


Approval <i>W. Brumitt</i>	Vogtle Electric Generating Plant NUCLEAR OPERATIONS	2-135 	Procedure No. 13005-1
Date 2-23-90	Unit <u>1</u>	Georgia Power	Revision No. 10
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REACTOR COOLANT SYSTEM DRAINING

FOR INFORMATION ONLY

1.0 PURPOSE

This procedure provides the necessary instructions for partially draining the Reactor Coolant System (RCS). Procedure instructions include the following:

- 4.1 RCS Draining Via The RCDT
- 4.2 RCS Draining Via The RHR System
- 4.3 Preparation For Opening The RCS Following Draining Via The RCDT
- 4.4 Opening The RCS To Atmosphere

2.0 PRECAUTIONS AND LIMITATIONS

2.1 PRECAUTIONS

- 2.1.1 During the early stages of an RCS drain operation, a nitrogen gas blanket should be provided in the pressurizer and Reactor Vessel Head to avoid a hydrogen hazard when air is initially admitted to the system through the vents.
- 2.1.2 The RCS level shall be maintained greater than or equal to an elevation of 188 feet whenever the Residual Heat Removal (RHR) System is in service except for Steam Generator tube burping at which time level will be maintained at 187 feet 6 inches.
- 2.1.3 During draining to one foot above mid-nozzle (188 feet), trend RHR Pump parameters on ERF for early detection of possible RHR Pump degradation due to vortexing.
- 2.1.4 Seal injection flow to the Reactor Coolant Pump (RCP) seals shall be established if the water level in the RCS is above the level of the seals in the RCP. This prevents crud infiltration into the seal chamber.

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- 2.1.5 The RCS should not be drained to the point where air will enter the RCS from the pressurizer surge line, unless the proposed maintenance requires it. This prevents draining of the SG tubes.
- 2.1.6 Observe all applicable Health Physics procedures when venting radioactive gases and vapor.
- 2.1.7 The Health Physics Department should be notified prior to performing evolutions which may significantly affect radiation levels.
- 2.1.8 If it is intended to drain down to perform maintenance on Reactor Head, Steam Generators (SG's) or RCP Seals, then the following RCS Level Controls should be placed into effect:
- a. If it is intended to operate at one foot above mid-nozzle level, the preferred RHR configuration is one train operating with a flow of 3000 gpm,
 - b. Tygon tube watch is required any time the RCS level is being changed while the RCS level is below 17% (approximately 207 feet elevation) pressurizer level,
 - c. Periodic comparison checks should be made every 4 hours between the Control Room temporary RCS Level Monitors and the Tygon tube,
 - d. The Control Room Monitors should agree within 7 percent of scale with the Tygon tube,
 - e. Two out of three Level Monitors must agree before draining RCS level below the top of the hot leg (188 feet - 3 inches),
 - f. If neither Control Room RCS Level Monitor is available, then a continuous Tygon tube watch should be established while RCS level is below 17% pressurizer level,
 - g. While level is in the region of the hot legs, trend RHR Pump parameters on ERF for early detection of possible RHR Pump degradation due to vortexing.
- 2.1.9 If level indication is lost or becomes suspect, draining will be stopped and the problem with the indication resolved. If necessary, raise RCS level to restore indications.

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- 2.1.10 Only one drain path shall be used at a time and operators shall be aware of the path being used. Appropriate log entries shall be made to keep personnel aware of drain flow paths.
- 2.1.11 When draining via the Reactor Coolant Drain Tank (RCDT), do not drain from the same loop(s) that are being monitored for level.
- 2.2 LIMITATIONS
- 2.2.1 During Cold Shutdown (Mode 5) with the Reactor Coolant Loops filled, one RHR train shall be operable and in operation and either one additional train shall be operable or the secondary side water level of at least two Steam Generators shall be greater than 17% wide range. (Technical Specification 3.4.1.4.1)
- 2.2.2 During Cold Shutdown (Mode 5) with Reactor Coolant Loops not filled, two RHR trains shall be operable with one train in operation. (Technical Specification 3.4.1.4.2)
- 3.0 PREREQUISITES AND INITIAL CONDITIONS
- 3.1 The Recycle Holdup Tanks are capable of receiving drain effluent.
- 3.2 The Liquid Waste Processing System is capable of receiving drain effluent.
- 3.3 The Auxiliary Gas System - Nitrogen is operating.
- 3.4 The Pressurizer Relief Tank (PRT) is in service, with 3-5 psig N₂ pressure.
- 3.5 The RCDT is in service with discharge aligned to the Recycle Holdup Tank.
- 3.6 The RHR System is operating with RHR letdown in service.
- 3.7 The RCS has been prepared for system draining per Section D of 12006-C, "Unit Cooldown To Cold Shutdown".
- 3.8 Communications have been established between the Control Room and Containment to ensure adequate RCS level and pressure monitoring during the draining operation.

