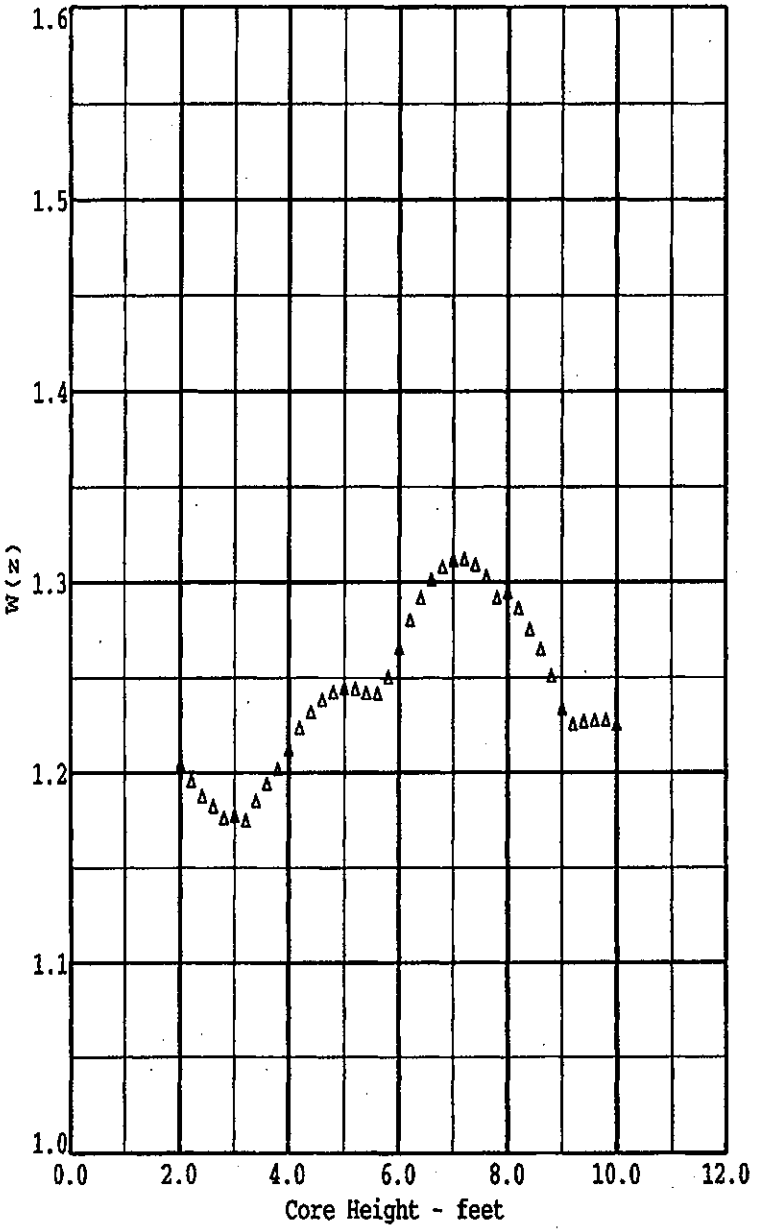
This figure is referred to by Specification B3.2.1

	Axial Point	Elevation (feet)	MOL-2 W(Z)
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
*	6	11.00	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.3024
	12	9.80	1.2899
	13	9.60	1.2855
	14	9.40	1.2785
	15	9.20	1.2662
	16	9.00	1.2544
	17	8.80	1.2405
	18	8.60	1.2309
	19	8.40	1.2321
	20	8.20	1.2315
	21	8.00	1.2334
	22	7.80	1.2390
	23	7.60	1.2405
	24	7.40	1.2397
	25	7.20	1.2362
	26	7.00	1.2305
	27	6.80	1.2225
	28	6.60	1.2127
	29	6.40	1.2015
	30	6.20	1.1898
	31	6.00	1.1781
	32	5.80	1.1699
	33	5.60	1.1679
	34	5.40	1.1710
	35	5.20	1.1753
	36	5.00	1.1785
	37	4.80	1.1803
	38	4.60	1.1808
	39	4.40	1.1799
	40	4.20	1.1778
	41	4.00	1.1739
	42	3.80	1.1707
	43	3.60	1.1693
	44	3.40	1.1673
	45	3.20	1.1659
	46	3.00	1.1659
	47	2.80	1.1698
	48	2.60	1.1775
	49	2.40	1.1856
	50	2.20	1.1937
	51	2.00	1.2025
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

These W(Z) values are consistent with Figure 5 and are valid over the HFP T_{avg} temperature range from 586.4°F to 587.4°F.

FIGURE 8 RAOC W(Z) AT 12000 MWD/MTU



This figure is referred to by Specification B3.2.1

	Axial Point	Elevation (feet)	EOL W(Z)
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
*	6	11.00	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.2251
	12	9.80	1.2274
	13	9.60	1.2273
	14	9.40	1.2268
	15	9.20	1.2255
	16	9.00	1.2335
	17	8.80	1.2507
	18	8.60	1.2647
	19	8.40	1.2749
	20	8.20	1.2862
	21	8.00	1.2946
	22	7.80	1.2917
	23	7.60	1.3028
	24	7.40	1.3092
	25	7.20	1.3121
	26	7.00	1.3116
	27	6.80	1.3079
	28	6.60	1.3012
	29	6.40	1.2918
	30	6.20	1.2800
	31	6.00	1.2653
	32	5.80	1.2501
	33	5.60	1.2416
	34	5.40	1.2419
	35	5.20	1.2441
	36	5.00	1.2443
	37	4.80	1.2424
	38	4.60	1.2382
	39	4.40	1.2318
	40	4.20	1.2234
	41	4.00	1.2120
	42	3.80	1.2016
	43	3.60	1.1940
	44	3.40	1.1850
	45	3.20	1.1746
	46	3.00	1.1772
	47	2.80	1.1760
	48	2.60	1.1823
	49	2.40	1.1875
	50	2.20	1.1955
	51	2.00	1.2045
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

These W(Z) values are consistent with Figure 5 and are valid over the HFP T_{avg} temperature range from 586.4°F to 587.4°F.

