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OPERATING PROCEDURE

OP-404

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DECAY HEAT REMOVAL SYSTEM

THIS PROCEDURE ADDRESSES SAFETY RELATED COMPONENTS

APPROVED BY: Interpretation Contact

Frank Rogers for GPH
(SIGNATURE ON FILE)

DATE: 3-2-96

INTERPRETATION CONTACT: Manager, Nuclear Operations Support

TABLE OF CONTENTS

TABLE OF CONTENTS (Con't)

1.0 PURPOSE

1.1 To provide procedures for filling, venting, and operating the Decay Heat (DH) Removal System and the Decay Heat Closed Cycle Cooling System.

1.2 To provide procedures for filling and draining the Fuel Transfer Canal using the Decay Heat Removal System(s).

1.3 To provide instructions for raising and lowering RCS level during partially drained conditions.

2.0 REFERENCES

2.1 IMPLEMENTING REFERENCES

2.1.1 CP-115, Nuclear Plant Tags & Tagging Orders

2.1.2 OP-402, Makeup and Purification System

2.1.3 OP-406, Spent Fuel Cooling System

2.1.4 EOP-08, LOCA Cooldown

2.1.5 OP-209, Plant Cooldown

2.1.6 SP-435, Valve Testing During Cold Shutdown

2.1.7 MP-125, Installation of Fuel Transfer Tube Covers and "Drain Line" Cover

2.1.8 FP-411, Seal Plate Inspection and Port Cover Installation

2.1.9 MP-122, Disassembly and Reassembly of Flanged Connections

2.1.10 OP-417, Containment Operating Procedure

2.1.11 CCNB, Control Center Notebook

2.1.12 OP-103B, Plant Operating Curves

2.1.13 SP-422, RC System Heatup and Cool Down Surveillance

2.1.14 SP-301, Shutdown Daily Surveillance Log

2.1.15 EOP-11, Loss of Decay Heat Removal

2.1.16 SP-195, Remote Reactor Vessel Level Instrumentation Calibration

2.2 DEVELOPMENTAL REFERENCES

2.2.1 EOP-08, LOCA Cooldown

2.2.2 EOP-07, Inadequate Core Cooling

2.2.3 OP-202, Plant Heatup

2.2.4 OP-209, Plant Cooldown

2.2.5 OP-301, Operation of the Reactor Coolant System

2.2.6 DELETED

2.2.7 OP-305, Operation of the Pressurizer

2.2.8 OP-401, Core Flooding System

2.2.9 OP-402, Makeup and Purification System

2.2.10 OP-403E, Chemical Addition System (Hydrazine System)

2.2.11 OP-405, Reactor Building Spray System

2.2.12 OP-406, Spent Fuel Cooling System

2.2.13 OP-409, Plant Ventilation Systems

2.2.14 SP-716, Reactivity Control System Chemistry Surveillance Program

2.2.15 MP-131A, Maintenance of Decay Heat Pumps

2.2.16 MP-131B, Maintenance of Building Spray Pumps

2.2.17 SP-301, Shutdown Daily Surveillance Log

2.2.18 SP-417, Refueling Interval Integrated Plant Response to Engineered Safeguards Actuation

2.2.19 SP-435, Valve Testing During Cold Shutdown

2.2.20 SP-456, Refueling Interval Equipment Response to an ESAS Test Signal

2.2.21 SP-457, Refueling Interval ECCS Response to a Safety Injection Test Signal

2.2.22 TBD, Technical Basis Document

2.2.23 SP-340A "A" Train ECCS - RWP-3A, DCP-1A, and System Valve Operability Test

2.2.24 SP-340B "A" Train ECCS - DHP-1A, BSP-1A, and System Valve Operability Test

2.2.25 SP-340D "B" Train ECCS - RWP-3B, DCP-1B, and System Valve Operability Test

2.2.26 SP-340E "B" Train ECCS - DHP-1B, BSP-1B, and System Valve Operability Test

2.2.27 Design Basis Document Section 6.2, 6.3, 6.6, 6.12

2.2.28 EQ 90-2492 "DHV-13 and DHV-24 Position"

2.2.29 SP-195, Remote Reactor Vessel Level Instrumentation Calibration

2.2.30 AI-500, Conduct of Operations

2.2.31 MAR 92-08-01-01, Installation of Permanent Seal Plate

2.2.32 E92-0223, Engineering Calculation

2.2.33 MAR 92-10-25-01, DHP Amps Alarms

2.2.34 MAR 92-10-19-01, RW & SW Pump Motor Cooler Vent Valves

2.2.35 MAR 86-09-22-01 FCN 9, Replacement of RM-L2, RM-L3, RM-L5, RM-L6, and RM-L7

2.2.36 TECH Manual #65

2.2.37 MAR 95-08-06-01, FCN 01, FCN 02, D.C. System Flow Margin Enhancement

2.2.38 PT-136B, D.C. System Flow Balance and EGDG KW Loading