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4.0 INSTRUCTIONS

4.1 RCS DRAINING VIA THE RCDT

4.1.1 RACK OUT and TAG the applicable breakers per Table 1.

4.1.2 If the RCS is to be drained below 25% Pressurizer Cold Calibration Level 1-LI-0462, NOTIFY Maintenance to install the RCS level monitoring instrumentation per 54840-1, "Installation And Removal Instructions For The RCS Temporary Level Indication Tygon Tube And The Defeat Of The Residual Heat Removal Suction Valve Auto Closure Interlock".

4.1.3 NOTIFY Maintenance to install the spool piece in the common RCS Loop Drain Header upstream of Loop Drain Header Isolation 1-1901-U6-242.

4.1.4 VERIFY the Recycle Holdup Tanks have sufficient capacity to support draining operations.

4.1.5 ALIGN nitrogen from the PRT to the Pressurizer steam space as follows:

4.1.5.1 CONNECT temporary supply hose from the PRT Vent to the Pressurizer Spray Line Vent:

- a. REMOVE Blind Flange at PRT Vent Valve 1-1201-U4-115 and INSTALL a Chicago fitting at flange,
- b. ATTACH a hose to the Chicago fitting at valve 1-1201-U4-115,
- c. REMOVE pipe cap at the Pressurizer Spray Line Vent Valve 1-1201-X4-084 and INSTALL a Chicago fitting,
- d. ATTACH the other end of the hose installed in Step 4.1.5.1b to the Chicago fitting at Vent Valve 1-1201-X4-084.

NOTE

Ensure that the hose connected in Step 4.1.5.1d slopes upward or vertical all the way from the PRT to the Pressurizer Spray Line Vent with no restricting kinks.

- 4.1.5.2 ALIGN nitrogen through the Pressurizer Safety Loop Seal Drain Header.
- a. ENSURE CLOSED Reactor Head Vents To Pressurizer Relief Tank 1-HV-0442A and 1-HV-0442B,
 - b. ENSURE OPEN Pressurizer Relief Tank Nitrogen Supply Isolations 1-HV-8033 and 1-HV-8047,
 - c. ENSURE OPEN Pressurizer Sprays 1-PV-0455B and 1-PV-0455C,
 - d. OPEN Pressurizer Safety Loop Seal Drain Header Isolation 1-1201-U4-105,
 - e. OPEN Pressurizer Safety 1-PSV-8010A Loop Seal Drain 1-1201-U4-102.
- 4.1.5.3 ALIGN nitrogen through the temporary hose connection from PRT to Pressurizer Spray Line Vent:
- a. OPEN PRT Vent valve 1-1201-U4-115,
 - b. OPEN Pressurizer Spray Line Vent Valves 1-1201-X4-072 and 1-1201-X4-084.

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- 4.1.6 ALIGN the Reactor Coolant Drain Tank (RCDT) and pumps as follows:

NOTE

All controls are located on local Panel PLPP unless otherwise noted.

- a. ENSURE both RCDT Pumps are stopped:
 - (1) RCDT Pump #1, 1-HS-1003A,
 - (2) RCDT Pump #2, 1-HS-1003B.
 - b. CLOSE RCDT Recirculation 1-HV-7144,
 - c. CLOSE RCDT Outlet Isolation 1-HV-7127,
 - d. ENSURE RCDT To PRT Isolation 1-HV-7141 is closed,
 - e. UNLOCK and OPEN RCDT Level Control Bypass 1-1901-U6-038,
 - f. At Control Room Panel QMCB, ENSURE OPEN RCDT Pump Discharge Inside and Outside Containment Isolations 1-HV-7699 and 1-HV-7136.
- 4.1.7 UNLOCK and OPEN RCS Loop Drain Header Isolation 1-1901-U6-242.

CAUTION

Do not drain from the same loop(s) that are being monitored for RCS level.

- 4.1.8 OPEN at least one pair of the following valves to allow draining of the RCS:
- 4.1.8.1 RC Loop 2 Drain Isolation 1-1201-U4-052
RC Loop 2 Drain To RCDT Isolation 1-1201-U4-208
 - 4.1.8.2 RC Loop 3 Drain Isolation 1-1201-U4-030
RC Loop 3 Drain To RCDT Isolation 1-1201-U4-209
 - 4.1.8.3 RC Loop 4 Drain Isolation 1-1201-U4-071
RC Loop 4 Drain To RCDT Isolation 1-1201-U4-206

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NOTE

Draining the RCS commences with the start of the RCDT Pumps.

- 4.1.9 DRAIN the RCS to 50% Pressurizer Level 1-LI-0462 as follows:
- a. START at least one RCDT Pump.
 - (1) RCDT Pump #1 using 1-HS-1003A,
 - (2) RCDT Pump #2 using 1-HS-1003B.

CAUTION

The PRT Rupture Disks may fail if a vacuum is drawn in the PRT.

