REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE

Required Review Level (check one)

- [x] **OSRC**
- [ ] **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-010-005	REVISION: 4	CHANGE: 5	DEVIATION: N/A

TITLE: Plant Shutdown

PROCEDURE OWNER (Position Title) Assistant Operations Manager (Support)

ACTIVITY (Check one)

- [x] Change
- [ ] Revision
- [ ] Deviation
- [ ] Deletion
- [ ] New Procedure
- [ ] Temporary Procedure

DESCRIPTION AND JUSTIFICATION OF CHANGE:

1. Added Limitation 3.2.30 and Note prior to step 9.1.6 giving the preferred COLSS Calculated Power indications to use during power maneuvers. This change was performed in response to CR-WF3-2005-03985 CA-12. This change adds information only. No actions are directed or implied by the information and, therefore, this change represents an Intent Change and meets Editorial Change criteria per EN-AD-101 section 3.0[5] and ENS-LI-101 section 3.0[18].

2. On page 45, Caution prior to step 9.3.22.12: Added reference to Attachment 9.4, Pressurizer Saturation & Psat + 100 psia, to aid in the compliance of Pressurizer cooldown limits. This change adds an attachment reference only and meets Editorial Change criteria per EN-AD-101 section 3.0[5] and ENS-LI-101 section 3.0[18].

- [x] Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (Check one)

- [ ] Normal
- [x] Editorial Correction (May only be used with Changes, Revisions, and Deviations)

REVIEW AND APPROVAL ACTIONS			PRINT NAME OR SIGNATURE	DATE
PREPARER			Michael Lawson	11/10/2005
EC SUPERVISOR	Administrative Review and Approval		(sign)	11-10-05
CROSS DISCIPLINE REVIEWS (List Groups)	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
50.59 REVIEWER ☐ Programatically Excluded: OSRC Mtg. No.: N/A			N/A	
50.54 REVIEWER	Review ☐		N/A	
TECHNICAL REVIEWER	Review		N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

Effective Date / Milestone (if applicable): N/A

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REQUEST/APPROVAL PAGE Continuation Sheet

PROCEDURE/INSTRUCTION NO. OP-010-005 REVISION 4 CHANGE 5 DEVIATION N/A

TITLE: Plant Shutdown

DESCRIPTION AND JUSTIFICATION OF CHANGE: (continued)

3. Changed step 9.3.24 to state "~ 100 PSIA" instead of directing pressurizer pressure be maintained "at 100 psia". This will make step 9.3.24 consistent with step 9.3.23.4 which directs establishing Pressurizer pressure ~ 100 psia. The intent of the step is unchanged, since it is not a reasonable expectation for Pressurizer pressure to be held exactly at 100 psia. This change serves to further assure procedural intent is met and does not constitute an Intent Change. This change, therefore, meets Editorial Change criteria per EN-AD-101 section 3.0 [5] and ENS-LI-101 section 3.0[18].

4. Added CR-WF3-2005-03985 to list of Source Documents. This change adds a document reference only and meets Editorial Change criteria per EN-AD-101 section 3.0 [5] and ENS-LI-101 section 3.0[18].

ADDITIONAL CROSS DISCIPLINE REVIEWS		PRINT NAME OR SIGNATURE	DATE
CROSS DISCIPLINE REVIEWS (List Groups)	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	

REQUEST/APPROVAL PAGE

SAFETY RELATED
PROCEDURE

Required Review Level (check one)
- [x] **OSRC**
- [ ] **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-010-005	REVISION: 4	CHANGE: 4	DEVIATION: N/A

TITLE: Plant Shutdown

PROCEDURE OWNER (Position Title) Assistant Operations Manager (Support)

ACTIVITY (Check one)

[x] Change [ ] Revision [ ] Deviation [ ] Deletion [ ] New Procedure [ ] Temporary Procedure

DESCRIPTION AND JUSTIFICATION OF CHANGE:

Added a note to Precautions and Limitations identifying the potential for Reactor Vessel Head void formation during Mode 5 & 6 operations and a method of monitoring for void formation. This information has been added per CR-WF3-2005-02461.

This change adds information only. No actions are directed or implied by the information and, therefore, this change does not represent an intent change and meets Editorial Change criteria per EN-AD-101 section 3.0[5].

[ ] Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (Check one)

[ ] Normal [x] Editorial Correction (May only be used with Changes, Revisions, and Deviations)

REVIEW AND APPROVAL ACTIONS		PRINT NAME OR SIGNATURE	DATE
PREPARER		Michael Lawson	10/13/2005
EC SUPERVISOR	Administrative Review and Approval	(sign)	10-18-05
CROSS DISCIPLINE REVIEWS (List Groups)	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
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50.59 REVIEWER [x] Programatically Excluded: OSRC Mtg. No.: N/A		N/A	
50.54 REVIEWER	Review [ ]	N/A	
TECHNICAL REVIEWER	Review	N/A	
QUALIFIED REVIEWER	Review [ ]	N/A	
GROUP/DEPT. HEAD	Review [ ] Approval [ ]	(sign) N/A	
GM, PLANT OPERATIONS	Review [ ] Approval [ ]	(sign) N/A	
VICE PRESIDENT, OPERATIONS	Approval [ ]	(sign) N/A	

Effective Date / Milestone (if applicable): N/A

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REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE

Required Review Level (check one)

- [x] OSRC
- [ ] QUALIFIED REVIEWER

PROCEDURE NUMBER: OP-010-005	REVISION: 4	CHANGE: 3	DEVIATION: N/A

TITLE: Plant Shutdown

PROCEDURE OWNER (Position Title) Assistant Operations Manager (Support)

ACTIVITY (Check one)

- [x] Change
- [ ] Revision
- [ ] Deviation
- [ ] Deletion
- [ ] New Procedure
- [ ] Temporary Procedure

DESCRIPTION AND JUSTIFICATION OF CHANGE:

Duplicated the steps that exist in OP-010-003 for aligning Reactor Coolant Pump Control Bleedoff to the Reactor Drain Tank and for restoration of Reactor Coolant Pump Controlled Bleedoff back to the Volume Control Tank. The new steps are added as a new attachment (Attachment 9.23) and are directed from the appropriate steps in the sequence of Attachment 9.3 ("Cooldown to Cold Shutdown (Mode 4 To Mode 5)"). The same steps are performed identically in OP-001-003 and have been reviewed under 10CFR50.59 with the operational constraints that the plant is Mode 5 and RCS Pressure is less than or equal to 1000 PSIA when Reactor Coolant Pump Control Bleedoff is aligned to the Reactor Drain Tank.

- [x] Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (Check one)

- [ ] Normal
- [x] Editorial Correction (May only be used with Changes, Revisions, and Deviations)

REVIEW AND APPROVAL ACTIONS			PRINT NAME OR SIGNATURE	DATE
PREPARER			Michael Lawson	9/7/2005
EC SUPERVISOR	Administrative Review and Approval		(sign)	9-8-2005
CROSS DISCIPLINE REVIEWS (List Groups)	N/A		N/A	
	N/A		N/A	
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	N/A		N/A	
50.59 REVIEWER ☐ Programatically Excluded:	OSRC Mtg. No.: N/A		N/A	
50.54 REVIEWER	Review ☐		N/A	
TECHNICAL REVIEWER	Review		N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

Effective Date / Milestone (if applicable): Concurrent with implementation of OP-001-003 Revision 24

Expiration Date / Milestone (if applicable): N/A

REQUEST/APPROVAL PAGE Continuation Sheet

PROCEDURE/INSTRUCTION NO. OP-010-005 REVISION 4 CHANGE 3 DEVIATION N/A

TITLE: Plant Shutdown

DESCRIPTION AND JUSTIFICATION OF CHANGE: (continued)

The inclusion of the instructions in OP-010-005 maintains these operational constraints. For better human performance measures (i.e., not causing the procedure user to jump from one procedure to another and then back), the steps are duplicated in OP-010-005 rather than directed to in OP-010-003. Since the alignment and conditions are identical to that which have already been reviewed and approved and which exist in another approved procedure, this change merely represents duplication of those instructions in another approved procedure. The appropriate controls (i.e., cautionary information on required conditions) accompany the instructions to assure correct performance in the required conditions. This change to OP-010-005 does not alter procedural intent, purpose, or scope, and creates no new operational sequences. The instructions being added to OP-010-005 in this procedure change have already received appropriate technical and License reviews and require no further of such reviews. OP-010-005 Revision 4 Change 3 therefore meets Editorial Change criteria per EN-AD-0101 section 3.0[5].

ADDITIONAL CROSS DISCIPLINE REVIEWS		PRINT NAME OR SIGNATURE	DATE
CROSS DISCIPLINE REVIEWS (List Groups)	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	

REQUEST/APPROVAL PAGE

SAFETY RELATED
PROCEDURE

Required Review Level (check one)
- [x] OSRC
- [ ] QUALIFIED REVIEWER

PROCEDURE NUMBER: OP-010-005	REVISION: 4	CHANGE: 2	DEVIATION: N/A

TITLE: Plant Shutdown

PROCEDURE OWNER (Position Title) Assistant Operations Manager (Support)

ACTIVITY (Check one)

[x] Change [ ] Revision [ ] Deviation [ ] Deletion [ ] New Procedure [ ] Temporary Procedure

DESCRIPTION AND JUSTIFICATION OF CHANGE:

Page 43 step 9.3.22.5: Changed the requirement for RCS dissolved H2 concentration from <15 cc/Kg to state that the concentration must be in compliance with CE-002-006, Maintaining Reactor Coolant Chemistry. Chemistry has changed their requirement in CE-002-006 to allow H2 concentration to be >15 cc/Kg with supervisor approval. This change only removes the chemistry requirement from OP-010-005, Plant Shutdown and refers to the requirement in the chemistry procedure. By removing this requirement from OP-010-005 it allows chemistry to make changes to their procedure without having to also change the operating procedures. This change merely removes duplication of information that already exists in an approved procedure (CE-002-006, Maintaining Reactor Coolant Chemistry) and therefore meets Editorial Change criteria per EN-AD-101 section 3.0[5].

[ ] Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (Check one)

[ ] Normal [x] Editorial Correction (May only be used with Changes, Revisions, and Deviations)

REVIEW AND APPROVAL ACTIONS				PRINT NAME OR SIGNATURE	DATE
PREPARER				Michael Lawson	9/7/2005
EC SUPERVISOR	Administrative Review and Approval			(sign)	9/7/05
CROSS DISCIPLINE REVIEWS (List Groups)	N/A			N/A	
	N/A			N/A	
	N/A			N/A	
	N/A			N/A	
	N/A			N/A	
50.59 REVIEWER [x] Programatically Excluded: OSRC Mtg. No.: N/A				N/A	
50.54 REVIEWER	Review [ ]			N/A	
TECHNICAL REVIEWER	Review			N/A	
QUALIFIED REVIEWER	Review [ ]			N/A	
GROUP/DEPT. HEAD	Review [ ]	Approval [ ]		(sign) N/A	
GM, PLANT OPERATIONS	Review [ ]	Approval [ ]		(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval [ ]		(sign) N/A	

Effective Date / Milestone (if applicable): N/A

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REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE

Required Review Level (check one)

☑ OSRC

☐ QUALIFIED REVIEWER

PROCEDURE NUMBER: OP-010-005	REVISION: 4	CHANGE: 1	DEVIATION: N/A

TITLE: Plant Shutdown

PROCEDURE OWNER (Position Title) Assistant Operations Manager (Support)

ACTIVITY (Check one)

☑ Change ☐ Revision ☐ Deviation ☐ Deletion ☐ New Procedure ☐ Temporary Procedure

DESCRIPTION AND JUSTIFICATION OF CHANGE:

In Attachment 9.14 changed values in notes for lower temperature limits for Reactor Coolant Pump (RCP) operations on both the narrow view and the expanded view graphs as follows: changed 219 degrees Fahrenheit to 199 degrees Fahrenheit for three RCP operation; changed 192 degrees Fahrenheit to 172 degrees Fahrenheit for two RCP operation; changed the RCP 2A operational limit changed from 367 degrees Fahrenheit to 347 degrees Fahrenheit. The revised values accord with Figures 1A and 1B in the latest approved version of EC-S98-001 (DRN 03-2208). The values were already correct on the expanded view graph but were wrong on the narrow view graph. These changes are corrections of reference values and meet Editorial Change criteria per EN-AD-101 section 3.0[4](b).

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (Check one)

☐ Normal ☑ Editorial Correction (May only be used with Changes, Revisions, and Deviations)

REVIEW AND APPROVAL ACTIONS		PRINT NAME OR SIGNATURE	DATE
PREPARER		David R Voisin	5/23/2005
EC SUPERVISOR	Administrative Review and Approval	(sign)	5/23/2005
CROSS DISCIPLINE REVIEWS (List Groups)	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
50.59 REVIEWER ☐ Programatically Excluded: OSRC Mtg. No.: N/A		N/A	
50.54 REVIEWER	Review ☐	N/A	
TECHNICAL REVIEWER	Review	N/A	
QUALIFIED REVIEWER	Review ☐	N/A	
GROUP/DEPT. HEAD	Review ☐ Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐ Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS	Approval ☐	(sign) N/A	

Effective Date / Milestone (if applicable): N/A

Expiration Date / Milestone (if applicable): N/A

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE

Required Review Level (check one)
- [x] OSRC
- [ ] QUALIFIED REVIEWER

PROCEDURE NUMBER: OP-010-005	REVISION: 4	CHANGE: 0	DEVIATION: N/A

TITLE: Plant Shutdown

PROCEDURE OWNER (Position Title) Assistant Operations Manager (Support)

ACTIVITY (Check one)

[ ] Change [x] Revision [ ] Deviation [ ] Deletion [ ] New Procedure [ ] Temporary Procedure

DESCRIPTION AND JUSTIFICATION OF CHANGE:

Revised procedure to include changes associated with the Waterford 3 Extended Power Uprate.

1. Step 9.1.14 was added to verify CD MVAAA154 (GLAND STEAM CONDENSER BYPASS) closes below a Condensate flow of 18000 gpm.

2. Step 9.1.32.8 was added to locally verify that the main transformer cooling system is shutdown (i.e., no cooling units should be in operation following actuation of the 86G1 and 86G2 relays).

3. Step 3.1.10 added "of pressure" after equalization for clarification purposes.

4. Table of contents removed reference to Revision 3 Attachment 9.13 Pressurizer Spray Transient Log

[x] Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (Check one)

[x] Normal [ ] Editorial Correction (May only be used with Changes, Revisions, and Deviations)

REVIEW AND APPROVAL ACTIONS		PRINT NAME OR SIGNATURE	DATE
PREPARER		James D. Comeaux	2/15/2005
EC SUPERVISOR	Administrative Review and Approval	(sign) N/A	
CROSS DISCIPLINE REVIEWS (List Groups)	Reactor Engineering	Tim Gode	3/24/2005
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
50.59 REVIEWER [x] Programatically Excluded: OSRC Mtg. No.: N/A		T N Schreckengast	2/24/2005
50.54 REVIEWER	Review [ ]	N/A	
TECHNICAL REVIEWER	Review	Robert Simpson	2/24/2005
QUALIFIED REVIEWER	Review [ ]	N/A	
GROUP/DEPT. HEAD	Review [x] Approval [ ]	(sign)	2/24/05
GM, PLANT OPERATIONS	Review [ ] Approval [x]	(sign)	3/3/05
VICE PRESIDENT, OPERATIONS	Approval [ ]	(sign) N/A	

Effective Date / Milestone (if applicable): Implementation of License Amendment Request NPF-38-249 5-9-05

Expiration Date / Milestone (if applicable): N/A

PROCEDURE/INSTRUCTION NO. OP-010-005 REVISION 4 CHANGE 0 DEVIATION N/A

TITLE: Plant Shutdown

DESCRIPTION AND JUSTIFICATION OF CHANGE: (continued)

5. Revision 3 Step 3.2.8 is deleted.

6. Revision 3 Step 3.2.4 has been deleted. Item 7.2.17 deleted commitments P-1078, P-1193, P-2788. Section 8.1 and Section 9.1 removed references to Revision 3 Attachment 9.13 Pressurizer Spray Transient Log. Caution before step 9.2.15 was deleted. Step 9.2.15 and step 9.2.16 were deleted. Caution prior to step 9.3.22.12 removed items 1, 2, 3 and added new item 2 from caution before Revision 3 step 9.3.23 to this caution. Caution before step 9.3.23 was deleted. Step 9.3.23 and step 9.3.24 were deleted. Revision 3 Attachment 9.13 Pressurizer Spray Transient Log was deleted.