FIGURE 9 RAOC W(Z) AT 20000 MWD/MTU

VOGTLE ELECTRIC GENERATING PLANT (VEGP) UNIT 2 CYCLE 10

CORE OPERATING LIMITS REPORT

REVISION 0

OCTOBER 2002

COLR for VEGP UNIT 2 CYCLE 10

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for VEGP UNIT 2 CYCLE 10 has been prepared in accordance with the requirements of Technical Specification 5.6.5.

The Technical Requirement affected by this report is listed below:

13.1.1	SHUTDOWN MARGIN - MODES 1 and 2

The Technical Specifications affected by this report are listed below:

3.1.1	SHUTDOWN MARGIN - MODES 3, 4 and 5
3.1.3	Moderator Temperature Coefficient
3.1.5	Shutdown Bank Insertion Limits
3.1.6	Control Bank Insertion Limits
3.2.1	Heat Flux Hot Channel Factor - $F_Q(Z)$
3.2.2	Nuclear Enthalpy Rise Hot Channel Factor – $F^N_{\Delta H}$
3.2.3	Axial Flux Difference
3.9.1	Boron Concentration

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 have been developed using NRC-approved methodologies, including those specified in Technical Specification 5.6.5.

2.1 SHUTDOWN MARGIN - MODES 1 AND 2 (Technical Requirement 13.1.1)

2.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.30 percent $\Delta k/k$.

2.2 SHUTDOWN MARGIN - MODES 3, 4 AND 5 (Specification 3.1.1)

2.2.1 The SHUTDOWN MARGIN shall be greater than or equal to the limits shown in Figures 1 and 2.

2.3 Moderator Temperature Coefficient (Specification 3.1.3)

2.3.1 The Moderator Temperature Coefficient (MTC) limits are:

The BOL/ARO/HZP - MTC shall be less positive than $+0.7 \times 10^{-4}$ $\Delta k/k/°F$ for power levels up to 70% RTP with a linear ramp to 0 $\Delta k/k/°F$ at 100% RTP.

The EOL/ARO/RTP-MTC shall be less negative than -5.50×10^{-4} $\Delta k/k/°F$.[1]

2.3.2 The MTC Surveillance limits are:

The 300 ppm/ARO/RTP-MTC should be less negative than or equal to -4.75×10^{-4} $\Delta k/k/°F$.[1]

The 60 ppm/ARO/RTP-MTC should be less negative than -5.35×10^{-4} $\Delta k/k/°F$.[1]

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
RTP stands for RATED THERMAL POWER

2.4 Shutdown Bank Insertion Limits (Specification 3.1.5)

2.4.1 The shutdown banks shall be withdrawn to a position greater than or equal to 225 steps.

2.5 Control Bank Insertion Limits (Specification 3.1.6)

2.5.1 The control banks shall be limited in physical insertion as shown in Figure 3.

[1] Applicable for full-power T-average of 586.4°F to 587.4°F.

2.6 Heat Flux Hot Channel Factor - $F_Q(Z)$ (Specification 3.2.1)

2.6.1 $$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} * K(Z) \quad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} * K(Z) \quad \text{for } P \leq 0.5$$

where: $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

2.6.2 $F_Q^{RTP} = 2.50$

2.6.3 K(Z) is provided in Figure 4.

2.6.4 $$F_Q(Z) \leq \frac{F_Q^{RTP}}{P * W(Z)} * K(Z) \quad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5 * W(Z)} * K(Z) \quad \text{for } P \leq 0.5$$

2.6.5 W(Z) values are provided in Figures 6 through 9.

2.6.6 The $F_Q(Z)$ penalty factors are provided in Table 1.

2.7 Nuclear Enthalpy Rise Hot Channel Factor - $F^N_{\Delta H}$ (Specification 3.2.2)

2.7.1 $F^N_{\Delta H} \leq F^{RTP}_{\Delta H} * (1 + PF_{\Delta H} * (1-P))$

where: $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

2.7.2 $F^{RTP}_{\Delta H} = 1.65$

2.7.3 $PF_{\Delta H} = 0.3$

2.8 Axial Flux Difference (Specification 3.2.3)

2.8.1 The Axial Flux Difference (AFD) Acceptable Operation Limits are provided in Figure 5.

2.9 Boron Concentration (Specification 3.9.1)

2.9.1 The boron concentration shall be greater than or equal to 1810 ppm.[1]

[1]This concentration bounds the condition of $k_{eff} \leq 0.95$ (all rods in less the most reactive rod) and subcriticality (all rods out) over the entire cycle. This concentration includes additional boron to address uncertainties and B^{10} depletion.

COLR for VEGP UNIT 2 CYCLE 10

TABLE 1

$F_Q(Z)$ PENALTY FACTOR

Cycle Burnup (MWD/MTU)	$F_Q(Z)$ Penalty Factor
All Burnups	1.020

Notes:

1. The Penalty Factor, to be applied to $F_Q(Z)$ in accordance with SR 3.2.1.2, is the maximum factor by which $F_Q(Z)$ is expected to increase over a 39 EFPD interval (surveillance interval of 31 EFPD plus the maximum allowable extension not to exceed 25% of the surveillance interval per SR 3.0.2) starting from the burnup at which the $F_Q(Z)$ was determined.