- b. MONITOR PRT Pressure 1-PI-0469,
- c. MONITOR RCS Pressure on the temporary gauge at 1-1201-U4-100,

NOTES

- a. If the activity level in the Waste Gas Decay Shutdown Tank is sufficiently low to conform to ALARA as determined by Health Physics and Chemistry, the Waste Gas System may be used to supply nitrogen for draining the RCS. If Waste Gas System is used, refer to Step 4.1.2 of 13004-1, "Pressurizer Relief Tank Operation".
- b. At the discretion of the Unit Shift Supervisor (USS), Nitrogen (N_2) pressure may be raised above normal pressure in the PRT to enhance maintenance of a positive pressure in the RCS and the PRT.
- d. ADJUST PRT Nitrogen Supply Regulator 1-PCV-8034 or CYCLE RCDT Pumps as necessary to maintain a positive PRT Pressure 1-PI-0469.

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4.1.10 At 50% Pressurizer Level 1-LI-0462, STOP draining as follows:

- a. ENSURE both RCDT Pumps are stopped:
 - (1) RCDT Pump #1, 1-HS-1003A,
 - (2) RCDT Pump #2, 1-HS-1003B.
- b. CLOSE RCDT Pump Discharge Inside Containment Isolation 1-HV-7699.

4.1.11 If it is desired to stop draining and open the RCS, PERFORM Step 4.3.

NOTE

The Reactor Vessel Flange is at an elevation of 194 feet.

4.1.12 To continue draining the RCS to the Reactor Vessel Flange, PLACE the Tygon hose level indication in service as follows:

- a. Slowly OPEN Pressurizer Steam Space 1e Vent 1-1201-U4-100,
- b. OPEN RCS Loop 1 Drain Isolation 1-20-4-01,
- c. Slowly OPEN RCS Loop 1 Tygon Hose Connection Isolation 1-1201-U4-003.

4.1.13 NOTIFY I&C Department to install the remote RCS level monitoring instrumentation per 23985-1, "RCS Temporary Water Level System".

4.1.14 If the Reactor Vessel Head has not been vented to atmosphere per Step 4.4, then SUPPLY N₂ to the Reactor Vessel Head as follows:

- a. ENSURE CLOSED RCS Excess Letdown Heat Exchanger Inlet 1-HV-8098,
- b. OPEN all Reactor Head Vent Isolations:
 - (1) 1-HV-8095A,
 - (2) 1-HV-8096A,
 - (3) 1-HV-8095B,
 - (4) 1-HV-8096B.
- c. OPEN both Reactor Head Vents To Pressurizer Relief Tank:
 - (1) 1-HV-0442A,
 - (2) 1-HV-0442B.

CAUTION

Maintain a positive pressure in the RCS. Do not drain the RCS at a rate faster than nitrogen can be fed into the RCS. A negative pressure may collapse the Tygon hose, cause a false reading on Tygon tube vessel level indication and the pressurizer level indication.

- 4.1.15 DRAIN the RCS to an elevation of 194 feet as indicated by the Tygon hose as follows:
- a. OPEN RCDT Pump Discharge Inside Containment Isolation 1-HV-7699 by holding 1-HS-7699 in OPEN until the valve is fully open,
 - b. START at least one RCDT Pump:
 - (1) 1-HS-1003A for RCDT Pump #1,
 - (2) 1-HS-1003B for RCDT Pump #2.

CAUTION

The PRT Rupture Disks may fail if a vacuum is drawn in the PRT.

- c. MONITOR PRT Pressure 1-PI-0469,
- d. MONITOR RCS Pressure on the temporary gauge at 1-1201-U4-100,

NOTE

If the activity level in the Waste Gas Decay Shutdown Tank is sufficiently low to conform to ALARA as determined by Health Physics and Chemistry, the Waste Gas System may be used to supply nitrogen for draining the RCS. If Waste Gas System is used, refer to Step 4.1.2 of 13004-1, "Pressurizer Relief Tank Operation".

- e. ADJUST PRT Nitrogen Supply Regulator 1-PCV-8034 or CYCLE RCDT Pumps as required to maintain a positive PRT Pressure 1-PI-0469.

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- 4.1.16 At 194 feet, STOP draining as follows:
- a. ENSURE both RCDT Pumps are stopped:
 - (1) RCDT Pump #1, 1-HS-1003A,
 - (2) RCDT Pump #2, 1-HS-1003B.
 - b. CLOSE RCDT Pump Discharge Inside Containment Isolation 1-HV-7699.
- 4.1.17 If it is desired to stop draining and open the RCS, PERFORM Step 4.3.
- 4.1.18 At the USS discretion, Steam Generator Tube bundles may be drained by the addition of nitrogen to the Steam Generator Channel Heads per Checklist 1.