7. Step 3.2.28 changed the 4 Reactor Coolant Pump (RCP) operation minimum temperature from 355F to 382F.

8. Step 9.1.4 changed Tc range from 541-558 to 536-549F.

9. Step 9.1.12 added information to record time at entry below 70% power to track ADV Technical Specification (TS).

10. Step 9.1.15 changed the power to remove reactor power cutback from service to less than 65% power.

11. Step 9.1.17 changed the power level for running one feed pump from 60% to 55%.

12. Step 9.1.48 changed the Steam Bypass Control System hot zero power setpoint from 1000 psia to 970 psia.

13. Step 9.1.52 changed Tave statement to Tc at 541F (536-546F).

14. Step 9.1.52 changed pressurizer pressure band to 2175-2265 psia.

15. Note prior to Step 9.2.3 was change to reference the RCS pressure and temperature limits of Attachment 9.14 for RCP operation.

16. Caution prior to Step 9.2.10 added information to reference the RCS pressure and temperature limits of Attachment 9.14 for RCP operation.

17. Caution before step 9.2.17 was added for information to ensure that RCP controlled bleedoff is kept less than 65 psig in accordance with RCS pressure and temperature limits of Attachment 9.14 for RCP operation.

18. Attachment 9.14 was added for RCS Pressure and Temperature Limits.

19. Deleted references to Commitment P-6359. This commitment has been closed and is no longer required to be referenced. This portion of the revision meets the Editorial Change criteria of EN-AD-101 Section 3.0[4].

ADDITIONAL CROSS DISCIPLINE REVIEWS		PRINT NAME OR SIGNATURE	DATE
CROSS DISCIPLINE REVIEWS (List Groups)	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	

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4

1.0 PURPOSE

[Commitments P-178, P-6359, P-17715]

1.1 To provide major steps (outlined in Modes 1-5 Technical Specifications) necessary to take plant to Cold Shutdown.

1.2 This procedure provides administrative controls to ensure that required surveillances have been completed prior to changing modes.

1.3 This procedure provides verification signoff blanks for alignments of safety related equipment.

1.4 This procedure provides a method for addition of hydrogen peroxide to RCS prior to opening system for maintenance or refueling.

1.5 This procedure provides steps necessary to lower Pressurizer level to > 5% Pressurizer Level Cold Cal (RC-ILI-0103), while in Cold Shutdown for maintenance.

1.6 This procedure provides a method of inhibiting Shutdown Cooling Interlocks during cooldown after entering Mode 5.

2.0 PREREQUISITES

2.1 Onsite electrical loads are energized in accordance with:

- OP-006-001, Plant Distribution (7KV, 4KV and SSD) Systems
- OP-006-003, 125V DC Electrical Distribution
- OP-006-005, Inverters and Distribution
- OP-006-007, 120 and 208 Volt Distribution System

2.2 The Radiation Monitoring System is in operation in accordance with OP-004-001, Radiation Monitoring.

2.3 The Instrument Air System is in service in accordance with OP-003-016, Instrument Air.

2.4 The Station Air System is in service in accordance with OP-003-021, Station Air System.

2.5 The Condensate Makeup and Storage System is in operation in accordance with OP-003-004, Condensate Makeup.

2.6 The Primary Makeup System is in operation in accordance with OP-002-011, Primary Makeup System.

2.7 The Plant Monitoring Computer is in operation in accordance with OP-004-012, Plant Computer System.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 PRECAUTIONS

3.1.1 The RCS shall be maintained within Pressure/Temperature Operating limits of Technical Specification 3.4.8.1, Figures 3.4-2 and 3.4-3.

3.1.2 When depressurizing RCS with less than four RCPs running, then maintain a constant depressurization rate, rather than depressurizing in steps

3.1.3 When racking out breaker for any Charging Pump, prior to entry into Mode 5, then ensure that discharge and suction valves are Closed, to preclude flow through the idle pumps.

3.1.4 Hydrogen peroxide is a strong oxidizing agent. Caution must be exercised when adding hydrogen peroxide to RCS.

3.1.5 Hydrogen Peroxide shall not be added to the RCS with a bubble in the Pressurizer until RCS dissolved H2 concentration is < 15 cc/kg as a flammable mixture is possible in the Pressurizer.

3.1.6 Steam Generators shall not be overfilled (> 100%) while being placed in wet layup.

3.1.7 Chemistry and Radiation Protection Departments shall be notified following each Reactor Startup, Reactor Shutdown, or Thermal Power change that exceeds 15% of Rated Thermal Power in one hour.

3.1.8 Prior to going below 350°F, Technical Specification 3.1.2.9 must be complied with, to ensure Shutdown Margin is met to preclude a Boron Dilution event.

3.1.9 Control rods should be manually withdrawn or inserted in a deliberate and carefully controlled manner, while closely monitoring reactor response.

3.1.10 Ensure Controlled Bleedoff is unisolated when RCS pressure is greater than VCT pressure to prevent equalization of pressure across RCP Seals.

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3.1.11 Hydrogen peroxide additions with a bubble in the Pressurizer may result in excess dissolved oxygen concentration in the Pressurizer due to spray flow (auxiliary spray, main spray and spray bypass flow). Main or auxiliary spray flow should be minimized following hydrogen peroxide addition to the RCS.

3.1.12 Securing Pressurizer spray flow during hydrogen peroxide addition will interrupt boron equalization of the Pressurizer with the RCS. If boration of the RCS continues during hydrogen peroxide addition, then ensure that boron equalization criteria is achieved subsequent to the hydrogen peroxide addition or refueling boron concentration has been reached in the Pressurizer.

3.1.13 The following condition while in modes 5 and 6 may introduce void formation in the reactor vessel head: **[CR-WF3-2005-02461]** 4

- Safety Injection Tanks drained and depressurized
- Safety Injection Tank Outlet valves open
- Pressurizer level below 26% Cold Cal (Refueling level <36')

3.1.13.1 Monitoring for Head Void formation may be accomplished by using RVLMS Upper Head voiding in Level 1 and below

3.2 LIMITATIONS

3.2.1 It is understood that some steps of this procedure may not be applicable due to plant conditions. In these cases SM/CRS may N/A step and initial it.

3.2.2 With a steam bubble in the Pressurizer, RCS subcool margin shall be maintained >28°F.

3.2.3 RCS temperature and pressure must not exceed 350°F or 392 PSIA respectively, with Shutdown Cooling loop in service.

3.2.4 If RCS boron concentration is changed or anticipated to change by ≥ 50 PPM, then initiate Boron Equalization to maintain Pressurizer and RCS within 10 PPM.

3.2.5 Maximum back pressure for Main Turbine operation should not exceed 5.5" Hg Abs (24.5" vacuum).

3.2.6 Low Pressure Turbine Steam Inlet Temperature should be limited to ≤ 400°F when the unit is below 10% load. Adjust reheater outlet temperature to less than 400°F within approximately 15 minutes after reaching 10% load.

3.2.7 Values for Equilibrium Shape Index (ESI) will be provided and updated by Reactor Engineering in accordance with NE-003-001, Core Performance Monitoring. In those cases when ESI is not known, maintain the Axial Shape Index (ASI) as close to 0.0 as possible, until core approaches equilibrium conditions and ESI can be determined.

3.2.8 CEA withdrawal during power operation should be in small steps (less than 3 inches). ASI should be monitored closely after CEA motion, to determine impact of CEA motion.

3.2.9 CPC Calibrated Neutron Flux Power and Thermal Power tend to de-calibrate during power changes or CEA movement. Monitor CPC Calibrated Neutron Flux Power and Thermal Power closely, while changing power or moving CEAs.

3.2.10 If plant is being shutdown to <15% Reactor Power, then calibration of CPC Calibrated Neutron Flux Power (PID 171), CPC Thermal Power (PID 177), and Actual Excore Nuclear Power (CP-10 DVM) does not need to be performed. (T.S. Table 4.3-1)

3.2.11 Systems should be operated in Auto whenever possible. When in Manual, then frequent monitoring will be required to ensure process is being controlled in desired band.

3.2.12 Prior to resetting Low Pressurizer Pressure Trip Setpoint, ensure adequate subcooled margin is maintained for projected pressure trip setpoint.

3.2.13 To prevent excessive valve wear, MSIVs should be Closed using Soft Closure method listed in OP-005-004, Main Steam.

3.2.14 To prevent excessive valve wear, MFIVs should be Closed using Slow Closure method listed in OP-003-033, Main Feedwater.

3.2.15 Do not exceed an administrative limit of 75 MVAR in, or 400 MVAR out, or the requirements of the Generator Capability Curve, Plant Data Book Figure 3.2.3, whichever is more limiting.

3.2.16 Planned Plant Shutdown following power operations has been identified as an Infrequently Performed Test or Evolution in accordance with UNT-005-027, Infrequently Performed Test or Evolutions. Appropriate guidelines have been incorporated into this procedure to ensure compliance with UNT-005-027, Infrequently Performed Test or Evolutions.

3.2.17 Do not Reset Moisture Separator Reheater prior to verifying Main Turbine is tripped, to prevent rapid cooldown of MSR tube bundles.

3.2.18 Steps within this procedure may be performed concurrently or out of sequence with SM/CRS concurrence, unless specified otherwise within the body of the procedure.

3.2.19 If USBSCAL is not in service, a step change in indicated Plant Power of 1.0% may occur when COLSS Steam Calorimetric is disabled.

3.2.20 If USBSCAL is not in service, the COLSS Steam Calorimetric will not be selected if Plant Power drops below 95% as indicated by MSBSCAL (PMC PID C24246) and FWBSCAL (PMC PID C24246) will be selected.

3.2.21 Changes to this procedure shall be reviewed by the Reactor Engineering prior to approval. **[Commitment P-21855]**

3.2.22 Entry into an operational mode or other specified condition shall not be made unless the surveillance requirement(s) associated with the limiting condition for operation have been performed within the stated surveillance interval or as otherwise specified. This provision shall not prevent passage through or to operational modes as required to comply with action requirements. **[Commitment P-328]**

3.2.23 All manipulations of locked valves shall be documented in accordance with OP-903-130, Verification of Locked Valves and Breakers.

3.2.24 Cold leg temperature indication should be used to monitor the RCS cooldown rate until the final RCP is secured. Cold leg temperature should be determined as the average of all cold leg temperature indications measured by instruments located in RC loops with operating RCPs. The inservice Shutdown Cooling Heat Exchanger outlet temperature(s) (SI-ITI-0351X, SI-ITI-0352X) should be used to monitor the cooldown rate after the last RCP is secured. **[ER-W3-1999-0766-003]**

3.2.25 Natural Circulation takes 5 to 15 minutes to set up after RCPs have stopped. Natural Circulation relies on Steam Generators to remain a heat sink. Operators should ensure Steam Generator pressure is below saturation pressure for current RCS temperature.

3.2.26 When reactor power is less than 98% power, as indicated on computer point C24631 [MAIN STEAM RAW POWER (MSBSRAW)], or an alternate point provided by Reactor Engineering, then the value of C24648 [BSCAL SMOOTHING VAL. APPLD (DUMOUT17)] should automatically change to 1. This is done to ensure an accurate power is used for COLSS monitoring of DNBR and LPD power operating limits. If this does not occur as required, then inform Reactor Engineering and set the value of 1 for COLSS power smoothing constant K24250, [ADDRSSBL SMOOTHING FOR BSCAL (ALPHA)] in accordance with OP-004-005, Core Operating Limits Supervisory System.

3.2.27 When reactor power is greater than 98% power, as indicated on computer point C24631 [MAIN STEAM RAW POWER (MSBSRAW)], or an alternate point provided by Reactor Engineering, then the value of C24648 [BSCAL SMOOTHING VAL. APPLD (DUMOUT17)], should automatically change to 0.02. This is done to smooth out the instrumentation noise that occurs when operating at power levels greater than 98%. If this does not occur as required, then inform Reactor Engineering and set the value of 0.02 for COLSS power smoothing constant K24250, [ADDRSSBL SMOOTHING FOR BSCAL (ALPHA)] in accordance with OP-004-005, Core Operating Limits Supervisory System.

3.2.28 The fourth Reactor Coolant Pump shall be secured prior to cooling RCS temperature to <382°F.

3.2.29 The Pressurizer shall be limited to a maximum cooldown rate of 135°F per hour. Prior to cooling the Pressurizer below 90°F, a one hour minimum soak shall occur at 95±5°F. At all times during Pressurizer cooldown, Pressurizer pressure shall not exceed P_{sat} + 100 psia. **[ER-W3-2001-1211-000]**

3.2.30 BSCAL is not a good indication of instantaneous power during power maneuvers. Additionally, once the smoothing factor is applied at approximately 98% MSBSRAW (PMC PID C24631), BSCAL becomes a time weighted average of power recorded over approximately 20 minutes. The following table lists COLSS calculated powers available during power maneuvering to monitor instantaneous power: **[CR-WF3-2005-03985]**

UFM not in service	
Reactor Power ≥ 95%	MSBSRAW PMC PID C24631
Reactor Power < 95% and ≥ 35%	FWBSRAW PMC PID C24630
Reactor Power < 35%	BDELT PMC PID C24104
UFM in service	
Reactor Power ≥ 95%	MSBSRAW PMC PID C24631
Reactor Power < 95% and ≥ 40%	USBSRAW PMC PID C24629
Reactor Power < 40% and ≥ 35%	FWBSRAW PMC PID C24630
Reactor Power < 35%	BDELT PMC PID C24104