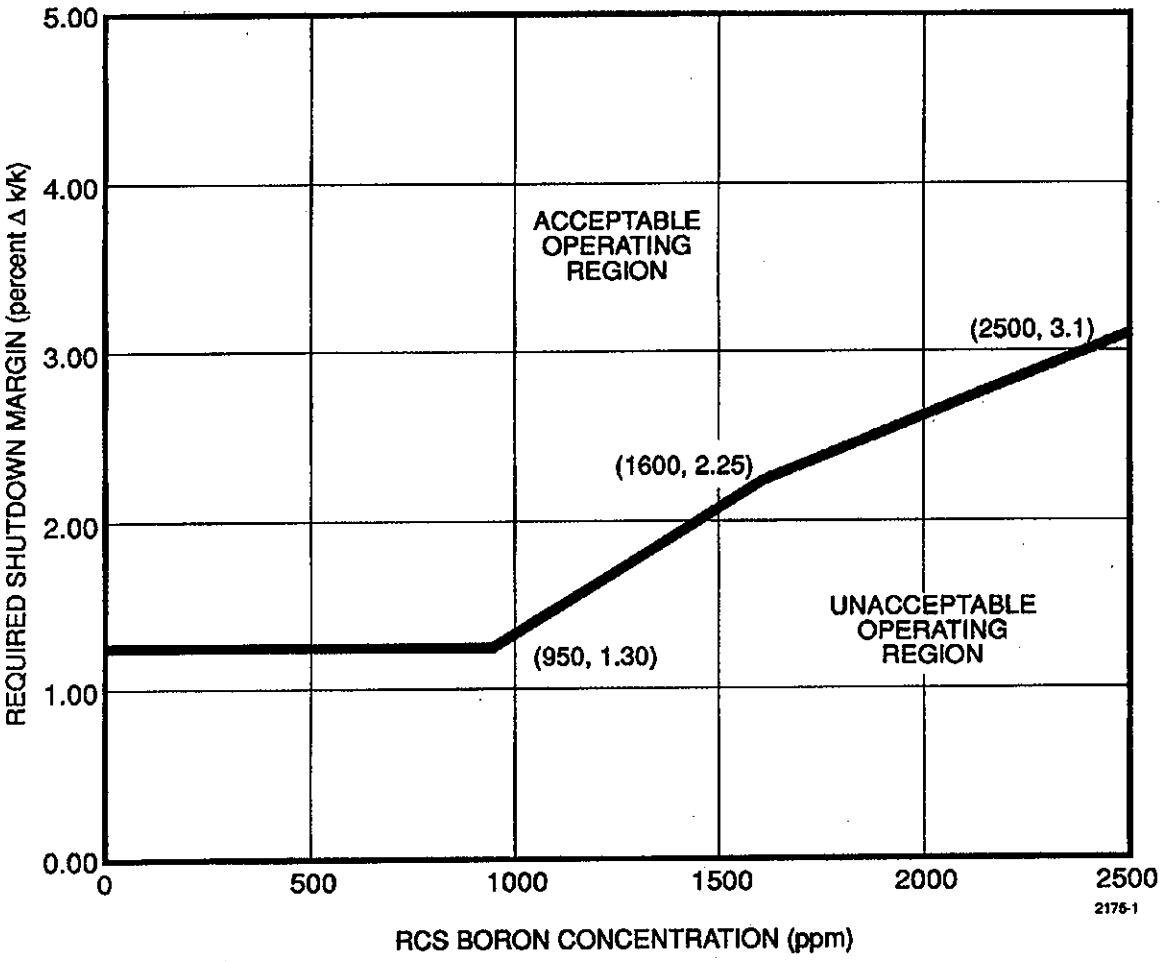


FIGURE 1

REQUIRED SHUTDOWN MARGIN FOR MODES 3 AND 4 (MODE 4 WITH AT LEAST ONE REACTOR COOLANT PUMP RUNNING)