CAUTIONS

- a. If the Steam Generators were not drained per Step 4.1.18, then as the RCS water level reaches the Reactor Vessel Nozzles, the coolant will begin to drain from the SG's in slugs causing erratic level indication.
- b. Upon approaching RCS hot leg region, trend RHR Pump parameters on ERF for early detection of possible RHR Pump degradation due to vortexing.

NOTE

The middle of the vessel nozzles is at an elevation of 187 feet.

- 4.1.19 To continue draining the RCS to the 188 feet - 0 inches elevation, PERFORM the following:
- a. OPEN RCDT Pump Discharge Inside Containment Isolation 1-HV-7699 by holding 1-HS-7699 in OPEN until the valve is fully open,
 - b. START at least one RCDT Pump:
 - (1) RCDT Pump #1, 1-HS-1003A,
 - (2) RCDT Pump #2, 1-HS-1003B.

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CAUTION

The PRT Rupture Disks may fail
if a vacuum is drawn in the PRT.

- c. MONITOR PRT Pressure 1-PI-0469,
- d. MONITOR RCS Pressure on the temporary gauge at 1-1201-U4-100,
- e. ADJUST PRT Nitrogen Supply Regulator 1-PCV-8034 or CYCLE RCDT Pumps as required to maintain a positive PRT Pressure 1-PI-0469.

NOTE

If the Steam Generators were not drained per Step 4.1.18, then during burping of the SGs the level should be lowered to elevation 187 feet 6 inches to facilitate SG draining. Level will be erratic during this operation, and should be closely monitored. When SG draining is complete, raise and maintain level at 188 feet.

4.1.20 At 188 feet, STOP draining as follows:

- a. ENSURE both RCDT Pumps are stopped:
 - (1) RCDT Pump #1, 1-HS-1003A,
 - (2) RCDT Pump #2, 1-HS-1003B.
- b. CLOSE RCDT Pump Discharge Inside Containment Isolation 1-HV-7699.

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4.1.21 If the SG Manways are to be opened, then DRAIN the SG Channel Head by opening the applicable SG Channel Head Drain Line Isolation and Root Valves:

- a. SG 1 1-1201-U4-202,
1-1201-U4-247,
- b. SG 2 1-1201-U4-203,
1-1201-U4-248,
- c. SG 3 1-1201-U4-204,
1-1201-U4-249,
- d. SG 4 1-1201-U4-205,
1-1201-U4-250.

NOTE

SG Channel Head Drain Valves
will remain open while manways
are off.

4.1.22 To open the RCS, PERFORM Step 4.3.

4.2 RCS DRAINING VIA THE RHR SYSTEM

4.2.1 RACK OUT and TAG the applicable breakers per Table 1.

4.2.2 If the RCS is to be drained below 25% Pressurizer Cold Calibration Level 1-LI-0462, NOTIFY Maintenance to install RCS level monitoring instrumentation per 54840-1, "Installation And Removal Instructions For The RCS Temporary Level Indication Tygon Tube And The Defeat of The Residual Heat Removal Suction Valve Auto Closure Interlock".

4.2.3 VERIFY the Recycle Holdup Tanks have sufficient capacity to support draining operations.

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- 4.2.4 ALIGN nitrogen from the PRT to the Pressurizer steam space as follows:
- 4.2.4.1 CONNECT nitrogen supply hose from the PRT Vent to the Pressurizer Spray Line Vent:
- a. REMOVE blind flange at PRT Vent Valve 1-1201-U4-115 and INSTALL a Chicago fitting at flange,
 - b. ATTACH a hose to the Chicago fitting at valve 1-1201-U4-115,
 - c. REMOVE pipe cap at Pressurizer Spray Line Vent valve 1-1201-X4-084 and INSTALL a Chicago fitting,
 - d. ATTACH the other end of the hose installed in Step 4.2.4.1b to the Chicago fitting at Vent Valve 1-1201-X4-084.

NOTE

Ensure that the hose connected in Step 4.2.4.1b slopes upward or vertical all the way from the PRT to the Pressurizer Spray Line Vent with no restricting kinks.

- 4.2.4.2 ALIGN nitrogen through the Pressurizer Safety Loop Seal Drain Header.
- a. ENSURE CLOSED Reactor Head Vents To Pressurizer Relief Tank 1-HV-0442A and 1-HV-0442B,
 - b. ENSURE OPEN Pressurizer Relief Tank Nitrogen Supply Isolations 1-HV-8033 and 1-HV-8047,
 - c. ENSURE OPEN Pressurizer Sprays 1-PV-0455B and 1-PV-0455C,
 - d. OPEN Pressurizer Safety Loop Seal Drain Header Isolation 1-1201-U4-105,
 - e. OPEN Pressurizer Safety 1-PSV-8010A Loop Seal Drain 1-1201-U4-102,
- 4.2.4.3 ALIGN nitrogen through the temporary hose connection from PRT to the Pressurizer Spray Line Vent.
- a. OPEN PRT Vent Valve 1-1201-U4-115,
 - b. OPEN Pressurizer Spray Line Vent Valves 1-1201-X4-072 and 1-1201-X4-084.