5

4.0 INITIAL CONDITIONS

NONE

5.0 PROCEDURE

5.1 Complete the appropriate attachments, as follows:

5.1.1 For Plant Shutdown to Hot Standby (Mode 1 to Mode 3), complete Attachment 9.1.

5.1.2 For Cooldown to Hot Shutdown (Mode 3 to Mode 4), complete Attachment 9.2.

5.1.3 For Cooldown to Cold Shutdown (Mode 4 to Mode 5), complete Attachment 9.3.

6.0 AUTOMATIC FUNCTIONS

NONE

7.0 REFERENCES

7.1 USE

7.1.1 OP-001-002, Reactor Coolant Pump Operation

7.1.2 OP-001-003, Reactor Coolant System Drain Down

7.1.3 OP-002-003, Component Cooling Water System

7.1.4 OP-002-005, Chemical and Volume Control

7.1.5 OP-002-010, Reactor Auxiliary Building HVAC and Containment Purge

7.1.6 OP-002-011, Primary Makeup System

7.1.7 OP-002-012, Primary Sampling

7.1.8 OP-003-001, Condenser Air Evacuation System

7.1.9 OP-003-003, Condensate

7.1.10 OP-003-004, Condensate Makeup

7.1.11 OP-003-006, Circulating Water

7.1.12 OP-003-008, Electro-Hydraulic Oil System

7.1.13 OP-003-011, Generator Gas

7.1.14 OP-003-012, Gland Seal System

7.1.15 OP-003-016, Instrument Air

7.1.16 OP-003-017, Turbine Lube Oil System

7.1.17 OP-003-021, Station Air System

7.1.18 OP-003-022, Stator Coil Water

7.1.19 OP-003-023, Seal Oil

7.1.20 OP-003-027, Turbine Closed Cooling Water System

7.1.21 OP-003-033, Main Feedwater

7.1.22 OP-003-034, Feed Heater Vents and Drains

7.1.23 OP-003-035, Auxiliary Feedwater

7.1.24 OP-004-001, Radiation Monitoring

7.1.25 OP-004-003, Control Element Assembly Calculation System

7.1.26 OP-004-004, Control Element Drive

7.1.27 OP-004-005, Core Operating Limits Supervisory System Operation

7.1.28 OP-004-006, Core Protection Calculator System

7.1.29 OP-004-012, Plant Computer System

7.1.30 OP-004-014, Reactor Regulating System

7.1.31 OP-004-015, Reactor Power Cutback System

7.1.32 OP-004-021, Anticipated Transient System

7.1.33 OP-005-001, Auxiliary Boiler Systems

7.1.34 OP-005-003, Extraction Steam

7.1.35 OP-005-004, Main Steam

7.1.36 OP-005-005, Reheat Steam System

7.1.37 OP-005-007, Main Turbine and Generator

7.1.38 OP-006-001, Plant Distribution (7KV, 4KV and SSD) Systems

7.1.39 OP-006-003, 125V DC Electrical Distribution

7.1.40 OP-006-005, Inverters and Distribution

7.1.41 OP-006-007, 120 and 208 Volt Distribution System

7.1.42 OP-006-008, Transformer Operation

7.1.43 OP-008-001, Annulus Negative Pressure

7.1.44 OP-008-002, Containment Atmosphere Release

7.1.45 OP-008-003, Containment Cooling System

7.1.46 OP-008-004, Control Element Drive Mechanism Cooling System

7.1.47 OP-008-007, Reactor Cavity Cooling System

7.1.48 OP-009-001, Containment Spray

7.1.49 OP-009-005, Shutdown Cooling System

7.1.50 OP-009-008, Safety Injection System

7.1.51 OP-100-009, Control of Valves and Breakers

7.1.52 OP-102, Protective and Caution Tagging

7.1.53 OP-901-103, Emergency Boration

7.1.54 OP-901-501, PMC or Core Operating Limit Supervisory System Inoperable

7.1.55 OP-903-001, Technical Specification Surveillance Logs

7.1.56 OP-903-024, Reactor Coolant System Water Inventory Balance

7.1.57 OP-903-090, Shutdown Margin

7.1.58 OP-903-101, Startup Channel Functional Test Startup Channel __ 1 and ___ 2

7.1.59 OP-903-102, Safety Channel Nuclear Instrumentation Functional Test

7.1.60 OP-904-007, Charging Pump Pulsation Dampener Pressure Check

7.1.61 OP-904-017, Anticipated Transient System Check

7.1.62 OI-002-000, Annunciator, Alarm and Control Room Instrumentation Status Control

7.1.63 CE-002-006, Maintaining Reactor Coolant Chemistry

7.1.64 Plant Data Book

7.1.65 UNT-004-044, Component and Equipment Labeling

7.1.66 UNT-005-027, Infrequently Performed Test or Evolutions

7.1.67 MI-003-002, Safety Channel Nuclear Instrumentation Functional Test

7.1.68 OP-010-006, Outage Operations

7.2 SOURCE

7.2.1 Technical Specifications

7.2.2 CENPD-28, Chemistry Specifications

7.2.3 Hydrogen Peroxide Addition Report dated December 16, 1986 W3Y86-0101

7.2.4 Reactivity Control W35A88-0098

7.2.5 Boron Dilution Alarm Reset Times W3C1-94-0023

7.2.6 Technical Requirements Manual (TRM)

7.2.7 Core Operating Limits Report (COLR)

7.2.8 CR-WF3-1999-0828, RCS Cooldown After Securing RCP

7.2.9 Technical Manual #457000397, Magnetic Jack Type CEDM Technical Manual

7.2.10 ER-W3-99-0766-03-00, RCS Cooldown Rate

7.2.11 Technical Specification Change Request 99-15 (T.S. 3.4.8.1)

7.2.12 CR-WF3-2002-01992, TRM Actions on Downpower w/ UFM Inop

7.2.13 LO-WLO-2001-00006, Chemical Degassing of RCS Hydrogen

7.2.14 ER-W3-2001-1211-000, Mechanical Nozzle Seal Assemblies, MNSA-2

7.2.15 CR-W3-2003-2863

7.2.16 CR WF3-2003-2990

7.2.17 CR-WF3-2005-03985 5

7.2.18 Commitments

- P-178 Admin Control & QA - Instructions & Procedures - Shutdown Procedures
- P-328 Surveillance Requirements Applicability - Mode Entry Requirement
- P-354 Boration System Charging/HPSI Pumps
- P-1171 Reactor Coolant System Isotopic Analysis for Iodine Following 15% Power Changes
- P-1180 Reactor Coolant System Pressure/Temperature Surveillance
- P-1191 Reactor Coolant System Pressurizer Heatup/Cooldown Temperature Surveillance
- P-1204 Reactor Coolant System Vent Path Flow Verification
- P-1493 ECCS - Safety Injection Tanks LCO
- P-3016 Surveillance of Reactor Trip Breakers, GE Type AK-2-25, to Assure Proper Position of the Undervoltage Armature
- P-4144 Operating Restrictions Based on Reference Nil Ductility Temperature

- P-4853 Safety Injection Tank Administrative Controls
- P-4908 Safety Injection System Operator Actions During Plant Shutdown
- P-4910 Safety Injection System Operator Actions During Plant Shutdown 5
- P-5803 Administrative Controls And Procedures to Prevent Reactor Coolant System Low Temperature Overpressurization
- P-5804 Administrative Controls Necessary to Provide LTOP are Limited to those Controls that Open the SDCS Isolation Valve
- P-6003 Reactor Coolant System Hydrogen Limitation for Shutdown
- P-6359 General Plant Operating Procedure Instructions for Operation
- P-13420 Methods of Maintaining Exposures Alara During Refueling
- P-13461 Shutdown Margin - Verify After Refueling
- P-13540 Steam Generator Secondary Side Water Chemistry Control
- P-14314 Undetected Loss of Reactor Coolant
- P-16607 Reactor Vessel Pressurized Thermal Shock
- P-16685 Multiple Problems Following a Fire Complicate Plant Stabilization
- P-17715 General Plant Operating Procedure Instructions for Operation
- P-20801 Non Compliance with Boron Dilution T.S. Caused by Inadequate Procedure
- P-21806 Prevent Missed Surveillance by Making Procedure Improvements
- P-21855 Reactor Engineering to Review Procedures
- P-25637 Testing the Atmospheric Dump Valves in Mode 3 or 4
- P-25727 Exceeding the Technical Specifications Limits for Reactor Coolant System Cooldown Rate

8.0 RECORDS

8.1 Transmit the following records in accordance with OI-012-000, Control of Records:

- 9.1, Plant Shutdown to Hot Standby (Mode 1 to Mode 3)
- 9.2, Cooldown to Hot Shutdown (Mode 3 to Mode 4)
- 9.3, Cooldown to Cold Shutdown (Mode 4 to Mode 5)
- 9.5, Lowering Pressurizer Level
- 9.7, RCS Cooldown Log
- 9.8, Pressurizer Cooldown Log
- 9.10, Closure Inhibit of SDC Suction Valves
- 9.13, Surveillances for Closing Reactor Trip Breakers with MG Sets Operating

9.0 ATTACHMENTS

9.1 Plant Shutdown to Hot Standby (Mode 1 to Mode 3)

9.2 Cooldown to Hot Shutdown (Mode 3 to Mode 4)

9.3 Cooldown to Cold Shutdown (Mode 4 to Mode 5)

9.4 Pressurizer Saturation & P_{sat} + 100 PSIA

9.5 Lowering Pressurizer Level

9.6 Mode 5 Checklist

9.7 RCS Cooldown Log

9.8 Pressurizer Cooldown Log

9.9 Axial Shape Control Guidelines

9.10 Closure Inhibit of SDC Suction Valves

9.11 Infrequently Performed Task or Evolutions Lessons Learned

9.12 Boron Equalization

9.13 Surveillances for Closing Reactor Trip Breakers w/MG Sets Operating

9.14 RCS Pressure and Temperature Limits

9.1 PLANT SHUTDOWN TO HOT STANDBY (MODE 1 TO MODE 3)

(Initial/Date)

NOTE

Power may be stabilized at SM/CRS discretion at any point during performance of this section. The Senior Line Manager for Plant Shutdown shall be the Operations Manager, his designee, or a qualified Duty Plant Manager. Performance of an Infrequently Performed Test or Evolution (IPTE) Brief shall not preclude full compliance with any Technical Specification or procedurally required Plant Shutdown.

9.1.1 If performing a planned Plant Shutdown following Power Operations, then the following Infrequently Performed Test or Evolutions (IPTE) controls should be complied with:

9.1.1.1 The Senior Line Manager shall brief the operating personnel on the following:

- Exercise caution and conservatism, particularly when uncertainties are encountered
- Maintain the highest margin of safety possible. This margin of safety will not be jeopardized by any urgency to complete this evolution
- Open communications shall be maintained at all times to ensure this evolution is performed in a controlled and safe manner
- A briefing on lessons learned from past experiences while performing this evolution based on applicable portions of Attachment 9.11, Infrequently Performed Task or Evolutions (IPTE) Lessons Learned
- If unexpected conditions arise or unexpected plant response is encountered, then stop the evolution and place the plant in a safe condition, as directed by the SM/CRS

9.1.1.2 The Senior Line Manager shall be present onsite at all times from commencing power reduction until Mode 3 entry and provide the following:

- Exercise responsibility for oversight of the evolution
- Authority over pace of the evolution
- Resolution of problems encountered during evolution

9.1.2 Prior to commencing power reduction, notify Load Dispatcher. _____/_____

9.1.3 Announce to Station Personnel that a power reduction is in progress over the Plant Paging System. _____/_____

9.1.4 Maintain RCS T_{cold} 536°F to 549°F during the downpower.

9.1.5 Perform Boron Equalization in accordance with Attachment 9.12, Boron Equalization. _____/_____

NOTE

BSCAL is not a good indication of instantaneous power during power maneuvers. Additionally, once the smoothing factor is applied at approximately 98% MSBSRAW (PMC PID C24631), BSCAL becomes a time weighted average of power recorded over approximately 20 minutes. The following table lists COLSS calculated powers available during power maneuvering to monitor instantaneous power: **[CR-WF3-2005-03985]**

UFM not in service	
Reactor Power ≥ 95%	MSBSRAW PMC PID C24631
Reactor Power < 95% and ≥ 35%	FWBSRAW PMC PID C24630
Reactor Power < 35%	BDELT PMC PID C24104
UFM in service	
Reactor Power ≥ 95%	MSBSRAW PMC PID C24631
Reactor Power < 95% and ≥ 40%	USBSRAW PMC PID C24629
Reactor Power < 40% and ≥ 35%	FWBSRAW PMC PID C24630
Reactor Power < 35%	BDELT PMC PID C24104

5

9.1.6 Begin RCS boration in accordance with OP-002-005, Chemical and Volume Control to reduce Reactor power. _____/_____

(Initial/Date)

CAUTION

CONTROL RODS SHOULD NEVER BE WITHDRAWN OR MANUALLY INSERTED EXCEPT IN A DELIBERATE CAREFULLY CONTROLLED MANNER WHILE CLOSELY MONITORING THE REACTOR'S RESPONSE.

9.1.7 Maintain ASI using CEA Reg. Group 5, 6 or Group P Control Element Assemblies in accordance with Attachment 9.9, Axial Shape Control Guidelines. (Refer to T.S. 3.1.3.6 and 3.1.3.7).

9.1.8 When Average Reactor Coolant Temperature (T_{avg}) begins to drop, then reduce Generator load to match T_{avg} and Reference Temperature (T_{ref}) in accordance with OP-005-007, Main Turbine and Generator. _____/_____

NOTE

(1) If USBSCAL is not in service, the COLSS Steam Calorimetric will be automatically disabled when MSBSCAL (PMC PID C24246) drops below 95% Power, and will revert back to FWBSCAL (PMC PID C24235).

(2) If USBSCAL is not in service, there may be a step change in COLSS indicated Plant Power of 1.0%, when COLSS Steam Calorimetric is disabled. 5

9.1.9 When reactor power consistently indicates less than 98% power, as indicated on computer point C24631 [MAIN STEAM RAW POWER (MSBSRAW)], or an alternate point provided by Reactor Engineering, then verify the value of C24648 [BSCAL SMOOTHING VAL. APPLD (DUMOUT17)], automatically changes to 1. _____/_____

9.1.9.1 If C24648 does not automatically change to 1, then inform Reactor Engineering and set the value of 1 for COLSS power smoothing constant K24250, [ADDRSSBL SMOOTHING FOR BSCAL (ALPHA)] in accordance with OP-004-005, Core Operating Limits Supervisory System.

9.1.10 Between 90% and 80% Power at SM/CRS discretion, reevaluate CEA Subgroups selected to drop on a Reactor Cutback event in accordance with OP-004-015, Reactor Power Cutback System. _____/_____

9.1.11 Following a Reactor Power change of >15% within a one hour period, notify Chemistry Department to sample Reactor Coolant System (RCS) for an isotopic iodine analysis two to six hours later. **[Commitment P-1171]** _____/_____

Chemist Contacted **Date/Time**

9.1.12 When Reactor Power is <70% power, then record date and time to determine compliance requirement with Technical Specification 3.7.1.7. _____/_____

_____
Date/Time

9.1.13 When Reactor power is approximately 70% or Heater Drain Pump flow is unstable, then remove Heater Drain Pumps from service in accordance with OP-003-034, Feed Heater Vents and Drains. _____/_____

9.1.14 When Condensate Flow is 18,000 gpm (PMC PID S02404), verify CLOSED CD-154, Gland Steam Condenser Bypass (PMC PID D02404). _____/_____

9.1.15 When Reactor power is less than 65%, then perform the following:

9.1.15.1 Verify Reactor Power Cutback System Auto Actuate Out Of Service pushbutton is illuminated. _____/_____

9.1.15.2 If Reactor Trip on Turbine Trip was in service, then perform the following:

9.1.15.2.1 Verify Loss Of Turbine Trip keyswitch in Disable position. _____/_____

9.1.15.2.2 Verify Loss Of Load keyswitch in RPC. _____/_____

9.1.15.2.3 Verify Loss Of Turb Bypass keyswitches in Bypass for all four channels at PPS Remote Operator Modules. _____/_____

9.1.15.2.4 Check red Bypass lights illuminate for each channel in Bypass. _____/_____

9.1.16 Remove Polishers from service to maintain system pressure in accordance with OP-003-031, Condensate Polisher/Backwash Treatment. _____/_____

9.1.17 When Reactor power is approximately 55%, then remove one Main Feedwater Pump from service in accordance with OP-003-033, Main Feedwater. _____/_____

(Initial/Date)

NOTE

If plant is being shutdown to < 15% Reactor Power, then step 9.1.16 may be N/A.

9.1.18 When Reactor power is approximately 50%, then verify the following agree with Secondary Calorimetric Power within limits specified in OP-903-001, Technical Specification Surveillance Logs:

- CPC Calibrated Neutron Flux Power (PID 171)
- CPC Thermal Power (PID 177)
- Actual Excore Nuclear Power (CP-10 DVM)

NOTE

When Reactor power is less than 40%, the UFM will remove itself from service and cause the "COLSS Master" to annunciate.

9.1.19 When reactor power is less than 50% and B24006, UFM OVERALL QUALITY (QLEFM), indicates bad, then remove the UFM generated alarms from the COLSS Master annunciator by setting B24058, REMOVE UFM FROM COLSS MASTER (COLS2) to ON in accordance with OP-004-005, Core Operating Limits Supervisory System Operation.

9.1.20 If all three Condensate Pumps are in operation and Reactor Power is ~ 40%, then remove one Condensate Pump from service. _____/_____

9.1.21 If 35% Generator load is reached and a plant shutdown is not planned, then reduce MSR temperature in accordance with OP-005-005, Reheat Steam System. _____/_____

NOTE

Main Feedwater Pump operation at flows below approximately 8000 gpm can result in recirculation of flow and elevated pump vibration. **[CR WF3-2003-2990]**

9.1.22 Throttle Open or Open Steam Generator Feed Pump A(B) Recirc Flow Control FW-111A(B) to maintain operating Main Feedwater Pump flow greater than 8000 gpm as practical.