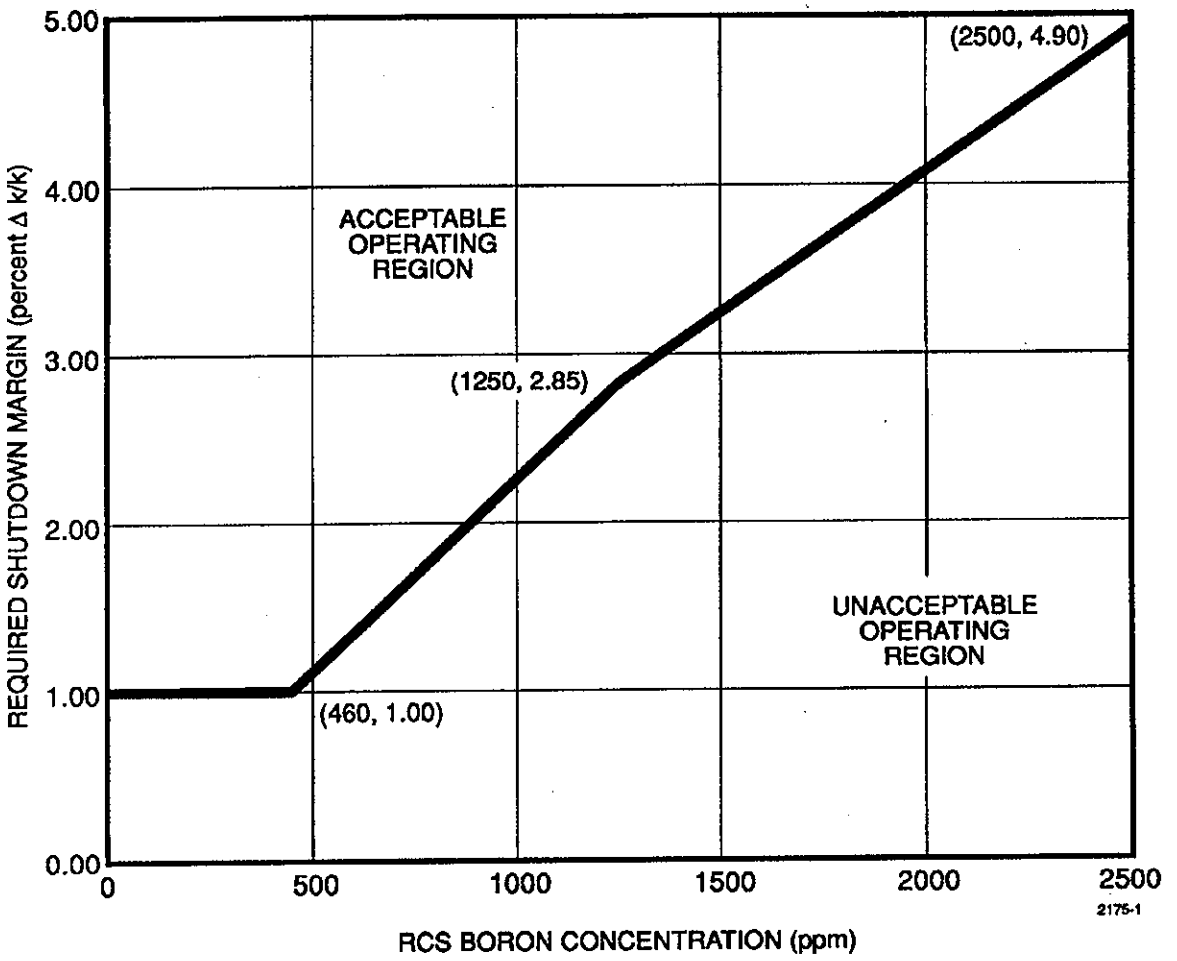


FIGURE 2

REQUIRED SHUTDOWN MARGIN FOR MODES 4 AND 5 (MODE 4 WITH NO REACTOR COOLANT PUMPS RUNNING)