3.0 PERSONNEL INDOCTRINATION

	DESCRIPTION	VALUE
3.1	**SETPOINTS**	
3.1.1	Decay Heat Pump runout flow	4100 gpm
3.1.2	DH pump maximum recirculation flow	3700 gpm
3.1.3	High flow alarm	3750 gpm
3.1.4	Low flow alarm (with HPI signal) Low flow alarm	2800 gpm 1500 gpm
3.1.5	Flow controller setpoint	3000 gpm
3.1.6	Automatic Closure Interlock System (ACIS)	284 PSIG Nominal (without regard for instrument errors or calibration
	DHV-3 Lowest Actuation	261 PSIG in RCS Loop A and increasing
	DHV-3 Lowest Reset	255 PSIG in RCS Loop A and decreasing
	DHV-4 Lowest Actuation	266 PSIG in RCS Loop B and increasing
	DHV-4 Lowest Reset	260 PSIG in RCS Loop B and decreasing
3.1.7	RC inventory low alarm	129 FT elevation
3.1.8	DH to PZR spray valve open alarm	DHV-91 not fully closed & RC press $\geq$ 200 PSIG RCV-53 is open & RC press $\geq$ 200 PSIG

3.2 LIMITS AND PRECAUTIONS

	LIMIT	BASIS
3.2.1	Maximum DH pump flow is 4000 gpm	Prevents reaching D.H. Pump Runout
3.2.2	The DH pumps shall be tripped anytime their suction supply valves are not in the open position or evidence of cavitation (abnormal noise, fluctuating motor current or pump flow) exists	To minimize cavitation damage
3.2.3	IF Decay heat indicated flow is > 300 GPM and < 1400 GPM, THEN Total time of pump operation should be limited to 72 hrs for the life of pump. Total run time at this reduced flow shall be logged in the Control Center Notebook	Minimize wear of the DH rotating assembly Logged time may be reset to zero following replacement of the rotating assembly
3.2.4	Indicated Decay heat flow of < 300 GPM should be limited to < 2 hrs total accumulated life of the pump. Pump operation in this range shall be logged in the control Center Notebook	Prevents failure of DH Pump shaft and/or bearings. Logged time may be reset to zero following the replacement of the rotating assembly Notify Maintenance Superintendent when logged hrs exceeded 1.5 hrs

	LIMIT	BASIS
3.2.5	The following DH Pump Motor Start guidelines should be observed: No more than two consecutive starts from ambient conditions with the motor attaining full speed between starts If a motor trips, has experienced two consecutive starts (less than 15 minutes run time) or is shutdown prior to attaining full speed, wait 45 minutes prior to attempting a restart Following a restart, another restart may be performed if the motor has run $\geq$ 15 minutes	Motor winding insulation damage may result from repeated starts
3.2.6	The following start guidelines should be observed for RWP-3A and RWP-3B: No more than four starts in succession with motor initially at ambient temp and coasting to rest between starts Two restarts may be performed following a trip/stop after operating at rated load Run for 20 minutes at full load before additional starts	Exceeding number of allowed starts may cause rotor and/or stator to overheat

3.2 **LIMITS AND PRECAUTIONS** (Cont'd)

	LIMIT	BASIS
3.2.7	Maintain purification flow less than the most restrictive of the following; o One M.U. Demineralizer and One Pre/Post filter, 80 gpm o One M.U. Demineralizer and two Pre/Post filters, 125 gpm o Two M.U. Demineralizers and two Pre/Post filters, 140 gpm	Prevent exceeding the maximum design of components
3.2.8	Maintain purification flow greater than 25 gpm	Prevents channeling of demin bed reducing effectiveness
3.2.9	Maintain D.H. cooler outlet temperature less than 135 degrees while on DH purification	Protects Anion resin from thermal degradation which prevents release of stored contaminants
3.2.10	MU purification system pressure shall be maintained < 100 PSIG during DH system operation and should be secured when RCS pressure is > 100 PSIG	Prevents lifting the M.U. system relief valves