9.1.23 At ~ 20% Generator load, verify Open Turb & Extr Lines Drain Valves on CP-1. _____/_____

(Initial/Date)

9.1.24 Align Blowdown Flash Tank Vent to Condenser by performing the following:

9.1.24.1 Throttle open BD Tank Extraction Line Isol to Main Condenser, BD-119. ____/____

9.1.24.2 Close BD Tank Extraction Line Isol to #4 FW IP Heaters, BD-120. ____/____

9.1.25 If plant is to be placed in Mode 3, then consider starting up the Portable Boiler in accordance with OP-005-001, Auxiliary Boiler Systems. ____/____

9.1.26 At ~ 230 MWe, transfer electrical loads to Startup Transformers in accordance with OP-006-001, Plant Distribution (7KV, 4KV and SSD) Systems. ____/____

9.1.27 Notify Load Dispatcher that unit is going off line. ____/____

9.1.28 Notify Southern Control that unit is going off line. ____/____

9.1.29 At SM/CRS discretion when less than 20% Reactor power, place High Steam Generator Level Trip Bypass keyswitches for all four PPS channels to Bypass. ____/____

9.1.30 If Steam Generator (S/G) levels cannot be maintained in Automatic, then transfer following controllers to Manual: ____/____

- Main FW Reg Valve Controllers, FW-IHIC-1111 and 1121
- Start Up Feedwater Reg Valve Controllers, FW-IHIC-1105 and 1106
- FWPT Speed Controllers, FW-IHIC-1107 and 1108
- FW Control Master Controllers, FW-IFIC-1111 and 1121

9.1.31 Maintain S/G levels 50% to 70% NR.

(Initial/Date)

9.1.32 At ~ 60 MWe, secure Main Turbine by performing the following:

9.1.32.1 Adjust MVARs to approximately zero. ____/____

9.1.32.2 Start Bearing & Gen Seal Oil Backup Pump. ____/____

9.1.32.3 Verify High Pressure Bearing Lift Pump is in Auto. ____/____

9.1.32.4 Trip Main Turbine by simultaneously Depressing Turbine Think and Trip pushbuttons. ____/____

9.1.32.5 Verify following valves Closed: ____/____

- Throttle Valves
- Governor Valves
- Reheat Stop Valves
- Intercept Valves

NOTE

When Generator motoring occurs, then Generator Output Breakers and Exciter Field Breaker should automatically open after ~ 3 seconds.

9.1.32.6 If 20 seconds after verifying Turbine Trip, the Generator is motoring but has not automatically Tripped, then perform the following:

9.1.32.6.1 Manually Trip the Generator by Depressing both Generator Emergency Trip pushbuttons. ____/____

9.1.32.6.2 Generate a WR. ____/____

9.1.32.7 Place Auto Voltage Regulator to Off. ____/____

9.1.32.8 Verify 86G1 and 86G2 relays are Reset. ____/____

9.1.32.9 Verify locally that Main Transformer A and B Cooling Fans are secured. ____/____

9.1.33 Open the following valves: _____/_____

- ES-110 ES Header to HP Heaters Manual Drain
- ES-120A ES Header to HP Heater 1A Orifice Trap Inlet
- ES-120B ES Header to HP Heater 1B Orifice Trap Inlet
- ES-120C ES Header to HP Heater 1C Orifice Trap Inlet
- ES-206 ES Header to #2 Heaters Manual Drain
- ES-216A ES to IP Heater 2A Orifice Trap Inlet
- ES-216B ES to IP Heater 2B Orifice Trap Inlet
- ES-216C ES to IP Heater 2C Orifice Trap Inlet
- ES-308A ES Header to IP Heater 3A Drain
- ES-308B ES Header to IP Heater 3B Drain
- ES-308C ES Header to IP Heater 3C Drain
- ES-312A ES to IP Heater 3A Orifice Trap Inlet
- ES-312B ES to IP Heater 3B Orifice Trap Inlet
- ES-312C ES to IP Heater 3C Orifice Trap Inlet
- ES-421A ES to IP Heater 4A Orifice Trap Inlet
- ES-421B ES to IP Heater 4B Orifice Trap Inlet
- ES-421C ES to IP Heater 4C Orifice Trap Inlet

9.1.34 Secure MSRs in accordance with OP-005-005, Reheat Steam System. _____/_____

NOTE

The Reactor may be tripped at higher than normal power levels if OP-903-067, Unit Power Supply Transfer Check, is performed on the plant shutdown.

9.1.35 If Reactor power drops to < 5%, then perform the following:

9.1.35.1 Inform SM/CRS plant entered Mode 2. _____/_____/_____
. SM/CRS Sign / Date / Time

9.1.35.2 Set Plant Monitoring Computer to Mode 2 in accordance with OP-004-012, Plant Computer System. _____/_____

9.1.36 Manually Trip the Reactor and verify the following: ____/____

9.1.36.1 All Control Element Assemblies (CEAs) are fully inserted. ____/____

9.1.36.2 All CEA bottom lights are illuminated. ____/____

9.1.36.3 Reactor Trip Switchgear Breakers 1-8 are Open. ____/____

9.1.36.4 Reactor Power is dropping with a negative startup rate. ____/____

9.1.37 Inform SM/CRS plant has entered Mode 3. _____/____/____
SM/CRS Sign / Date / Time

9.1.37.1 Set Plant Monitor Computer to Mode 3 in accordance with OP-004-012, Plant Computer System. ____/____

9.1.38 If Reactor Coolant System (RCS) is to be cooled down and depressurized, then perform the following:

9.1.38.1 Commence degassing RCS by verifying Pressurizer Steam Space sample line is aligned to Volume Control Tank (VCT) in accordance with CE-003-027, Operation of the Primary Sample Panel. ____/____

NOTE

Notify Radiation Protection (RP) when changing charging and letdown flows.

9.1.38.2 If Technical Specification 3.1.2.9 permits, then verify two Charging Pumps operating in accordance with OP-002-005, Chemical and Volume Control. ____/____

9.1.38.3 Start a nitrogen purge of VCT in accordance with OP-002-005, Chemical and Volume Control. ____/____

9.1.38.4 If borating is desired to reach Refueling boron concentration, then perform one of the following: ____/____

- Borate in accordance with OP-002-005
- Emergency boration
- Borate from RWSP by performing the following:

  a. Open RWSP to Charging Pumps Suction Isolation, CVC-507

  b. Close Volume Control Tank Outlet Isolation, CVC-183

9.1.39 If plant shutdown is for refueling, then perform Diverse Reactor Trip Actuation Test in accordance with OP-904-017, Diverse Reactor Trip Anticipated Transient System. ____/____

9.1.40 Verify Control Element Drive Mechanism (CEDM) Motor Generator (MG) sets secured in accordance with OP-004-004, Control Element Drive. ____/____

9.1.41 Remove DRTS and DEFAS from service in accordance with OP-004-021, Anticipated Transient System. ____/____

9.1.42 When Reactor Power drops below 10^{-4}%, then perform the following:

NOTE

The LOCAL POWER DENSITY/DNBR BY-PASS Annunciator (D-11 Cabinet K) will alarm when all CPCs are in Bypass.

9.1.42.1 Bypass the CPC Trips by positioning each CPC Trip Bypass keyswitch to On. ____/____

9.1.42.1.1 Check the On light illuminates for each CPC. ____/____

9.1.42.2 Verify the High Log Power Trip is Enabled on all four PPS channels. ____/____

9.1.42.2.1 Check the Off light illuminates for each PPS ROM. ____/____

CAUTION

3 OUT OF 4 HI LOG POWER CHANNELS MUST BE OPERABLE PRIOR TO CLOSING REACTOR TRIP BREAKER WITH MG SETS OPERATING.

9.1.43 Prior to closing Reactor Trip Breakers with MG sets operating, verify the surveillances on Attachment 9.13 are current. **[Commitment P-3016]** ____/____

9.1.44 Verify at 10^{-6}% power Startup (S/U) Channels Energize and read ~ 10^{4} counts per second. ____/____

9.1.45 Between 30 to 60 minutes after Reactor Shutdown, verify Boron Dilution Monitors setpoint is adjusted in accordance with COLR 3.1.2.9, and continue to adjust at the frequency required by Technical Specification Surveillance 4.1.2.9.5. _____/_____

9.1.45.1 Document setpoint verifications in accordance with OP-903-001, Technical Specification Surveillance Logs.

9.1.46 Verify OP-903-101, Startup Channel Functional Test Startup Channel _1 and _2, has been performed within the previous 31 days. (T.S. 4.1.2.9.2). _____/_____

9.1.47 If Auxiliary/Temp Boiler is in service, then transfer Gland Sealing Steam from Main Steam in accordance with OP-003-012, Gland Seal Steam.

9.1.47.1 Verify High Pressure Turbine Gland Steam Regulator, GS-107, maintains 1.5 to 3.0 PSIG. _____/_____

9.1.47.2 Verify all Low Pressure Turbine Gland Steam Regulators maintain 1.5 to 3.0 PSIG. _____/_____

- GS-208A LP Turbine A Gland Steam Regulator A1
- GS-208B LP Turbine B Gland Steam Regulator B1
- GS-208C LP Turbine C Gland Steam Regulator C1
- GS-213A LP Turbine A Gland Steam Regulator A2
- GS-213B LP Turbine B Gland Steam Regulator B2
- GS-213C LP Turbine C Gland Steam Regulator C2

9.1.47.3 Verify Main Feedwater Pump Turbine Gland Steam Pressure Controller, GS-219, maintains 3 to 5 PSIG. _____/_____

9.1.48 Verify Steam Bypass Control System is maintaining Steam Header pressure at 970 PSIA. _____/_____

9.1.49 Maintain Steam Generator (S/G) levels 50% to 70% NR by performing the following:

9.1.49.1 Start Auxiliary Feedwater Pump in accordance with OP-003-035, Auxiliary Feedwater. _____/_____

9.1.49.2 Secure operating Main Feedwater Pump in accordance with OP-003-033, Main Feedwater. _____/_____

(Initial/Date)

9.1.50 If required, then align Auxiliary Steam header to the Temporary Boiler in accordance with OP-005-002, Auxiliary Steam. _____/_____

9.1.51 Remove second Condensate Pump from service unless it is to be used for Secondary System cleanup in accordance with OP-003-032, Secondary System Outage Drain Down Guide. _____/_____

9.1.52 If the plant is to remain in Hot Standby, then maintain the following conditions:

- Steam Generator levels 50% to 70% NR
- T_{avg} at 541°F (536 - 546°F) with Steam Bypass Control System in Automatic
- Pressurizer pressure at 2250 PSIA (2175 -2265 PSIA)
- Pressurizer level ~ 33% by Control Channel indication

9.1.53 Transmit completed attachment to Records Management.

9.2 COOLDOWN TO HOT SHUTDOWN (MODE 3 TO MODE 4)

(Initial/Date)

NOTE

(1) If RCS Vent Target Rock valves are suspected of leaking, then a leakage test should be performed prior to depressurizing RCS less than 200 PSIA, in accordance with OP-903-098, RCS Vent System Functional Check and Valve Lineup Verification.

(2) Cold leg temperature indication should be used to monitor the RCS Cooldown rate until the final RCP is secured. Cold leg temperature should be determined as the average of all cold leg temperature indications measured by instruments located in RC loops with operating RCPs. **[ER-W3-99-0766]**

9.2.1 During cooldown, record Reactor Coolant System (RCS) and Pressurizer cooldown rates every 15 minutes on Attachment 9.7 RCS Cooldown Log, and Attachment 9.8, Pressurizer Cooldown Log. **[Commitments P-1180, P-1191]**

9.2.2 Log cooldown number on OP-010-004, Power Operation, Attachment 9.9, Design Cycle Transient Log Sheet, found in Operations Cumulative Tracking Log. _____/_____

NOTE

(1) If Steam Generator(s) are to be cooled down, then allow one Reactor Coolant Pump (RCP) in that loop to run until Steam Generator is cooled. This will also ensure proper boron concentration is reached in both loops when borating for a shutdown. A SG LO Flow trip will be generated when the first RCP is secured.

(2) Ensure Reactor Coolant Pumps operate within the required Pressure Temperature limits for operation. Refer to attachment 9.14 for RCS Pressure and Temperature Limits (ECS98-001).

9.2.3 Secure two RCPs, preferably 1A and 2A, in accordance with OP-001-002, Reactor Coolant Pump Operation. _____/_____

9.2.4 Verify Spray Valve Selector Switch on CP-2 is aligned to loop with an operating RCP. _____/_____

9.2.5 Transfer Pressurizer Level Control from RRS to RTGB by performing the following:

9.2.5.1 Place Pressurizer Level Controller (RC-ILIC-0110) in Manual. _____/_____

9.2.5.2 At CP-31, place Switches 1 and 2 on card frame 1, slot 36, to Defeat. _____/_____

9.2.5.3 Check RTGB light illuminates on CP-2, and RRS light extinguishes. _____/_____

NOTE

Large adjustments to Pressurizer Level Controller (RC-ILIC-0110) can cause large oscillations to occur within Chemical and Volume Control System (CVCS).

9.2.5.4 Place Pressurizer Level Controller (RC-ILIC-0110) in Auto. _____/_____

9.2.5.5 Slowly adjust setpoint to approximately 50% Control Channel. _____/_____

9.2.6 Prior to commencing RCS cooldown, verify OP-903-090, Shutdown Margin, has been completed to determine required boron concentration. **[Commitment P-13461]** _____/_____

9.2.7 Commence RCS boration to meet Shutdown Margin Boron Concentration or Refueling Boron Concentration as appropriate by one of the following: _____/_____

- Borate in accordance with OP-002-005
- Emergency boration
- Borate from RWSP by performing the following:

  a. Open RWSP to Charging Pumps Suction Isolation, CVC-507

  b. Close Volume Control Tank Outlet Isolation, CVC-183

(Initial/Date)

9.2.8 If Shutdown Cooling will be placed in service, then the following guidelines apply:

NOTE

RCS final boron concentration shall be greater than the minimum boron concentration as calculated in OP-903-090, Shutdown Margin.

9.2.8.1 Notify Chemistry to calculate Boron / Lithium concentration required per CE-002-006.

9.2.8.2 Align delithiating IX as requested by Chemistry Department for pH control in accordance with OP-002-005, Chemical and Volume Control.

9.2.8.3 RCS pH should be acidic prior to placing Shutdown Cooling in service.

CAUTION

RAISING LETDOWN FLOW WILL INCREASE LETDOWN HEADER PRESSURE, POSSIBLY LIFTING LETDOWN BACK PCVS OUTLET RELIEF TO HUTS, CVC-126.

9.2.8.4 Maximize Charging and Letdown Flow during RCS cooldown.

9.2.9 Perform Boron Equalization in accordance with Attachment 9.12, Boron Equalization. _____/_____

CAUTION

(1) MAINTAIN RCS PRESSURE AND TEMPERATURE WITHIN LIMITS OF TECHNICAL SPECIFICATION 3.4.8.1, FIGURE 3.4-3. **[Commitment P-4144]**

(2) RCS TEMPERATURE SHALL BE LIMITED TO A MAXIMUM COOLDOWN RATE OF 100°F PER HOUR. (T.S. 3.4.8.1) **[Commitment P-4144]**

(3) PRESSURIZER SHALL BE LIMITED TO A MAXIMUM COOLDOWN RATE OF 135°F PER HOUR. (TRM 3.4.8.2) **[Commitment P-4144, ER-W3-2001-1211]**

(4) ENSURE REACTOR COOLANT PUMPS OPERATE WITHIN THE REQUIRED PRESSURE TEMPERATURE LIMITS FOR OPERATION. REFER TO ATTACHMENT 9.14, RCS PRESSURE AND TEMPERATURE LIMITS, FOR RCP OPERATING LIMITS

9.2.10 If it is desired to cool down using the Steam Bypass Control System (SBCS), and if Condenser and SBCS are available, then cool down RCS as follows:

9.2.10.1 Place SBCS Master Controller, MS-IPIC-1010, in Manual. _____/_____

9.2.10.2 Place M/A station for one or more SBCS Valve(s) in Manual. _____/_____

9.2.10.3 Place its associated permissive switch in Manual. _____/_____

9.2.10.4 Place remaining permissive switches to Off. _____/_____

9.2.10.5 Throttle Open SBCS Valve(s) to commence RCS cooldown. _____/_____

9.2.11 If it is desired to cool down using the Atmospheric Dump Valves (ADVs), or if Condenser or SBCS is not available, then cool down RCS as follows:

9.2.11.1 Place at least one Atmospheric Dump Valve (ADV), Controller MS-IPIC-0303A1(B1), in Manual. _____/_____

9.2.11.2 Throttle Open ADV(s) to commence RCS cooldown. _____/_____

9.2.12 If not performed within the last 3 months, then perform testing of Atmospheric Dump Valve(s) with Steam Pressure in accordance with OP-903-033, Cold Shutdown IST Valve Tests. (PMRQ 3284-01) **[Commitment P-25637]** _____/_____

9.2.13 Maintain Steam Generator levels 50% to 70% NR.

(Initial/Date)

9.2.14 When SG 1(2) PRESSURE LO PRETRIP A/C (B/D) Annunciator on CP-2 alarms, then reset Low Steam Generator Pressure Trip setpoints on all four channels. _____/_____

CAUTION

OPERATION WITH RCP CONTROL BLEEDOFF PRESSURE GREATER THAN 65 PSIG MAY INCREASE RCP SEAL FACE WEAR WITHOUT SUFFICIENT RCS PRESSURE. REFER TO ATTACHMENT 9.14 FOR RCP OPERATING LIMITS

9.2.15 If RCS will be depressurized and opened for maintenance, then perform the following:

9.2.15.1 Establish a nitrogen blanket on the Volume Control Tank in accordance with OP-002-005, Chemical and Volume Control. _____/_____

9.2.15.2 Continue degassing RCS until until one of the following conditions is met: _____/_____

- hydrogen peroxide will be added to the RCS and RCS hydrogen concentration is ≤ 15 cc/Kg

  or

- hydrogen peroxide will not be added to the RCS and RCS hydrogen concentration is ≤ 5 cc/Kg.