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4.2.5 ENSURE RHR letdown is in service.

4.2.6 INITIATE RCS draining as follows:

NOTE

If chemistry conditions require draining through the CVCS mixed bed, 1-TV-0129 must be positioned to the CVCS mixed bed.

- a. PLACE Letdown To Demin/VCT, 1-TV-0129 to the VCT,
- b. PLACE Letdown Divert 1-HV-0112A in the HUT position,

NOTE

Letdown flow should be limited to 120 gpm to prevent exceeding design flow through the Mixed Bed Demineralizer and the Reactor Coolant Filter.

- c. ADJUST Letdown Pressure Controller 1-PIC-0131 as required to obtain the desired Letdown Flow 1-FI-0132A (RCS drain rate),

CAUTION

The PRT Rupture Disks may fail if a vacuum is drawn in the PRT.

- d. MONITOR PRT Pressure 1-PI-0469,

NOTES

- a. If the activity level in the Waste Gas Decay Shutdown Tank is sufficiently low to conform to ALARA as determined by Health Physics and Chemistry, the Waste Gas System may be used to supply nitrogen for draining the RCS. If Waste Gas System is used, refer to 13004-1, "Pressurizer Relief Tank Operation".
 - b. At the discretion of the USS, N₂ pressure may be raised above normal pressure in the PRT to enhance maintenance of a positive pressure in the RCS and PRT.
 - e. ADJUST PRT Nitrogen Supply Regulator 1-PCV-8034 or 1-PIC-0131 as required to maintain a positive PRT Pressure 1-PI-0469.
- 4.2.7 MAINTAIN VCT Level 1-LI-0185 between 30% and 50% while draining as follows:
- a. When 1-LI-0185 falls to 30%, PLACE Letdown Divert 1-HV-0112A in the VCT position,
 - b. When 1-LI-0185 rises to 50%, PLACE 1-HV-0112A in the HUT position.
- 4.2.8 MONITOR Pressurizer Level 1-LI-0462.
- 4.2.9 At 50% Pressurizer Level 1-LI-0462, STOP draining as follows:
- a. PLACE Letdown Divert 1-HV-0112A in the VCT position,
 - b. ADJUST Letdown Pressure Controller 1-PIC-0131 and/or charging and seal injection to maintain Pressurizer Level 1-LI-0462 between 40% and 50%.
- 4.2.10 If it is desired to stop draining and open the RCS, PERFORM Step 4.4.

NOTE

The Reactor Vessel Flange is
at an elevation of 194 feet.

- 4.2.11 To continue draining the RCS to the Reactor Vessel Flange, PLACE the Tygon hose level indication in service as follows:
- a. Slowly OPEN Pressurizer Steam Space Sample Vent I-1201-U4-100,
 - b. OPEN RC Loop 1 Drain Isolation 1-1201-U4-001,
 - c. Slowly OPEN RC Loop 1 Tygon Hose Connection Isolation 1-1201-U4-003.
- 4.2.12 NOTIFY I&C Department to install the remote RCS level monitoring instrumentation per 23985-1, "RCS Temporary Water Level System".
- 4.2.13 If the Reactor Vessel Head has not been vented to atmosphere per Step 4.4, then SUPPLY N₂ to the Reactor Vessel Head as follows:
- a. ENSURE CLOSED RCS Excess Letdown Heat Exchanger Inlet 1-HV-8098,
 - b. OPEN all Reactor Head Vent Isolations:
 - (1) 1-HV-8095A,
 - (2) 1-HV-8096A,
 - (3) 1-HV-8095B,
 - (4) 1-HV-8096B.
 - c. OPEN both Reactor Head Vents To Pressurizer Relief Tank:
 - (1) 1-HV-0442A,
 - (2) 1-HV-0442B.

CAUTION

Maintain a positive pressure in the RCS. Do not drain the RCS at a rate faster than nitrogen can be fed into the RCS. A negative pressure may collapse the Tygon hose, cause a false reading on the Tygon tube and the pressurizer level indication.

- 4.2.14 DRAIN the RCS to an elevation of 194 feet as indicated by the Tygon hose as follows:
- a. PLACE Letdown Divert 1-HV-0112A in the HUT position,

NOTE

Letdown flow should be limited to 120 gpm to prevent exceeding design flow through the Mixed Bed Demineralizer and the Reactor Coolant Filter.

- b. ADJUST Letdown Pressure Controller 1-PIC-0131 as required to obtain the desired Letdown Flow 1-FI-0132A (RCS drain rate),

CAUTION

The PRT Rupture Disks may fail if a vacuum is drawn in the PRT.