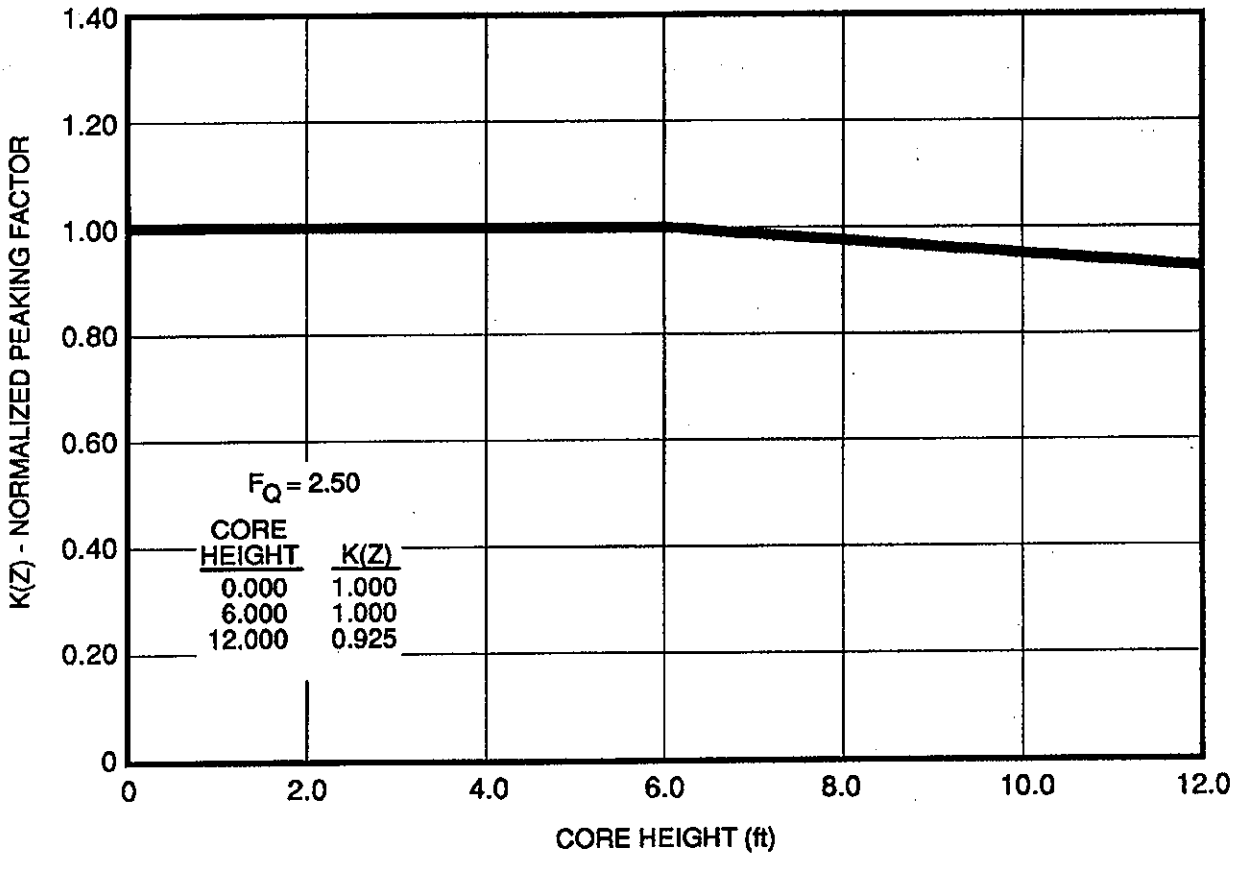


FIGURE 4

K(Z) - NORMALIZED F_Q (Z) AS A FUNCTION OF CORE HEIGHT

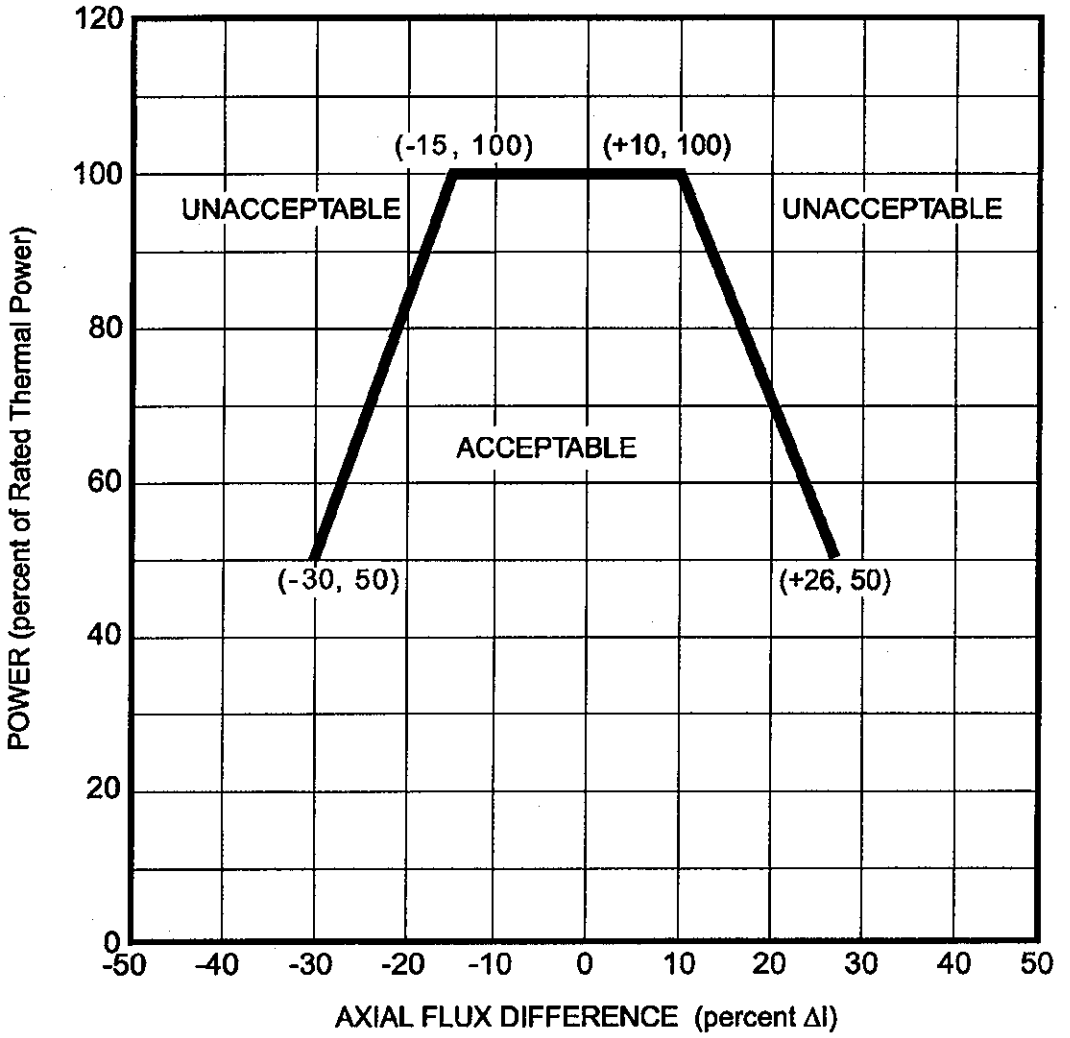
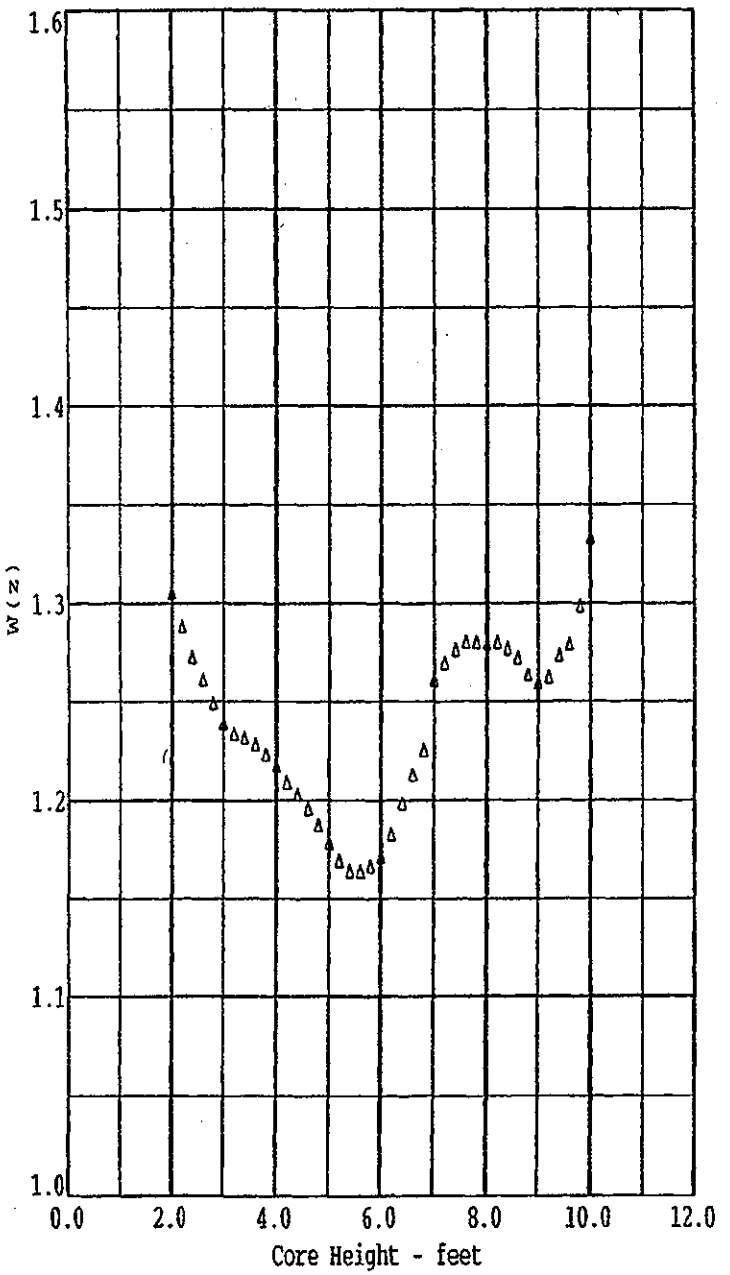