CAUTION

(1) MAINTAIN PRESSURE AND TEMPERATURE WITHIN LIMITS OF TECHNICAL SPECIFICATION 3.4.8.1, FIGURE 3.4-3. **[Commitment P-4144]**

(2) WHEN DEPRESSURIZING RCS WITH LESS THAN FOUR RCPS RUNNING, THEN MAINTAIN A CONSTANT DEPRESSURIZATION RATE, RATHER THAN DEPRESSURIZING IN STEPS. THIS HELPS MAINTAIN SPRAY LINE FULL OF WATER, MINIMIZING THERMAL FATIGUE OF PRESSURIZER SPRAY NOZZLES.

(3) PRESSURIZER SHALL BE LIMITED TO A MAXIMUM COOLDOWN RATE OF 135°F PER HOUR. (TRM 3.4.8.2) **[CR 03-2863, ER-W3-2001-1211]**

9.2.16 Begin lowering RCS pressure to 1200 PSIA by adjusting setpoint of Pressurizer Pressure Controller, RC-IPIC-0100, in small increments. _____/_____

NOTE

Prior to resetting Low Pressurizer Pressure Trip Setpoint, ensure adequate subcooled margin is maintained for projected pressure trip setpoint.

9.2.17 When PZR PRESSURE LO PRETRIP A/C (B/D) annunciator on CP-2 alarms, then reset Pressurizer Pressure Low Trip setpoint on all four channels. _____/_____

9.2.18 When RCS Temperature is < 450°F and it is desired to feed Steam Generators with Condensate System, then perform the following:

9.2.18.1 Secure Auxiliary Feedwater Pump in accordance with OP-003-035, Auxiliary Feedwater. _____/_____

9.2.18.2 Align Condensate Pumps to feed Steam Generators in accordance with OP-003-003, Condensate. _____/_____

CAUTION

MONITOR CONTAINMENT PRESSURE WHILE VENTING SITS TO ENSURE LIMITS OF TECH SPEC 3.6.1.4 ARE BEING MAINTAINED.

9.2.19 When RCS pressure is < 1750 PSIA, then begin depressurization of Safety Injection Tanks to > 235 PSIG but < 300 PSIG in accordance with OP-009-008, Safety Injection System. _____/_____
[Commitments P-1493, P-4853, P-4908]

9.2.21 When RCS pressure is approximately 1200 PSIA, then perform the following:

9.2.21.1 On CP-4, select Both for Letdown Flow Control Valves, CVC-113A(B) _____/_____

9.2.21.2 On CP-4, select Both for Backpressure Regulator Valves, CVC-123A(B). _____/_____

9.2.21.3 Slowly un-isolate Letdown Flow Control Valve, CVC-113A(B) not in service by verifying the following valves Open: _____/_____

- CVC-111A Letdown Flow Cntrl Vlv A Inlet Isolation
- CVC-114A Letdown Flow Cntrl Vlv A Outlet Isolation

or

- CVC-111B Letdown Flow Cntrl Vlv B Inlet Isolation
- CVC-114B Letdown Flow Cntrl Vlv B Outlet Isolation

9.2.21.4 Slowly unisolate Backpressure Regulator Valve, CVC-123A(B), not in service by verifying the following valves Open: _____/_____

- CVC-121A Letdown Back PCV A Inlet Isolation
- CVC-125A Letdown Back PCV A Outlet Isolation

or

- CVC-121B Letdown Back PCV B Inlet Isolation
- CVC-125B Letdown Back PCV B Outlet Isolation

CAUTION

MAINTAIN PRESSURE IN ACCORDANCE WITH PRESSURE LIMITS OF TECHNICAL SPECIFICATION 3.4.8.1, FIGURE 3.4-3. **[Commitment P-4144]**

9.2.20 When RCS pressure is < 1600 PSIA, then perform the following:

9.2.20.1 Place Pressurizer Pressure Controller (RC-IPIC-0100) in Manual. _____/_____

9.2.20.2 Continue to lower pressure by using normal spray or auxiliary spray. _____/_____

9.2.22 Verify RCS chemistry meets the requirements of CE-002-006, Maintaining Reactor Coolant Chemistry. _____/_____

_____/_____
Chemist Contacted Date/Time

9.2.23 When RCS Pressure is ~ 1000 PSIA, then verify Charging Pumps Pulsation Dampener Pressure is 600 PSIG (500-700 PSIG) if not previously performed in accordance with OP-904-007, Charging Pump Pulsation Dampener Pressure Check (PMRQ# 3339-01). _____/_____

9.2.24 When RCS temperature is < 400°F, then adjust setpoint of the Backpressure Regulator (CVC-IPIC-0201) to 250 PSIA. _____/_____

9.2.25 When RCS pressure is < 400 PSIA, then bypass RPS/ESFAS PZR Press Bypass by placing keyswitch to Bypass on all four PPS channels. _____/_____

CAUTION

TECHNICAL SPECIFICATION 3.1.2.9 MUST BE COMPLIED WITH TO ENSURE SHUTDOWN MARGIN IS MET, AND TO PRECLUDE AN UNANALYZED BORON DILUTION EVENT. **[Commitment P-20801]**

9.2.26 Prior to entering Mode 4, verify plant configuration in accordance with Technical Specification 3.1.2.9, Boron Dilution. **[Commitment P-20801]**

Performed _____/_____

Verified _____/_____

9.2.27 When RCS Temperature is less than 350°F, then perform the following:

9.2.27.1 Inform SM/CRS plant has entered Mode 4. _____/_____/_____
SM/CRS Sign / Date / Time

9.2.27.2 Set Plant Monitor Computer to Mode 4 in accordance with OP-004-012, Plant Computer System. _____/_____

(Initial/Date)

9.2.28 When in Mode 4 and RCS pressure < 392 PSIA, then perform the following:

9.2.28.1 Unlock and Close SIT Outlet Valve Breakers: _____/_____

SIT	Valve	Breaker	(Initial/Date)
1A	SI-331A	SI-EBKR-311A-8H	_____/_____
1B	SI-331B	SI-EBKR-311B-8H	_____/_____
2A	SI-332A	SI-EBKR-311A-8M	_____/_____
2B	SI-332B	SI-EBKR-311B-8M	_____/_____

9.2.28.2 Close the following SIT Outlet Valves: _____/_____
[Commitment P-4908]

- SI-331A SIT 1A Outlet Isolation
- SI-331B SIT 1B Outlet Isolation
- SI-332A SIT 2A Outlet Isolation
- SI-332B SIT 2B Outlet Isolation

9.2.29 Transmit completed attachment to Records Management.

9.3 COOLDOWN TO COLD SHUTDOWN (MODE 4 TO MODE 5)

(Initial/Date)

NOTE

If only one Shutdown Cooling train will be operated, then the 'B' train is preferred for radiological concerns.

9.3.1 Align Low Pressure Safety Injection (LPSI) and Containment Spray (CS) for Shutdown Cooling (SDC) operation in accordance with OP-009-005, Shutdown Cooling System. **[Commitment P-4910]** _____/_____

CAUTION

BOTH RC LOOP 2 AND 1 SDC SUCTION LTOP RELIEF TO CNTMT SUMP VALVES (SI-406A, SI-406B) SHALL BE ALIGNED TO RCS WHEN TEMPERATURE OF ANY RCS LOOP IS ≤ 230°F, OR RCS SHALL BE DEPRESSURIZED WITH A VENT OF GREATER THAN OR EQUAL TO 5.6 SQUARE INCHES. (T.S. 3.4.8.3) **[Commitments P-5803, P-5804]**

9.3.2 Prior to reducing Reactor Coolant System (RCS) temperature to 230°F, verify both LTOPs are aligned in accordance with OP-009-005, Shutdown Cooling System. **[Commitments P-5803, P-5804]**

Performed _____/_____
Verified _____/_____

- SI-406A, RC Loop 2 SDC LTOP Relief to CNTMT Sump
- SI-406B, RC Loop 1 SDC LTOP Relief to CNTMT Sump

NOTE

When borating for a shutdown, then keep one RCP running in each loop until the proper boron concentration is reached to ensure adequate mixing throughout RCS, and prevent inadvertent dilution when Steam Generator U-tubes are drained.

9.3.3 If hydrogen peroxide will not be added to the RCS, then secure one Reactor Coolant Pump (RCP), preferably 2B, in accordance with OP-001-002, Reactor Coolant Pump Operation. _____/_____

9.3.4 CEDM fans may be secured in accordance with OP-008-004, CEDM Cooling, when either of the following conditions are met: _____/_____

- RCS temperature is < 300°F

  or

- RCS temperature is < 350°F and PMI verifies selected CEDM coil temperatures are < 345°F prior to securing CEDM fans

9.3.4.1 After CEDM fans are secured, direct PMI to verify selected CEDM coil temperatures are < 345°F every 15 minutes until temperatures stabilize, but not < 1 hour.

9.3.4.2 If any monitored CEDM coil temperature reaches 345°F, then restart CEDM fans in accordance with OP-008-004, Control Element Drive Mechanism Cooling System.

9.3.4.3 If desired, secure Reactor Cavity Cooling in accordance with OP-008-007, Reactor Cavity Cooling. _____/_____

9.3.5 Maintain RCS pressure 325 to 392 PSIA.

NOTE

Cold leg temperature indication should be used to monitor the RCS cooldown rate until the final RCP is secured. Cold leg temperature should be determined as the average of all cold leg temperature indications measured by instruments located in RC loops with operating RCPs. **[ER-W3-99-0766]**

CAUTION

RCS TEMPERATURE SHALL BE LIMITED TO A MAXIMUM COOLDOWN RATE OF 100°F PER HOUR. (T.S. 3.4.8.1) **[Commitment P-4144]**

9.3.6 Commence RCS cooldown to ≤ 200°F using SDC system. _____/_____

(Initial/Date)

9.3.7 When RCS Temperature is less than 200°F, then inform SM/CRS plant has entered Mode 5.

_____ / _____
SM/CRS Sign / Date / Time

9.3.7.1 Set Plant Monitor Computer to Mode 5 in accordance with OP-004-012, Plant Computer System. _____ /

9.3.7.a If desired to align RCP Control Bleed-off to the Reactor Drain Tank then perform Attachment 9.15, Aligning RCP Control Bleed-off to the Reactor Drain Tank. (May be N/A) _____ / 3

9.3.8 Upon entering Mode 5, perform Attachment 9.10, Closure Inhibit of SDC Suction Valves. _____ /

9.3.9 Upon entering Mode 5, implement the following in accordance with OP-010-006, Outage Operations: _____ /

- RCS Perturbation Log
- Containment Closure Impairment Log

9.3.10 When T_C is < 200°F, then perform the following:

9.3.10.1 Verify the following Safety Injection Tanks (SITs) Outlet Valves are Closed: _____ /

SI-331A	SIT 1A Outlet Isolation
SI-331B	SIT 1B Outlet Isolation
SI-332A	SIT 2A Outlet Isolation
SI-332B	SIT 2B Outlet Isolation

9.3.10.2 Open SIT Outlet Valve Breakers: _____ /

SIT	Valve	Breaker	(Initial/Date)
1A	SI-331A	SI-EBKR-311A-8H	_____ /
1B	SI-331B	SI-EBKR-311B-8H	_____ /
2A	SI-332A	SI-EBKR-311A-8M	_____ /
2B	SI-332B	SI-EBKR-311B-8M	_____ /

9.3.11 Close both Main Steam Isolation Valves (MSIVs), MS-124A and MS-124B, using Soft Closure method in accordance with OP-005-004, Main Steam. _____ /

9.3.12 Refer to Attachment 9.6, Mode 5 Checklist, for required surveillances to be maintained while in Mode 5.

9.3.13 Prior to depressurizing RCS to ≤ 200 PSIA, verify OP-903-098, RCS Vent System Functional Check and Valve Lineup Verification, has been performed within the previous 18 months. **[Commitment P-1204]** _____/_____ 3

9.3.14 If time duration in Cold Shutdown will exceed 24 hours, then notify ME to perform the following for inaccessible detectors: /

- ME-003-017, Cerberus Pyrotronics Thermal Fire Detector Testing
- ME-003-002, Fire Detection Supervisory Circuit Functional Test

NOTE

RCS degassing should continue until Pressurizer is taken solid, regardless of H2 Concentration in RCS.

9.3.15 Verify a nitrogen blanket has been established on Volume Control Tank (VCT) in accordance with OP-002-005, Chemical and Volume Control. _____/_____

9.3.16 If RCS will be depressurized and opened for maintenance, then continue degassing RCS with RCPs, or SDC in operation, or in accordance with OP-002-005, Chemical and Volume Control, Section 8.20 (Degassing of Pressurizer in Mode 5), until one of the following conditions is met: **[Commitments P-6003, P-13420]** _____/_____

- hydrogen peroxide will be added to the RCS and RCS hydrogen concentration is ≤ 15 cc/Kg

  or

- hydrogen peroxide will not be added to the RCS and RCS hydrogen concentration is ≤ 5 cc/Kg.

NOTE

(1) Prior to depressurizing RCS < 325 PSIA, verify last RCP has been secured in accordance with OP-001-002, Reactor Coolant Pump Operation.

(2) Cold leg temperature indication should be used to monitor the RCS cooldown rate until the final RCP is secured. The inservice Shutdown Cooling Heat Exchanger outlet temperature(s) (SI-ITI-0351X, SI-ITI-0352X) should be used to monitor the cooldown rate after the last RCP is secured. **[ER-W3-1999-0766-003]**

9.3.17 If hydrogen peroxide will not be added to the RCS, then perform the following:

9.3.17.1 Verify proper boron concentration (shutdown margin) for Cold Shutdown. _____/_____

9.3.17.2 Secure remaining RCP in accordance with OP-001-002, Reactor Coolant Pump Operation. _____/_____ 3

NOTE

Steam Generator wet layup is > 80% Narrow Range level.

CAUTION

STEAM GENERATORS SHALL NOT BE OVERFILLED WHILE BEING PLACED IN WET LAYUP.

9.3.18 Feed both Steam Generators to wet layup in accordance with OP-003-003, Condensate, as recommended by the Chemistry Department. **[Commitment P-13540]** _____/_____

CAUTION

(1) RCS TEMPERATURE SHALL BE LIMITED TO A MAXIMUM COOLDOWN RATE OF 100°F PER HOUR. (T.S. 3.4.8.1) **[Commitment P-4144]**

(2) PRESSURIZER SHALL BE LIMITED TO A MAXIMUM COOLDOWN RATE OF 135°F PER HOUR. (TRM 3.4.8.2) **[Commitment P-4144, ER-W3-2001-1211]**

9.3.19 Commence RCS cooldown to 140°F. _____/_____

9.3.20 If RCPs have been secured, then commence RCS depressurization to < 200 PSIA. _____/_____

9.3.21 Adjust Pressurizer level to ~ 60% Pressurizer Level Cold Cal (RC-ILI-0103). _____/_____

(Initial/Date)

9.3.22 If hydrogen peroxide is being added to the RCS, then perform the following:

CAUTION

SECURING BORON EQUALIZATION WHLE CONTINUING TO BORATE THE RCS WILL RESULT IN A LOWER BORON CONCENTRATION IN THE PRESSURIZER THAN IN THE RCS. ENSURE THAT BORON EQUALIZATION CRITERIA IS ACHIEVED SUBSEQUENT TO THE HYDROGEN PEROXIDE ADDITION OR REFUELING BORON CONCENTRATION HAS BEEN REACHED IN THE PRESSURIZER.