- c. MONITOR PRT Pressure 1-PI-0469,
- d. MONITOR RCS Pressure on the temporary gauge at 1-1201-U4-100,

NOTE

If the activity level in the Waste Gas Decay Shutdown Tank is sufficiently low to conform to ALARA as determined by Health Physics and Chemistry, the Waste Gas System may be used to supply nitrogen for draining the RCS. If Waste Gas System is used, refer to Step 4.1.2 of 13004-1, "Pressurizer Relief Tank Operation".

- e. If applicable, ADJUST PRT Nitrogen Supply Regulator 1-PCV-8034 or 1-PIC-0131 as required to maintain a positive PRT Pressure 1-PI-0469.
- 4.2.15 MAINTAIN VCT Level 1-LI-0185 between 30% and 50% while draining as follows:
- a. When 1-LI-0185 falls to 30%, PLACE Letdown Divert 1-HV-0112A in the VCT position,
 - b. When 1-LI-0185 rises to 50%, PLACE 1-HV-0112A in the HUT position.
- 4.2.16 At 194 feet, STOP draining as follows:
- a. PLACE Letdown Divert 1-HV-0112A in the VCT position,
 - b. ADJUST Letdown Pressure Controller 1-PIC-0131 and/or charging and seal injection to MAINTAIN RCS level at 194 feet.
- 4.2.17 If it is desired to stop draining and open the RCS, PERFORM Step 4.4.
- 4.2.18 At the USS discretion, Steam Generator Tube bundles may be drained by addition of nitrogen to the Steam Generator Channel Heads per Checklist 1.

CAUTIONS

- a. If the Steam Generators were not drained per Step 4.2.18, then as the RCS water level reaches the Reactor Vessel Nozzles, the coolant will begin to drain from the SG's in slugs causing erratic level indication.
- b. Upon approaching RCS hot leg region, closely monitor RHR Pump suction and discharge pressure as well as RHR flow rate to ensure early detection of RHR degradation due to vortexing at the RHR Pump suction.

NOTE

The middle of the vessel nozzles is at an elevation of 187 feet.

4.2.19 To continue draining the RCS to 188 feet - 0 inches elevation, PERFORM the following:

- a. PLACE Letdown Divert 1-HV-0112A in the HUT position,

NOTE

Letdown flow should be limited to 120 gpm to prevent exceeding design flow through the Mixed Bed Demineralizer and the Reactor Coolant Filter.

- b. ADJUST Letdown Pressure Controller 1-PIC-0131 as required to obtain the desired Letdown Flow 1-FI-0132A (RCS drain rate),

CAUTION

The PRT Rupture Disks may fail if a vacuum is drawn in the PRT.

- c. MONITOR PRT Pressure 1-PI-0469,
- d. MONITOR RCS Pressure on the temporary gauge at 1-1201-U4-100,
- e. If applicable, ADJUST PRT Nitrogen Supply Regulator 1-PCV-8034 or 1-PIC-0131 as required to maintain a positive PRT Pressure 1-PI-0469.

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4.2.20 MAINTAIN VCT Level 1-LI-0185 between 30% and 50% while draining as follows:

- a. When 1-LI-0185 falls to 30%, PLACE Letdown Divert 1-HV-0112A in the VCT position,
- b. When 1-LI-0185 rises to 50%, PLACE 1-HV-0112A in the HUT position.

NOTE

If the Steam Generators were not drained per Step 4.2.18, then during burping of the SGs, the level should be lowered to elevation 187 feet 6 inches to facilitate SG draining. Level will be erratic during this operation, and should be closely monitored. When SG draining is complete, raise and maintain level at 188 feet.

4.2.21 At 188 feet STOP draining as follows:

- a. PLACE Letdown Divert 1-HV-0112A in the VCT position,
- b. ADJUST Letdown Pressure Controller 1-PIC-0131 and/or charging and seal injection to maintain RCS level at 188 feet.

4.2.22 If the SG Manways are to be opened, then DRAIN the SG Channel Head by opening the applicable SG Channel Head Drain Line Isolation and Root Valves:

- a. SG 1 1-1201-U4-202,
 1-1201-U4-247,
- b. SG 2 1-1201-U4-203,
 1-1201-U4-248,
- c. SG 3 1-1201-U4-204,
 1-1201-U4-249,
- d. SG 4 1-1201-U4-205,
 1-1201-U4-250.

NOTE

SG Channel Head Drain Valves will remain open while manways are off.