FIGURE 5

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF % OF RATED THERMAL POWER FOR RAOC



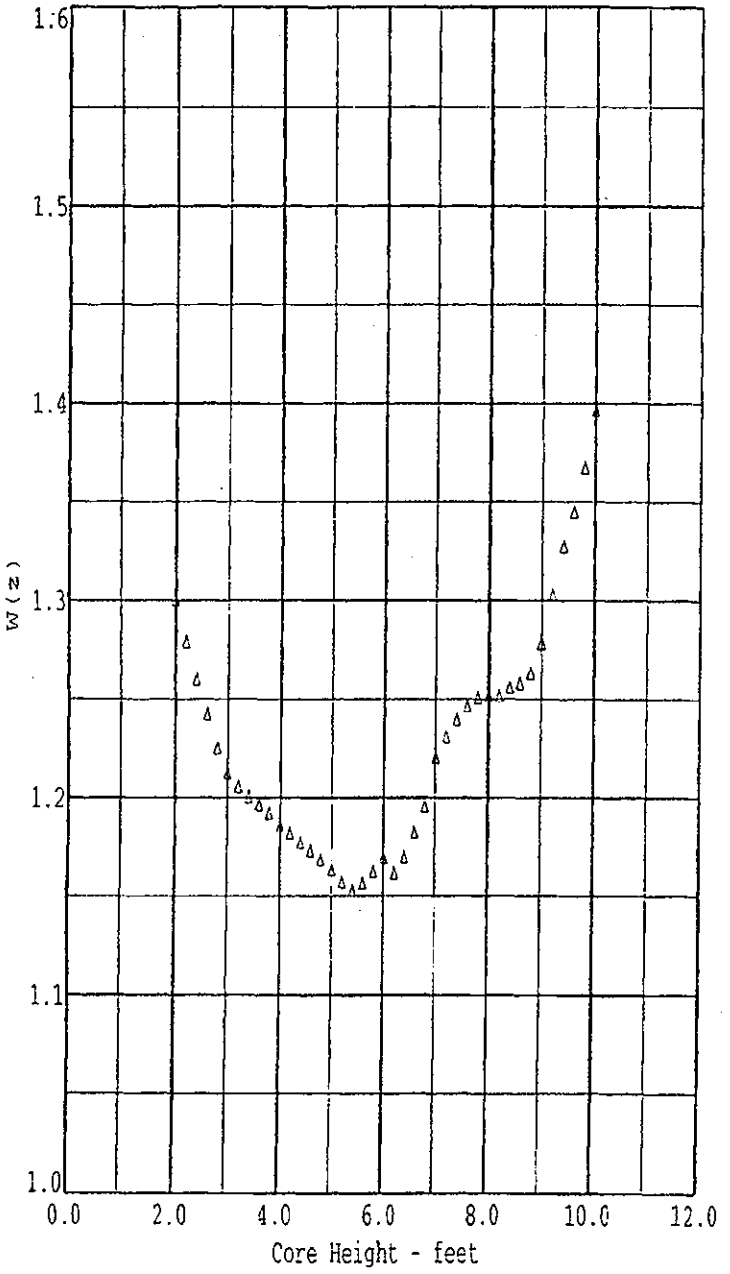
This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5 and are valid over the HFP T_{avg} temperature range from 586.4 to 587.4°F.

	Axial Point	Elevation (feet)	BOL W(Z)
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
*	6	11.00	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.3331
	12	9.80	1.2984
	13	9.60	1.2789
	14	9.40	1.2734
	15	9.20	1.2625
	16	9.00	1.2592
	17	8.80	1.2636
	18	8.60	1.2723
	19	8.40	1.2770
	20	8.20	1.2800
	21	8.00	1.2794
	22	7.80	1.2802
	23	7.60	1.2801
	24	7.40	1.2762
	25	7.20	1.2697
	26	7.00	1.2609
	27	6.80	1.2252
	28	6.60	1.2127
	29	6.40	1.1985
	30	6.20	1.1828
	31	6.00	1.1708
	32	5.80	1.1662
	33	5.60	1.1635
	34	5.40	1.1638
	35	5.20	1.1692
	36	5.00	1.1783
	37	4.80	1.1875
	38	4.60	1.1957
	39	4.40	1.2029
	40	4.20	1.2090
	41	4.00	1.2173
	42	3.80	1.2231
	43	3.60	1.2281
	44	3.40	1.2316
	45	3.20	1.2337
	46	3.00	1.2390
	47	2.80	1.2492
	48	2.60	1.2612
	49	2.40	1.2727
	50	2.20	1.2881
	51	2.00	1.3053
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