9.3.22.1 If boron equalization is in progress, then secure boron equalization in accordance with Attachment 9.12, Boron Equalization. _____/_____

9.3.22.2 Close the following valves: _____/_____

- RC-302A, Reactor Coolant Loop 1A PZR Spray Bypass
- RC-302B, Reactor Coolant Loop 1B PZR Spray Bypass

9.3.22.3 Verify Radiation Protection (RP) has completed surveys of RCS, SDC, and CVCS purification filter. _____/_____

NOTE

Chemistry will determine the CVCS ion exchanger that will be used for RCS cleanup.

9.3.22.4 Align CVCS ion exchanger that will be used for cleanup in accordance with OP-002-005, Chemical and Volume Control. _____/_____

9.3.22.5 Verify the following conditions: _____/_____

- There is a bubble in the Pressurizer
- RCS temperature < 200°F
- RCS dissolved H2 concentration per CE-002-006, Maintaining Reactor Coolant Chemistry 2
- Reactor Coolant Loop PZR Spray Valve bypass valves RC-302A and RC-302B are closed
- Pressurizer Auxiliary Spray is secured
- At least one RCP in each loop in service
- At least one train of SDC in service

9.3.22.6 Inform Chemistry that Operations is ready to add hydrogen peroxide to RCS. _____/_____

NOTE

Auxiliary spray must not be used during hydrogen peroxide additions to RCS. Normal Spray may be used if it becomes necessary to cool down the Pressurizer. If auxiliary spray is needed to control Pressurizer temperature or pressure, then stop hydrogen peroxide addition.

9.3.22.7 Add hydrogen peroxide to RCS, as requested by Chemistry Department, using CVCS Chemical Addition Pump in accordance with OP-002-005, Chemical and Volume Control. _____/_____

NOTE

Following hydrogen peroxide addition, high activity is expected in the RCS. Therefore, Main Spray must not be used. Aux Spray may be used for RCS temperature or pressure control, but should be minimized to prevent dissolved oxygen introduction into the Pressurizer. Chemistry should be notified if Aux Spray is used following hydrogen peroxide addition.

9.3.22.8 Direct Chemistry to begin frequent sampling of the RCS. _____/_____

9.3.22.9 When Chemistry reports residual hydrogen peroxide and oxygen in RCS, then perform the following:

CAUTION

RAISING LETDOWN FLOW WILL INCREASE LETDOWN HEADER PRESSURE, POSSIBLY LIFTING LETDOWN BACK PCVS OUTLET RELIEF TO HUTS, CVC-126.

9.3.22.9.1 Maximize Charging and Letdown Flow within the limits of Tech Spec 3.1.2.9. _____/_____

9.3.22.9.2 Place the designated Purification Ion Exchanger in service in accordance with OP-002-005, Chemical and Volume Control. _____/_____

NOTE

(1) When borating for a shutdown, then keep at least one RCP in each loop running until the proper boron concentration is reached to ensure adequate mixing throughout RCS and prevent inadvertent dilution when Steam Generator U-tubes are drained.

(2) Cold leg temperature indication should be used to monitor the RCS cooldown rate until the final RCP is secured. The inservice Shutdown Cooling Heat Exchanger outlet temperature(s) (SI-ITI-0351X, SI-ITI-0352X) should be used to monitor the cooldown rate after the last RCP is secured. **[ER-W3-1999-0766-003]**

9.3.22.10 When Chemistry reports Cobalt-58 activity in RCS has peaked, then perform the following:

9.3.22.10.1 Verify proper Boron Concentration (Shutdown Margin) for Cold Shutdown. _____/_____

9.3.22.10.2 Secure all RCPs in accordance with OP-001-002, Reactor Coolant Pump Operation. _____/_____

9.3.22.11 Open the following valves:

- RC-302A, Reactor Coolant Loop 1A PZR Spray Bypass
- RC-302B, Reactor Coolant Loop 1B PZR Spray Bypass

CAUTION

(1) PRESSURIZER SHALL BE LIMITED TO A MAXIMUM COOLDOWN RATE OF 135°F PER HOUR. (TRM 3.4.8.2) **[Commitment P-4144, ER-W3-2001-1211]**

(2) AT ALL TIMES DURING PRESSURIZER COOLDOWN, PRESSURIZER PRESSURE SHALL NOT EXCEED P_{SAT} + 100 PSIA. (Refer to attachment 9.4, Pressurizer Saturation & P_{sat} + 100 PSIA) (TRM 3.4.8.2) **[ER-W3-2001-1211-000]** 5

9.3.22.12 Commence RCS depressurization to < 200 PSIA using Auxiliary Spray. _____/_____

9.3.22.13 If boration of the RCS continued during the hydrogen peroxide addition, then ensure that boron equalization criteria has been achieved or refueling boron concentration has been reached in the Pressurizer. _____/_____

9.3.23 If RCS hydrogen concentration is less than 15 cc/Kg and it is desired to collapse the Pressurizer bubble, then perform the following:

9.3.23.1 Energize two Backup Banks of Pressurizer Heaters. _____/_____

9.3.23.2 Open Pressurizer Auxiliary Spray Valves: _____/_____

- CVC-216A Pressurizer Aux Spray Valve A
- CVC-216B Pressurizer Aux Spray Valve B

9.3.23.3 Close Charging line loop isolations: _____/_____

- CVC-218A Charging Line to Loop 1A
- CVC-218B Charging Line to Loop 2A

(Initial/Date)

NOTE

At 140°F, P_{SAT} + 100 PSIA is 103 PSIA.

9.3.23.4 Adjust setpoint on Letdown Backpressure Regulator, CVC-IPIC-0201, to achieve a RCS pressure of ~ 100 PSIA. _____/_____

9.3.23.5 Raise Pressurizer level to 100% Pressurizer Level Cold Cal (RC-ILI-0103). _____/_____

9.3.23.6 Turn off Pressurizer Heaters. _____/_____

NOTE

Leave Pressurizer Auxiliary Spray Valves, CVC-216A and CVC-216B Open to recirculate and cool the Pressurizer.

9.3.24 Maintain RCS pressure ~ 100 PSIA until Pressurizer water temperature is < 200°F. 5

9.3.25 Close RCP Bleed Off Valve, CVC-401. _____/_____

9.3.26 If RCS will be drained down, then commence depressurizing RCS to atmospheric pressure using Letdown Backpressure Regulator. _____/_____

NOTE

LPSI Pumps A and B Suction Isolations, SI-109A and SI-109B, are Closed and Caution tagged to prevent inadvertent makeup to the RCS from the RWSP.

9.3.27 When RCS Pressure is < 150 PSIA, then perform the following:

9.3.27.1 Estimate decay heat heatup rate in accordance with OP-901-131, Shutdown Cooling Malfunction. ____/____

____ ____/____
(Estimated Decay Heat Heatup Rate) (Date/Time)

9.3.27.2 Unlock and Close the following valves: ____/____

- SI-109A LPSI Pump Suction Isolation
- SI-109B LPSI Pump Suction Isolation

9.3.27.3 Place Caution Tags on the following in accordance: with OP-102, Protective and Caution Tagging: ____/____

- LPSI Pump A control switch
- LPSI Pump B control switch
- SI-109A LPSI Pump Suction Isolation
- SI-109B LPSI Pump Suction Isolation

9.3.28 Secure all Charging Pumps ____/____

9.3.29 Close the following valves: ____/____

- CVC-218A Charging Line to Loop 1A
- CVC-218B Charging Line to Loop 2A
- CVC-216A Pressurizer Auxiliary Spray Valve A
- CVC-216B Pressurizer Auxiliary Spray Valve B

9.3.30 Secure Letdown in accordance with OP-002-005, Chemical and Volume Control. ____/____

9.3.31 Place Shutdown Cooling Purification in service in accordance with OP-009-005, Shutdown Cooling System. ____/____

NOTE

Operable Charging Pump(s) must be capable of being supplied by an Operable Emergency Diesel Generator for Boration Flow Path. **[Commitment P-354]**

9.3.32 Maintain Charging Pump configuration in accordance with Technical Specification 3.1.2.9.

9.3.33 If a Charging Pump is being disabled to be in compliance with Technical Specification 3.1.2.9, then remove applicable Charging Pump from service in accordance with OP-002-005, Chemical and Volume Control. _____/_____

NOTE

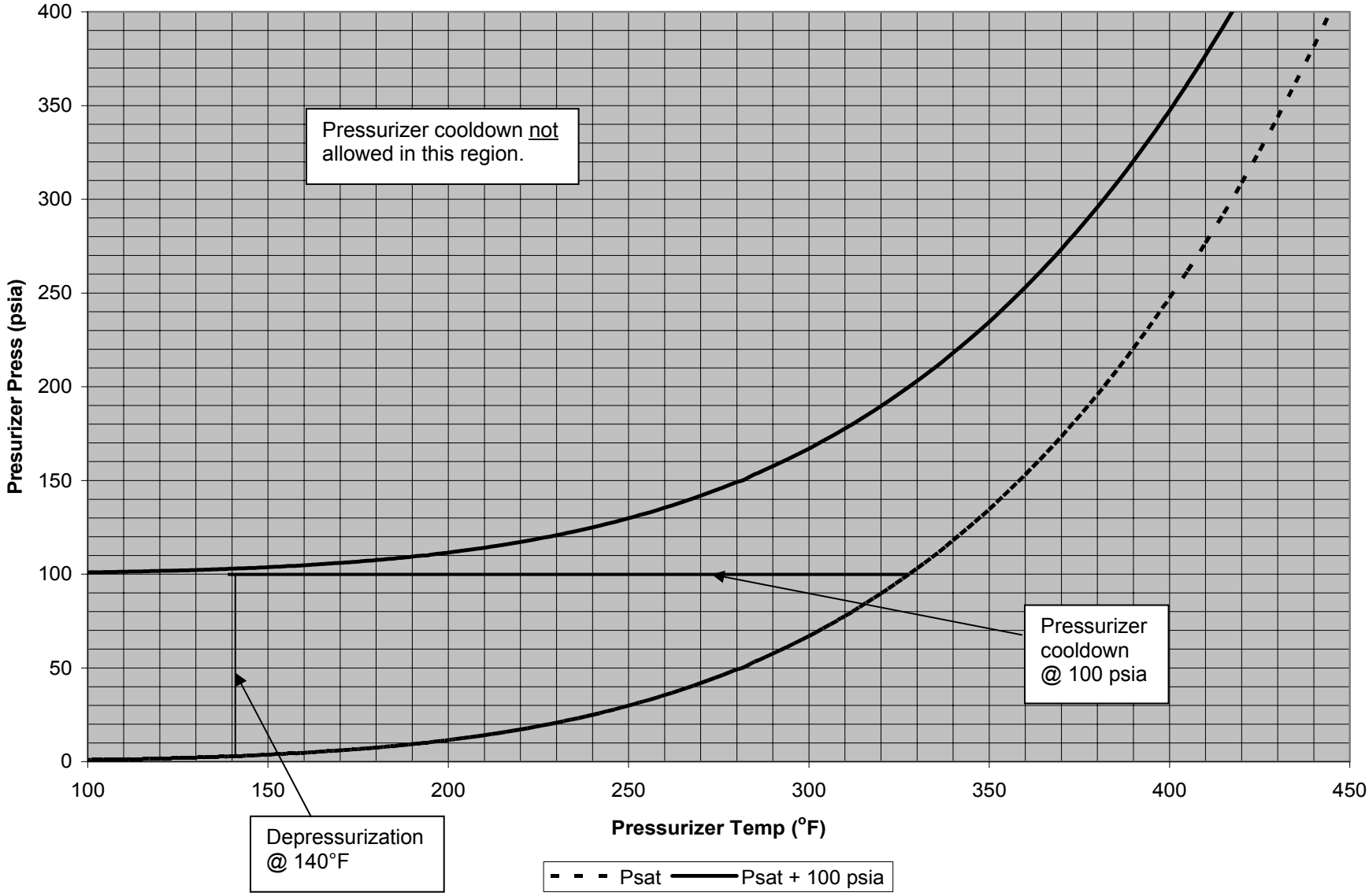
Pressurizer Level must be between 5% and 75% Pressurizer Level Cold Cal, RC-ILI-0103, prior to entering OP-010-006, Outage Operations.

9.3.34 If it is desired to lower Pressurizer level to between 5% and 75% Pressurizer Level Cold (RC-ILI-103), then perform Attachment 9.5, Lowering Pressurizer Level. **[Commitment P-14314]**

9.3.35 If required by plant conditions, then transition to OP-010-006, Outage Operations.

9.3.36 Transmit completed attachment to Records Management.

9.4 PRESSURIZER SATURATION & P_{SAT} + 100 PSIA



9.5 LOWERING PRESSURIZER LEVEL
[COMMITMENT P-14314]

(Initial/Date)

NOTE

Maintain Pressurizer Level between 5% and 75% Pressurizer Level Cold (RC-ILI-0103).

CAUTION

OPENING THE RCS TO CONTAINMENT ATMOSPHERE SHOULD NOT COMMENCE UNTIL GASEOUS ACTIVITY IS < 0.5 µCI/CC AND DOSE EQUIVALENT IODINE - 131 ACTIVITY IS < 0.01 µCI/ML. DOSE EQUIVALENT IODINE - 131 AND GAS ACTIVITY LIMITS MAY BE MODIFIED BY RADIATION PROTECTION.

9.5.1 Verify the following conditions: ____/____

- Shutdown Cooling Purification in service
- Sufficient volume available in Holdup Tanks for draining
- RCS Temperature < 140°F
- RCS is depressurized
- Pressurizer Heater breakers open and racked out

CAUTION

RADIATION PROTECTION PRECAUTIONS SHOULD BE FOLLOWED WHEN REMOVING BLANK FLANGE AND OPENING PRESSURIZER SPRAY LINE VENT (RC-309) AS SOME FLUID MAY BE RELEASED.

9.5.2 Have Mechanical Maintenance remove blank flange downstream of Pressurizer Spray Line Vent, RC-309. ____/____

9.5.3 Have I&C verify Pressurizer Level Cold Transmitter (RC-ILT-0103) reference leg is completely filled. ____/____

9.5.4 Slowly Open Pressurizer Spray Line Vent, RC-309. ____/____

9.5.5 Close both Letdown Backpressure Regulating Valves, CVC-123A and CVC-123B using Back Pressure Regulator, CVC-IPIC-0201. ____/____

9.5.6 Position control switch for VCT Inlet Valve, CVC-169, to BMS. ____/____

9.5.7 Close Letdown to LPSI Pumps Suction Isolation, CVC-164. _____/_____

9.5.8 Open Purification Ion Exchanger Outlet Header Isolation Valve, CVC-1661. _____/_____

CAUTION

LOWER PRESSURIZER LEVEL AT < 100 GPM TO PRECLUDE DRAWING A VACUUM IN RCS.

9.5.9 Start lowering Pressurizer level by Opening Letdown Backpressure Regulating Valves, CVC-123A and CVC-123B, using Back Pressure Regulator, CVC-IPIC-0201. _____/_____

9.5.10 When desired Pressurizer level is obtained, then perform the following:

9.5.10.1 Close both Letdown Backpressure Regulating Valves, CVC-123A and CVC-123B, using Back Pressure Regulator, CVC-IPIC-0201. _____/_____

9.5.10.2 Close Purification Ion Exchanger Outlet Header Isolation Valve, CVC-1661. _____/_____

9.5.10.3 Open Letdown to LPSI Pumps Suction Isolation, CVC-164. _____/_____

9.5.10.4 Slowly Open both Letdown Backpressure Regulating Valves, CVC-123A and CVC-123B, using Back Pressure Regulator, CVC-IPIC-0201, to establish purification flow. _____/_____

9.5.11 If Pressurizer Level is to be lowered to < 5% Pressurizer Level Cold, RC-ILI-0103, then go to OP-001-003, RCS Drain Down.