4.2.23 To open the RCS, PERFORM Step 4.4.

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- 4.3 PREPARATION FOR OPENING THE RCS FOLLOWING DRAINING VIA THE RCDT
- 4.3.1 RESTORE normal RCDT alignment as follows:
- a. CLOSE and LOCK RCS Loop Drain Header Isolation 1-1901-U6-242,
 - b. CLOSE and LOCK RCDT Level Control Bypass 1-1901-U6-038,
 - c. OPEN RCDT Outlet Isolation 1-HV-7127,
 - d. OPEN RCDT Recirculation 1-HV-7144,
 - e. OPEN RCDT Pump Discharge Inside Containment Isolation 1-HV-7699 by holding 1-HS-7699 in OPEN until 1-HV-7699 is fully open.
- 4.3.2 ENSURE CLOSED the following Loop Drain Valves:
- a. RC Loop 2 Drain Isolation 1-1201-U4-052,
 - b. RC Loop 2 Drain To RCDT Isolation 1-1201-U4-208,
 - c. RC Loop 3 Drain Isolation 1-1201-U4-030,
 - d. RC Loop 3 Drain To RCDT Isolation 1-1201-U4-209,
 - e. RC Loop 4 Drain Isolation 1-1201-U4-071,
 - f. RC Loop 4 Drain To RCDT Isolation 1-1201-U4-206.
- 4.3.3 CLOSE PRT Vent Valve 1-1201-U4-115.
- 4.3.4 CLOSE Pressurizer Spray Line Vent Valves 1-1201-X4-072 and 1-1201-X4-084.
- 4.3.5 ALIGN RCDT discharge to the Waste Holdup Tank as follows:
- a. OPEN RCDT To LWPS Isolation 1-1901-U6-040,
 - b. CLOSE Unit 1 RCDT Pump To Recycle Evaporator Feed Demineralizer Isolation 1-1901-U4-327.
- 4.3.6 START one RCDT Pump:
- a. RCDT Pump #1, 1-HS-1003A,
 - b. RCDT Pump #2, 1-HS-1003B.

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- 4.3.7 ISOLATE the VCT from the Waste Gas Processing System as follows:
- a. ENSURE CLOSED Isolation Valve Waste Gas Decay Shutdown Tank To VCT 1-1208-U4-352,
 - b. ENSURE CLOSED VCT TO GWPS ISO VLV 1-PV-0115.
- 4.3.8 VENT the RCS to atmosphere per Step 4.4.
- 4.4 OPENING THE RCS TO ATMOSPHERE

NOTE

The hoses used for venting should be routed to the Purge Ventilation System exhaust.

- 4.4.1 NOTIFY Maintenance to REMOVE the Blind Flange and install a venting hose at Pressurizer Safety Relief Header Vent 1-1201-U4-106, or to REMOVE pipe cap at Pressurizer Spray Line Vent Valve 1-1201-X4-084 and INSTALL a Chicago Fitting and Venting Hose.
- 4.4.2 NOTIFY Maintenance to remove the Blind Flange and install a venting hose at Reactor Vessel Head Vent System Vent Flow Gauge 1-FG-8099.
- 4.4.3 NOTIFY Maintenance to remove the Blind Flange and install a venting hose at Reactor Vessel Head Vent System Vent 1-1201-U4-086.

NOTE

At the discretion of the USS, the Pressurizer (PRZR) Safety Loop Seal Drain Header Isolation 1-1201-U4-105 may be left open to vent the PRT until desired pressure in the PRT is obtained, provided the N₂ supply to the PRT has been returned to normal or isolated.

- 4.4.4 If Pressurizer Spray Line Vent Valve 1-1201-X4-084 is to be used for venting, CONTINUE with Step 4.4.5, otherwise, CLOSE Pressurizer Safety Loop Seal Drain Header Isolation 1-1201-U4-105.
- 4.4.5 OPEN Pressurizer Safety 1-PSV-8010A Loop Seal Drain 1-1201-U4-102.

4.4.6 To vent the pressurizer to atmosphere, OPEN Pressurizer Safety Relief Header Vent 1-1201-U4-106, or OPEN Pressurizer Spray Line Vent Valves 1-1201-X4-072 and 1-1201-X4-084.

4.4.7 VENT the Vessel Head to atmosphere as follows:

- a. ENSURE CLOSED Reactor Head Vents To Pressurizer Relief Tank 1-HV-0442A and 1-HV-0442B,
- b. OPEN all Reactor Head Vent Isolations:
 - (1) 1-1208-U4-488, Isolation for 1-FG-8099,
 - (2) 1-1208-U4-086,
 - (3) 1-HV-8095A,
 - (4) 1-HV-8096A,
 - (5) 1-HV-8095B,
 - (6) 1-HV-8096B.