FIGURE 6
RAOC W(Z) AT150 MWD/MTU



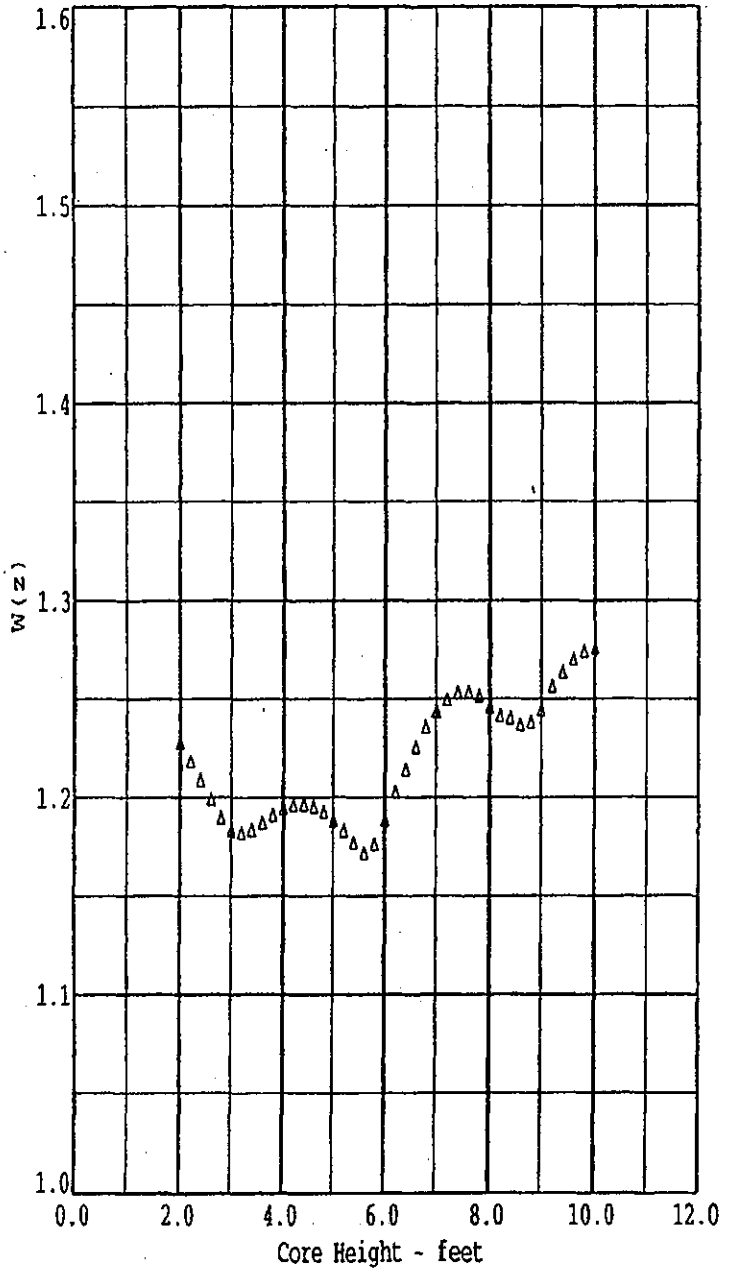
This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5 and are valid over the HFP T_{avg} temperature range from 586.4 to 587.4°F.

	Axial Point	Elevation (feet)	MOL-1 W(Z)
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
*	6	11.00	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.3967
	12	9.80	1.3673
	13	9.60	1.3446
	14	9.40	1.3272
	15	9.20	1.3026
	16	9.00	1.2783
	17	8.80	1.2633
	18	8.60	1.2582
	19	8.40	1.2560
	20	8.20	1.2516
	21	8.00	1.2518
	22	7.80	1.2508
	23	7.60	1.2464
	24	7.40	1.2397
	25	7.20	1.2309
	26	7.00	1.2201
	27	6.80	1.1958
	28	6.60	1.1824
	29	6.40	1.1701
	30	6.20	1.1617
	31	6.00	1.1700
	32	5.80	1.1626
	33	5.60	1.1566
	34	5.40	1.1528
	35	5.20	1.1573
	36	5.00	1.1634
	37	4.80	1.1685
	38	4.60	1.1731
	39	4.40	1.1773
	40	4.20	1.1819
	41	4.00	1.1863
	42	3.80	1.1922
	43	3.60	1.1967
	44	3.40	1.2005
	45	3.20	1.2056
	46	3.00	1.2126
	47	2.80	1.2250
	48	2.60	1.2424
	49	2.40	1.2600
	50	2.20	1.2790
	51	2.00	1.3003
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

FIGURE 7
RAOC W(Z) at 4000 MWD/MTU



This figure is referred to by Specification B3.2.1

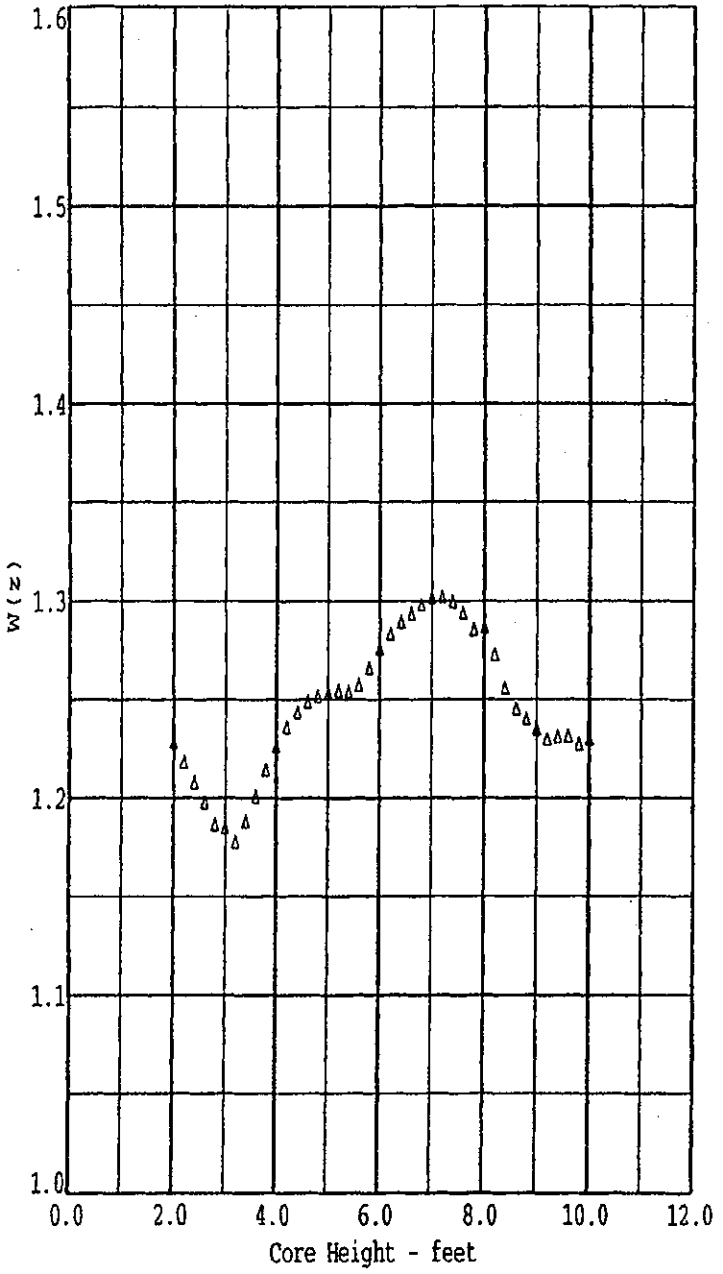
These W(Z) values are consistent with Figure 5 and are valid over the HFP T_{avg} temperature range from 586.4 to 587.4°F.