9.5.12 Maintain Pressurizer level between 5% and 75% Pressurizer Level Cold Cal (RC-ILI-0103) by performing the following:

9.5.12.1 Lower Pressurizer level as necessary by performing steps 9.5.5 through 9.5.10 of this Attachment.

9.5.12.2 Raise Pressurizer level as necessary by performing the following:

9.5.12.2.1 If RWSP is to be source of fill water, then perform the following:

9.5.12.2.1.1 Open RWSP to Charging Pumps Isolation Valve, CVC-507.

9.5.12.2.1.2 Close VCT Discharge Valve, CVC-183.

9.5.12.2.2 If VCT is to be source of fill water, then perform the following:

9.5.12.2.2.1 Verify VCT Boron Concentration is proper to maintain shutdown margin.

9.5.12.2.2.2 Open VCT Discharge Isolation Valve, CVC-183.

9.5.12.2.2.3 Close RWSP to Charging Pumps Isolation Valve, CVC-507.

9.5.12.2.2.4 Align VCT Makeup for Auto in accordance with OP-002-005, Chemical and Volume Control.

9.5.12.2.3 Start one Charging Pump.

9.5.12.2.4 When desired level is obtained, then Stop the Charging Pump.

9.5.13 If it is desired to fill Pressurizer solid, then perform OP-010-003, Plant Startup, Pressurizer Fill and Vent attachment.

9.5.14 Transmit completed attachment to Records Management.

9.6 MODE 5 CHECKLIST
[COMMITMENT P-21806]

PROCEDURE	SURVEILLANCE DESCRIPTION	FREQ	PMRQ #
OP-903-001	Technical Specification Surveillance Logs, Distribution Operability Check	W	N/A
OP-903-002	Boration Flow Path Valve Lineup Verification (One path)	M	7673-01
OP-903-003	Charging Pump Operability Check (One pump)	Q	
	Charging Pump 'A'		5996-04
	Charging Pump 'B'		5998-04
	Charging Pump 'A/B'		5997-04
OP-903-004	Boric Acid Pump Operability Check ①	Q	
	Boric Acid Pump 'A'		5843-03
	Boric Acid Pump 'B'		5844-03
OP-903-006	Reactor Trip Circuit Breaker Test (Manual Reactor Trip Test)	Q, S/U②③	3268-02
OP-903-006	Reactor Trip Circuit Breaker Test (Manual Reactor Trip Test)	6W②④	8365-03
OP-903-006	Reactor Trip Circuit Breaker Test (Undervoltage and Shunt Trip Test)	R②	3268-01
OP-903-013	Monthly Channel Checks (Seismic Monitoring)	M	3272-02
OP-903-019	Radioactive Liquid Effluent Monitoring System Source Check	M	3274-01
OP-903-021	Radioactive Gaseous Effluent Monitoring System Source Check	M	3275-01
OP-903-030	Safety Injection Pump Operability Verification ⑤	Q	
	HPSI Pump 'A'		8411-01
	HPSI Pump 'B'		7764-01
	HPSI Pump 'A/B'		4804-01
OP-903-051	Control Room Emergency Filtration Unit Operability Check	M	
	Train 'A'		3297-01
	Train 'B'		3297-02

① For BAM Pump required operable for operable Boration Flow Path.
② With Reactor Trip Circuit Breakers Closed, CEAs capable of withdrawal and fuel in the vessel.
③ If not performed in the previous 7 days.
④ The Quarterly CHANNEL FUNCTIONAL TEST shall be scheduled and performed such that the Reactor Trip Breakers (RTBs) are tested at least every 6 weeks to accommodate the appropriate vendor recommended interval for cycling of each RTB.
⑤ 1 HPSI Pump if HPSI Pump required for operable Boration Flow Path.

9.6 MODE 5 CHECKLIST (CONT'D)

PROCEDURE	SURVEILLANCE DESCRIPTION	FREQ	PMRQ #
OP-903-053	Fire Protection Pump Operability Test	M	3299-01
OP-903-054	Fire Protection Valve Lineup Check	M	3300-01
OP-903-055	Fire Main Flush and Hydrant Inspection	A	3301-01
OP-903-056	Fire Protection Functional Test	R	
	Motor Driven Fire Pump		1510-03
	Diesel Driven Fire Pump 'A'		1508-07
	Diesel Driven Fire Pump 'B'		1509-04
	Fire Protection Auto Start/Controller Test		3302-01
OP-903-057	Fire Protection System Flow Test	3 years	3303-01
OP-903-058	Fire Hose Station Valve Cycling Check ⑥	3 years	3304-01
OP-903-059	Sprinkler System Functional Test	R	3305-01
OP-903-060	Fire Hose Station Inspection	M	3306-01
OP-903-068	Emergency Diesel Generator and Subgroup Relay Operability Verification (One EDG)	M	
	EDG 'A'		3309-02
	EDG 'B'		3309-01
OP-903-076	Fuel Handling Building Ventilation Systems Operability Check⑦	M	
	Train 'A'		3312-02
	Train 'B'		3312-01
OP-903-077	Fire Protection System Valve Cycling Check	A	
	Valves Outside Containment		3313-02
	Valves Inside Containment		3313-01
OP-903-101	Startup Channel Functional Test (Boron Dilution Alarm Portion)	M	
	Channel 'A'		3323-01
	Channel 'B'		3323-02

⑥ FP Valves in Containment should be checked every Refueling.
⑦ Required with irradiated fuel in Spent Fuel Pool.

9.6 MODE 5 CHECKLIST (CONT'D)

PROCEDURE	SURVEILLANCE DESCRIPTION	FREQ	Model W/O #⑨
OP-903-107	Plant Protection System Channel Functional Test (Startup Sections)	S/U ⑧	
	Channel 'A'		10258
	Channel 'B'		10276
	Channel 'C'		10290
	Channel 'D'		10300
OP-903-107	Plant Protection System Channel Functional Test (Log Power - Modes 3,4,5)	Q	
	Channel 'A'		23519
	Channel 'B'		23530
	Channel 'C'		23522
	Channel 'D'		23526
			PMRQ #
	Integrated Emergency Diesel Generator/Engineering Safety Features Test (1 Train)	R	
OP-903-115	Train A		3326-01
OP-903-116	Train B		3327-01

⑧ Each startup or when required with the Reactor Trip Breakers Closed and CEA drive system capable of withdrawal, if not performed in previous 7 days.

If this is the first Mode 5 entry following refueling, then verify COLR is updated for the current fuel cycle.

⑨ Work Order to be generated on demand from Model Work Order.

9.7 RCS Cooldown Log
[Commitment P-1180]

Cooldown No. _______ Date(s): _________________

TIME①	PZR PRESS	RCS COLD LEG TEMPERATURE②⑥				SDC TEMPERATURE③		AVERAGE TEMP (AT)④	COOLDOWN RATE⑤
		1A	2A	1B	2B	A	B		

CAUTION

IF RCS COOLDOWN LIMITS ARE EXCEEDED, THEN RESTORE THE TEMPERATURE AND/OR PRESSURE TO WITHIN THE LIMIT WITHIN 30 MINUTES; PERFORM AN ENGINEERING EVALUATION TO DETERMINE THE EFFECTS OF THE OUT-OF-LIMIT CONDITION ON THE STRUCTURAL INTEGRITY OF THE RCS; DETERMINE THAT THE RCS REMAINS ACCEPTABLE FOR CONTINUED OPERATIONS OR BE IN AT LEAST HOT STANDBY WITHIN THE NEXT 6 HOURS AND REDUCE THE RCS T_{AVG} AND PRESSURE TO LESS THAN 200°F AND 500 PSIA, RESPECTIVELY, WITHIN THE FOLLOWING 30 HOURS. (T.S. 3.4.8.1) **[Commitments P-16607, P-16685]**

9.7.1 Record Cooldown Number in the Cumulative Tracking Log on OP-010-004, Power Operation, Design Cycle Transient Sheet.

9.7.2 Send a copy of this attachment to the Fatigue Monitoring Program Coordinator.

NOTES:

① Collect cooldown data every 15 minutes.

② If any RCPs are operating, then record all associated RCS Cold Leg Temperatures. N/A RCS Cold Leg Temperature(s) for RCS loops with secured RCPs. N/A SDC Temperatures.

③ If no RCPs are operating, then record Shutdown Cooling Heat Exchanger Outlet Temperatures for all Shutdown Cooling Loops in operation. N/A SDC Temperature for a SDC Loop not in operation. N/A RCS Cold Leg Temperatures.

④ Record the average of all recorded RCS Cold Leg Temperature(s) or the average of all recorded SDC Temperatures, as applicable.

⑤ Calculate and record Cooldown Rate using the following equation:

Cooldown Rate = 4 x (AT previous – AT current)

Record negative signs for negative values of cooldown rate (heatup rates).

⑥ If performing a Natural Circulation Cooldown, then record all RCS Cold Leg Temperatures.

9.8 Pressurizer Cooldown Log

[COMMITMENT P-1191]

Cooldown No. _____ Date: _____

TIME	PZR WTR TEMP	°F/HR	TIME	PZR WTR TEMP	°F/HR	TIME	PZR WTR TEMP	°F/HR	TIME	PZR WTR TEMP	°F/HR
0000			0600			1200			1800		
0015			0615			1215			1815		
0030			0630			1230			1830		
0045			0645			1245			1845		
0100			0700			1300			1900		
0115			0715			1315			1915		
0130			0730			1330			1930		
0145			0745			1345			1945		
0200			0800			1400			2000		
0215			0815			1415			2015		
0230			0830			1430			2030		
0245			0845			1445			2045		
0300			0900			1500			2100		
0315			0915			1515			2115		
0330			0930			1530			2130		
0345			1945			1545			2145		
0400			1000			1600			2200		
0415			1015			1615			2215		
0430			1030			1630			2230		
0445			1045			1645			2245		
0500			1100			1700			2300		
0515			1115			1715			2315		
0530			1130			1730			2330		
0545			1145			1745			2345		

CAUTION

IF PRESSURIZER COOLDOWN LIMITS ARE EXCEEDED, THEN RESTORE TO WITHIN THE LIMIT WITHIN 30 MINUTES; PERFORM AN ENGINEERING EVALUATION TO DETERMINE THE EFFECTS OF THE OUT-OF-LIMIT CONDITION ON THE STRUCTURAL INTEGRITY OF THE PRESSURIZER;AND ENTER TRM 3.0.3.
(TRM 3.4.8.2). **[P-16607, P-16685]**

9.8.1 Record Cooldown Number in the Cumulative Tracking Log on OP-010-004, Power Operation, Design Cycle Transient Sheet.

9.8.2 Send a copy of this attachment to the Fatigue Monitoring Program Coordinator.

9.9 AXIAL SHAPE CONTROL GUIDELINES

9.9.1 General Precautions and Notes

9.9.1.1 Axial Shape Control should be applied at all times when the reactor is above 20% power.

9.9.1.2 Maintain Axial Shape Index (ASI) within the following Equilibrium Shape Index (ESI):

9.9.1.2.1	During steady-state operations	± 0.05
9.9.1.2.2	During load transients	± 0.05
9.9.1.2.3	During Xenon Oscillation control	± 0.005

9.9.1.3 Axial Shape Control guidelines are not applicable during emergency or off-normal conditions.

9.9.1.4 The CEA insertion/withdrawal sequence and insertion limits of Technical Specifications shall be observed.

9.9.1.5 Control rods should be manually withdrawn or inserted in a deliberate and carefully controlled manner, while closely monitoring reactor response.

9.9.1.6 ASI should be monitored closely for several minutes after CEA motion, to determine the impact of the movement.

9.9.1.7 CEA motion should be slow and smooth (less than 3 inches per minute), particularly in the outward direction.

9.9.1.8 CEDMCS should be operated in Manual Group with Groups 5, 6 or Group P CEAs being used for control. (Refer to T.S. 3.1.3.6).

9.9.1.9 If operating with both CEACs Inoperable, then do not insert Group 6 CEAs below 127.5 inches withdrawn, and maintain Group P CEAs at the full out position.

9.9.1.10 Do not insert Group P or Group 5 or 6 CEAs below 75 inches withdrawn.

9.9.1.11 During axial shape control, monitor DNBR Margin (PID 107) on the most limiting CPC channel. If margin drops to 0.2 then cease CEA insertion and slowly begin to borate CEAs back out. Reduce power as necessary to maintain at least 0.2 DNBR margin.

9.9.1.12 Reactor Engineering should be contacted if any problems are encountered.

9.9.1.13 To prevent exceeding the Transient Insertion Limits of Technical Specification 3.1.3.6, COLR Figure 4, and the Shutdown margin requirements of Technical Specification 3.1.1.1, Regulating Group 5 CEAs shall not be inserted to less than 145 inches withdrawn for ASI control above 80% Power.

9.9.1.14 Below 80% Power, Regulating Group 5 CEAs may be inserted within the bounds of the Transient Insertion Limit as long as Regulating Group 6 CEAs are inserted first, and maintained at least 15 inches below Regulating Group 5 CEAs.

9.9.1.15 An Imminent Out-Of-Sequence CWP will be generated if Regulating Group 5 CEAs come within 7.5 inches of Regulating Group 6 CEAs. Penalty factors will be applied to the Radial Peaking Factor causing a CPC generated trip whenever Regulating Group 5 CEAs become more inserted than Regulating Group 6 CEAs.

9.9.1.16 At any time with Reactor Power $\geq$ 20% and Regulating Group 6 or Group P CEAs are < 120 inches withdrawn, or Regulating Group 5 CEAs are < 145 inches withdrawn for ASI control, then the amount of time shall be logged in accordance with OP-903-001, Technical Specification Surveillance Logs.

9.9.2 Short Term Power Reduction Control of ASI

CAUTION

(1) TO PREVENT EXCEEDING THE TRANSIENT INSERTION LIMITS OF TECHNICAL SPECIFICATION 3.1.3.6, COLR FIGURE 4 AND THE SHUTDOWN MARGIN REQUIREMENTS OF TECHNICAL SPECIFICATION 3.1.1.1, REGULATING GROUP 5 CEAS SHALL NOT BE INSERTED TO LESS THAN 145 INCHES WITHDRAWN FOR ASI CONTROL ABOVE 80% POWER.

(2) BELOW 80% POWER, REGULATING GROUP 5 CEAS MAY BE INSERTED WITHIN THE BOUNDS OF THE TRANSIENT INSERTION LIMIT AS LONG AS REGULATING GROUP 6 CEAS ARE INSERTED FIRST, AND MAINTAINED AT LEAST 15 INCHES BELOW REGULATING GROUP 5 CEAS.

(3) AT ANY TIME WITH REACTOR POWER ≥ 20% AND REGULATING GROUP 6 OR GROUP P CEAS ARE < 120 INCHES WITHDRAWN OR REGULATING GROUP 5 CEAS ARE < 145 INCHES WITHDRAWN FOR ASI CONTROL, THEN THE AMOUNT OF TIME SHALL BE LOGGED IN ACCORDANCE WITH OP-903-001, TECHNICAL SPECIFICATION SURVEILLANCE LOGS.

9.9.2.1 Power reduction should be initiated by boration. As power begins to lower, ASI should move in the negative direction. Insert CEAs to maintain the ASI in a small band about the target ESI as recommended by Reactor Engineering.

9.9.2.2 Continue to maintain ASI at target ESI ±0.05. Dilution or T_{AVG} deviations may be required in response to CEA insertion, or as a result of Xenon buildups to reduce the rate of power reduction, or to level power at the final desired level.

9.9.2.3 When final power level is obtained following a rapid power reduction using CEAs, then the CEAs should be borated out and used to control ASI at the target ESI ±0.05.

9.9.2.4 If power operation is to continue for > 72 hours at a reduced power level, then Reactor Engineering should be consulted to determine if it is desirable to return to an ARO configuration. If this is recommended, then a target ESI for the reduced power level must be recommended by Reactor Engineering.