5.0 REFERENCES

5.1 TECHNICAL SPECIFICATIONS

5.1.1 Technical Specification 3.4.1.4.1

5.1.2 Technical Specification 3.4.1.4.2

5.2 FSAR

5.2.1 Section 5.1

5.2.2 Section 5.2

5.2.3 Section 5.3

5.2.4 Section 5.4

5.3 PROCEDURES

- 5.3.1 13703-C, "Boron Recycle System"
- 5.3.2 13214-1, "Liquid Waste Processing System"
- 5.3.3 13707-C, "Auxiliary Gas System - Nitrogen"
- 5.3.4 13004-1, "Pressurizer Relief Tank Operation"
- 5.3.5 13002-1, "Reactor Coolant Drain Tank Operation"

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5.3.6	13011-1	"Residual Heat Removal System"
5.3.7	12006-C,	"Unit Cooldown To Cold Shutdown"
5.3.8	54840-1,	"Installation And Removal Instructions For The RCS Temporary Level Indication Tygon Tube And The Defeat Of The Residual Heat Removal Suction Valve Auto Closure Interlock"
5.3.9	23985-1,	"RCS Temporary Water Level System"
5.4	P&ID's	
5.4.1	1X4DB111	Reactor Coolant System
5.4.2	1X4DB112	Reactor Coolant System
5.4.3	1X4DB114	Chemical And Volume Control System
5.4.4	1X4DB127	Waste Processing System - Liquid
5.5	ONE LINE DIAGRAMS	
5.5.1	1X3D-AA-H01A	125V DC Class 1E Distribution Train A
5.5.2	1X3D-AA-H02A	125V DC Class 1E Distribution Train B
5.6	ELEMENTARY DIAGRAMS	
5.6.1	1X3D-BD-B03F	Reactor Coolant System 1-PV-0456A
5.6.2	1X3D-BD-B03H	Reactor Coolant System 1-PV-0455A
5.6.3	1X3D-BD-B03R	Reactor Coolant System 1-PV-0455B/0455C
5.6.4	1X3D-BD-C05F	CVCS 1-HV-8095B/8096B
5.6.5	1X3D-BD-C05G	CVCS 1-HV-8095A/8096A
5.6.6	1X3D-BD-C05H	CVCS 1-HV-0442A/0442B

END OF PROCEDURE TEXT

TABLE 1

<u>COMPONENT NAME</u>	<u>BKR NUMBER</u>	<u>POSITION</u>
#1 RCP	1AAA	RACKED OUT
#2 RCP	1BAB	RACKED OUT
#3 RCP	1CAC	RACKED OUT
#4 RCP	1DAD	RACKED OUT
PRESSURIZER HEATER PANEL 1NBPB1	1NB01-05	RACKED OUT
PRESSURIZER HEATER PANEL 1NBPB2	1NB10-05	RACKED OUT
PRESSURIZER HEATER PANEL 1NBPB3	1NB09-12	RACKED OUT
PRESSURIZER HEATER PANEL 1NBPC	1NB08-12	RACKED OUT

CHECKLIST 1

STEAM GENERATOR TUBE BUNDLE DRAINING

INITIALS

1.0 Notify the Unit Shift Supervisor (USS) and install two 2000 psig nitrogen bottles with regulators to each Steam Generator Channel Head Drain Line Root Valve

SG 1 1-1201-U4-202

IV

SG 2 1-1201-U4-203

IV

SG 3 1-1201-U4-204

IV

SG 4 1-1201-U4-205

IV

2.0 Drain each Steam Generator one at a time by performing the following:

NOTE

The order of draining Steam Generators and the decision for multiple draining is at the USS discretion.

2.1 Cut in the nitrogen bottles and set the Nitrogen Regulator to approximately 15 psig.

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CHECKLIST 1

STEAM GENERATOR TUBE BUNDLE DRAINING

INITIALS

2.2 Open the SG Channel Head Drain Isolation Root.

SG 1 1-1201-U4-202 _____

SG 2 1-1201-U4-203 _____

SG 3 1-1201-U4-204 _____

SG 4 1-1201-U4-205 _____

2.3 Slowly open the SG Channel Head Drain Isolation.

SG 1 1-1201-U4-247 _____

SG 2 1-1201-U4-248 _____

SG 3 1-1201-U4-249 _____

SG 4 1-1201-U4-250 _____

NOTE

Volume of the Steam Generator primary side is about 966 cubic feet.

2.4 When RCS level stops rising, isolate the nitrogen supply by closing the Channel Head Drain Isolation and Root Valves.

2.5 Drain the RCS to restore level to Reactor Vessel Flange level (194 feet) per Step 4.1 of this procedure.

2.6 Repeat Steps 2.1 through 2.5 for the remaining Steam Generators.

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CHECKLIST 1

STEAM GENERATOR TUBE BUNDLE DRAINING

NOTE

If the SG Manways are to be opened, then leave hoses attached and route to floor drain.

INITIALS

3.0 Remove the nitrogen bottles and regulators from the Channel Head Drain Lines and notify the USS.

3.1 Verify Steam Generator Channel Head Drain Line Isolation and Root Valves closed, nitrogen bottles removed.

SG 1 1-1201-U4-202 _____

1-1201-U4-247 _____

SG 2 1-1201-U4-203 _____

1-1201-U4-248 _____

SG 3 1-1201-U4-204 _____

1-1201-U4-249 _____

SG 4 1-1201-U4-205 _____

1-1201-U4-250 _____