	Axial Point	Elevation (feet)	MOL-2 W(Z)
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
*	6	11.00	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.2757
	12	9.80	1.2740
	13	9.60	1.2701
	14	9.40	1.2635
	15	9.20	1.2563
	16	9.00	1.2442
	17	8.80	1.2380
	18	8.60	1.2368
	19	8.40	1.2404
	20	8.20	1.2415
	21	8.00	1.2457
	22	7.80	1.2515
	23	7.60	1.2535
	24	7.40	1.2529
	25	7.20	1.2495
	26	7.00	1.2437
	27	6.80	1.2356
	28	6.60	1.2254
	29	6.40	1.2140
	30	6.20	1.2024
	31	6.00	1.1887
	32	5.80	1.1762
	33	5.60	1.1718
	34	5.40	1.1771
	35	5.20	1.1833
	36	5.00	1.1886
	37	4.80	1.1926
	38	4.60	1.1952
	39	4.40	1.1964
	40	4.20	1.1961
	41	4.00	1.1944
	42	3.80	1.1911
	43	3.60	1.1871
	44	3.40	1.1836
	45	3.20	1.1821
	46	3.00	1.1834
	47	2.80	1.1897
	48	2.60	1.1991
	49	2.40	1.2087
	50	2.20	1.2182
	51	2.00	1.2276
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

FIGURE 8
RAOC W(Z) AT 12000 MWD/MTU

COLR for VEGP UNIT 2 CYCLE 10



This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5 and are valid over the HFP T_{avg} temperature range from 586.4 to 587.4°F.

	Axial Point	Elevation (feet)	EOL W(Z)
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
*	6	11.00	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.2297
	12	9.80	1.2271
	13	9.60	1.2312
	14	9.40	1.2309
	15	9.20	1.2297
	16	9.00	1.2348
	17	8.80	1.2400
	18	8.60	1.2451
	19	8.40	1.2556
	20	8.20	1.2726
	21	8.00	1.2865
	22	7.80	1.2853
	23	7.60	1.2940
	24	7.40	1.2995
	25	7.20	1.3020
	26	7.00	1.3017
	27	6.80	1.2982
	28	6.60	1.2936
	29	6.40	1.2893
	30	6.20	1.2834
	31	6.00	1.2758
	32	5.80	1.2660
	33	5.60	1.2573
	34	5.40	1.2539
	35	5.20	1.2543
	36	5.00	1.2532
	37	4.80	1.2514
	38	4.60	1.2487
	39	4.40	1.2434
	40	4.20	1.2358
	41	4.00	1.2260
	42	3.80	1.2141
	43	3.60	1.2008
	44	3.40	1.1880
	45	3.20	1.1776
	46	3.00	1.1848
	47	2.80	1.1865
	48	2.60	1.1977
	49	2.40	1.2078
	50	2.20	1.2179
	51	2.00	1.2281
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

FIGURE 9
RAOC W(Z) AT 20000 MWD/MTU

K/A 076AA2.02

69. Given the following plant conditions:

- Unit is at 100%
- RCS Dose Equivalent Iodine-131 sample taken 0730 on 11/04/02 is 6.30 µCi/gram.
- RCS Dose Equivalent Iodine-131 sample taken 0730 on 11/06/02 is now 2.5 µCi/gram.

Based on these conditions which ONE of the following is the required action(s)?

A. Place all CVCS demins in service at maximum flow rate and continue power operations.

B. Place the Unit in Mode 3 at less than 500 degrees F within 6 hours.

C. Continue to monitor dose equivalent Iodine 131 to ensure it remains within acceptable region once per 4 hours.

D. Complete a load reduction to less than 50% within 6 hours and monitor RCS Dose Equivalent Iodine-131 every 4 hours.

K/A - 062AG2.4.24

"Loss of All AC"

56. The crew is in 19100-C, "~~Reactor Trip or Safety Injection~~". Prior to the step that the crew places equipment in PTL, the procedure cautions that 2 NSCW pumps should be available to load on each AC Emergency Bus.

These pumps are required to provide cooling for the .....

A. SI pump

B. MDAFW pump

C. ACCW pump

D. EDG

Vogtle 2002-301
RO Inital Exam
11/26/02

K/A
062AG2.4.24

"Loss of ALL AC" M 11-26-02

62. The crew is in 19100-C, "~~Reactor Trip or Safety Injection~~". Prior to the step that the crew places equipment in PTL, the procedure cautions that 2 NSCW pumps should be available to load on each AC Emergency Bus.

    These pumps are required to provide cooling for the .....

    A. SI pump

    B. MDAFW pump

    C. ACCW pump

    D. EDG