9.9.2.5 When a return to the pre-reduction power level is desired, then initiate the power ascension by dilution. Withdraw CEAs to maintain ASI at the target ESI ±0.05.

9.9.2.6 Prior to power escalation above 50% power, verify ASI at ESI ±0.05.

9.9.2.7 Contact Reactor Engineering if problems are encountered.

9.10 CLOSURE INHIBIT OF SDC SUCTION VALVES

Permission: _____ / _____
(SM/CRS Signature) (Date/Time)

9.10.1 SI-405A, RC Loop 2 SDC Suction Inside Containment Isolation.

9.10.1.1 Mechanical Maintenance gag Open SI-405A.

_____ _____
Performed Verified

9.10.1.2 Place caution tags on SI-405A valve and SI-405A control switch.

_____ _____
Performed Verified

9.10.2 SI-405B, RC Loop 1 SDC Suction Inside Containment Isolation.

9.10.2.1 Mechanical Maintenance gag Open SI-405B.

_____ _____
Performed Verified

9.10.2.2 Place caution tags on SI-405B valve and SI-405B control switch.

_____ _____
Performed Verified

Completed by: _____ / _____
(Signature) (Date/Time)

Reviewed by: _____ / _____
(SM/CRS Signature) (Date/Time)

9.11.1 Reactor Trip caused by Main Feedwater Control Problems w/ Steam Generator Level Manual Control

9.11.1.1 The normal shrink and swell behavior of the steam generators has a destabilizing influence on control systems. A feeding mode that tends to introduce relatively cold feedwater in batches makes the effects of shrink and swell even more pronounced.

9.11.1.2 The control process is further complicated in U-tube, recirculation-type steam generators by the phenomenon of recirculation breakdown at low power levels. Under these conditions, recirculation can periodically stop and restart making level control more difficult.

9.11.1.3 Another complication in the control of steam generator level during start-up is related to the number of individual tasks being performed simultaneously during the power ascension. Included in these tasks are turbine warming/loading and shifting from Auxiliary Feedwater Pump to Main Feedwater Pump.

9.11.1.4 Turbine loading induces steam generator level swings which lead to swings in RCS temperature. A Reactor Operator, principally concerned with maintaining T_{AVG} in a narrow band, will make reactivity changes to control the temperature and thereby affect steam generator level through heatup and cooldown. This process induces an unstable behavior that will tend to become more difficult to control with each cycle unless the process is stopped by periodically allowing the system to stabilize.

9.11.1.5 It is important that changes to feedwater be made in small increments to minimize the effects of shrink and swell, communications remain open between the primary and secondary operators concerning load, temperature and power changes and feedwater is monitored during turbine warming/loading.

9.12 BORON EQUALIZATION

NOTE

At any time the plant is performing a significant power change, Boron Equalization should be performed to prevent an unequal balance of boron concentration between the Pressurizer and the Reactor Coolant System. However, if a change in RCS boron concentration of > 50 PPM is anticipated, then Boron Equalization shall be initiated to maintain RCS and Pressurizer boron concentrations within 10 PPM.

9.12.1 Since this evolution affects reactivity the following practices should be observed:

- SM/CRS should be informed of this evolution
- Operator should minimize distractions while performing and receive a peer check
- Monitor reactor power and temperature for changes after performing

9.12.2 Perform Boron Equalization as follows:

9.12.2.1 Place available Pressurizer Backup Heaters control switches to On.

9.12.2.2 Reduce Pressurizer Spray Valve Controller (RC-IHIC-0100) setpoint potentiometer to establish spray flow and maintain RCS Pressure 2250 PSIA (2175 - 2265).

NOTE

Boron Equalization may be secured when the Boron concentration difference between the RCS and the Pressurizer is < 10 PPM, but should continue until the plant has been returned to a Steady State condition and subsequent samples of the RCS and the Pressurizer show that Boron concentrations are not changing.

9.12.3 Secure Boron Equalization as follows:

9.12.3.1 Place Pressurizer Backup Heater control switches to Auto.

9.12.3.2 Set Pressurizer Spray Controller setpoint potentiometer to approximately 75%.

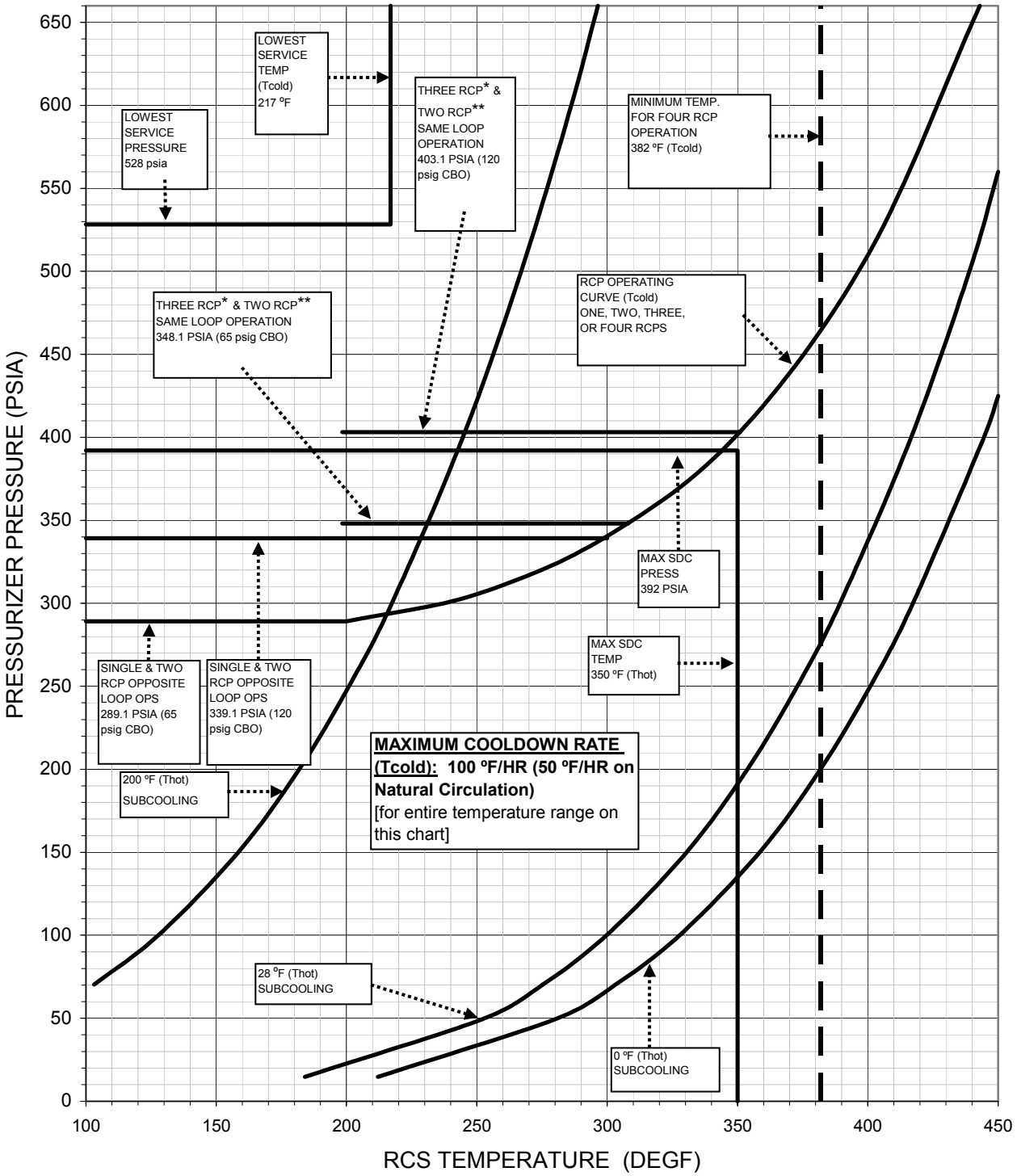
9.13 SURVEILLANCES FOR CLOSING REACTOR TRIP BREAKERS WITH MG SETS OPERATING

PROCEDURE	SURVEILLANCE DESCRIPTION	FREQ	PMRQ #	INIT/ DATE
OP-903-006	Reactor Trip Circuit Breaker Test, Section 7.1, Manual Reactor Trip Test	Q, S/U ①	3268-02	_____/_____
OP-903-102 ③	Safety Channel Nuclear Instrumentation Functional Test, Sections 7.1, 7.2, 7.4	M		
	Channel A		8181-03	_____/_____
	Channel B		8181-02	_____/_____
	Channel C		8181-04	_____/_____
	Channel D		8181-01	_____/_____
OP-903-107	Plant Protection System Channel Functional Test, Sections 7.1-7.4, 7.6, 7.24, 7.26	Q		
	Channel A		3324-02	_____/_____
	Channel B		3324-03	_____/_____
	Channel C		3324-04	_____/_____
	Channel D		3324-01	_____/_____
			Model W/O #②	
OP-903-102 ③	Safety Channel Nuclear Instrumentation Functional Test	S/U ①		
	Channel A		10191	_____/_____
	Channel B		10205	_____/_____
	Channel C		10229	_____/_____
	Channel D		10252	_____/_____
OP-903-107	Plant Protection System Channel Functional Test, for Hi Log Power	S/U ①		
	Channel A		10258	_____/_____
	Channel B		10276	_____/_____
	Channel C		10290	_____/_____
	Channel D		10300	_____/_____

① Each Startup or when required with the Reactor Trip Breaker Closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.

② Work Order to be generated on demand from Model Work Order.

③ Equivalent sections of MI-003-002 satisfy this surveillance performance.



* Not allowed below 199°F and RCP 2A operation not allowed below 347°F.

** Not allowed below 172°F and RCP 2A operation not allowed below 347°F.

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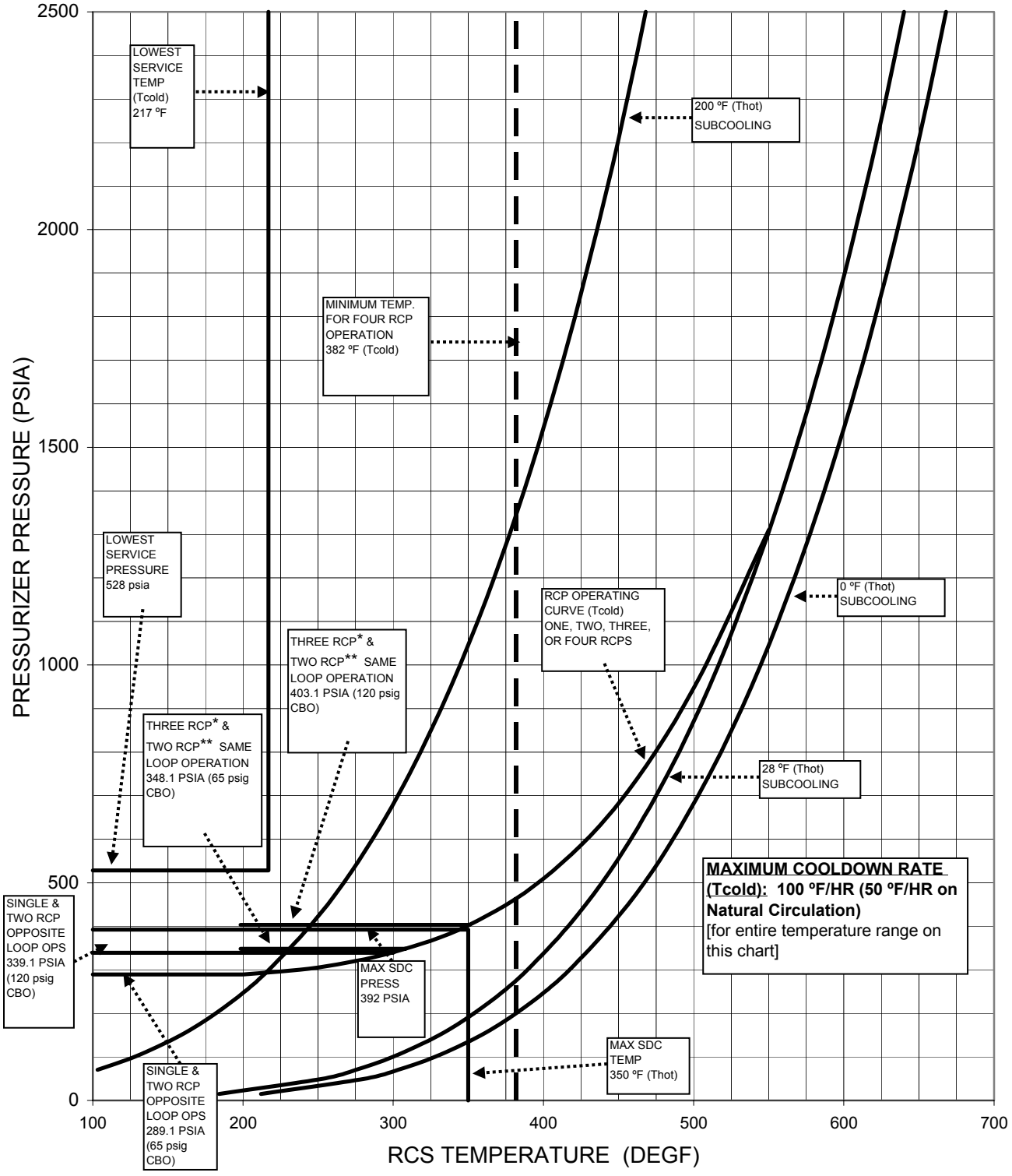

* Not allowed below 199°F and RCP 2A operation not allowed below 347°F.

** Not allowed below 172°F and RCP 2A operation not allowed below 347°F.

9.15 ALIGNING RCP CONTROL BLEED-OFF TO THE REACTOR DRAIN TANK

9.15.1 Verify the plant is in Mode 5 and RCS pressure is < 1000 PSIA.

NOTE

With CBO to VCT Isolation Valve OPEN (CVC-401), AND with the RCP Control Bleed-Off to Reactor Drain Tank Valves OPEN (RC-410A, RC-410B, RC-510A, RC-510B), the VCT will sluice down to the RDT. Operator(s) should continue to OPEN the RCP CBO to Reactor Drain tank valves (RC-410A, RC-410B, RC-510A, and RC-510B) expediently once this step is begun, and expediently CLOSE CVC-401, immediately following the OPENING of the RCP Control Bleed-Off to Reactor Drain Tank valves. Additionally, Reactor Drain Tank should be at or near a minimum desired level to receive water sluiced from the VCT during this evolution.

9.15.2 To align RCP Control Bleed-off to the Reactor Drain Tank perform the following:

9.15.2.1 Open the following valves:

- RCP 1A Control Bleed-off to Reactor Drain Tank, RC-410A
- RCP 1B Control Bleed-off to Reactor Drain Tank, RC-410B
- RCP 2A Control Bleed-off to Reactor Drain Tank, RC-510A
- RCP 2B Control Bleed-off to Reactor Drain Tank, RC-510B 3

9.15.2.2 At C/S on CP-4, CLOSE RCP BLEEDOFF, CVC-401.

NOTE

With CBO to VCT Isolation Valves OPEN (CVC-401), AND with the RCP Control Bleed-Off to Reactor Drain Tank Valves OPEN (RC-410A, RC-410B, RC-510A, RC-510B), the VCT will sluice down to the RDT. Operator(s) should expediently CLOSE the RCP CBO to Reactor Drain tank valves (RC-410A, RC-410B, RC-510A, and RC-510B) once RCP Control Bleed-Off Isolation, CVC-401 is OPENED. Additionally, Reactor Drain Tank should be at or near a minimum desired level to receive water sluiced from the VCT during this evolution.

9.15.3 If it is desired to realign RCP Control Bleed-off to the VCT, then perform the following:

9.15.3.1 At C/S on CP-4, OPEN RCP BLEEDOFF, CVC-401.

9.15.3.2 Close the following valves:

- RCP 1A Control Bleed-off to Reactor Drain Tank, RC-410A
- RCP 1B Control Bleed-off to Reactor Drain Tank, RC-410B
- RCP 2A Control Bleed-off to Reactor Drain Tank, RC-510A
- RCP 2B Control Bleed-off to Reactor Drain Tank, RC-510B