3.2 LIMITS AND PRECAUTIONS (Cont'd)

	LIMIT	BASIS
3.2.11	When the DH system is in operation, do not close DHV-3, DHV-4, or DHV-41 unless the RC pumps and at least one OTSG are available to cool the core and DH pumps are stopped	To ensure decay heat removal from the Rx. Core at all times
3.2.12	The DH system shall be isolated from the RCS system if the RC pressure is greater than 284 PSIG and/or RC temperature is greater than 300°F	Prevents exceeding D.H. System components design limits
3.2.13	All personnel should be clear of the DH pits while starting a DH or Building Spray (BS) pump. A current Health Physics survey must be in effect prior to entering a pit	Personnel protection and ALARA considerations
3.2.14	Maximum ΔT across a DHCCC heat exchanger (seawater side) may not exceed 10°F	Prevents excessive flow restrictions in the DH RW system from fouled tubes
3.2.15	WHEN all HPI pumps are red tagged off and the RCS is vented to atmosphere, THEN A.C.I. may be bypassed at the SSOD's discretion	To prevent inadvertent shutdown of D.H. System and minimize possible pump cavitation damage

LIMIT	BASIS
3.2.16 During periods when the reactor vessel head is removed, the following valves shall be open and their breaker control handles shall be placed in the "Lock-Reset" position: *DHV-3 ES-MCC-3A1 (Unit 3C) DHV-4 ES-MCC-3B1 (Unit 11B) DHV-41 ES-MCC-3AB (Unit 4C) These valves and breakers shall be blue-tagged to the SSOD *DHV-3 must have breaker handle locked to eye bolt on breaker cubicle door	To prevent isolation of the DH System due to a spurious ACI signal
3.2.17 When the BWST is unavailable and a BAST is being used for emergency boration inventory, the following valves shall be closed and their breakers racked out: DHV-34 ES-MCC-3A1 (Unit 4C) DHV-35 ES-MCC-3B1 (Unit 6B) These valves and breakers shall be blue-tagged to the SSOD	To prevent damage to the LPI pumps due to inadvertent ES actuation

LIMIT	BASIS
3.2.18 The following requirements shall be met prior to removing a DH train from service: No more than one DH train shall be removed from service at any one time AND The requirements for voluntarily entering a degraded mode of operation listed in CP-115, Nuclear Plant Tags and Tagging Orders, have been met AND The refueling transfer canal is flooded, or at least one OTSG is available for cooling by either forced flow or natural circulation	To assure that redundant or diverse DH removal methods are available during all modes of plant operation
3.2.19 Maximum PZR level is $\leq$ 220 inches whenever RCS temperature is $\leq$ 283°F and the reactor vessel head is not completely detensioned	Low Temperature Overpressure Protection (LTOPS)
3.2.20 Maintain RCS level and DHP flow within the Acceptable region of OP-103B, curves 16 and 18	To ensure adequate suction capability and to prevent vortexing
3.2.21 IF RCS level indication becomes erratic or questionable, THEN stop draining RCS until resolved	To provide proper level indication

LIMIT	BASIS
3.2.22 Whenever the RCS is partially drained, any evolutions that could disrupt the operation of the operating DH, DC, or RW systems should be avoided	To prevent loss of decay heat removal capability per NRC Generic Letter 88-17
3.2.23 Whenever the reactor vessel level is < 132 FT, one HPI pump should be available to supply flow through its associated flowpath to the RCS. "Available" means that the flowpath is intact and that the pump can be placed in service within a short enough time to meet the intended need	To provide alternate means of supplying RCS inventory per NRC Generic Letter 88-17
3.2.24 The equipment hatch should be installed within 2.5 hours of either: a) Loss of decay heat removal b) An inadvertent Reactor Vessel level reduction to < 129'6" Maintenance personnel should be available at all times to install the hatch whenever it is removed	Minimize the potential for an unmonitored airborne radioactive release per NRC Generic Letter 88-17
3.2.25 All containment penetrations to outside atmosphere should be capable of being closed within 2.5 hours upon a loss of decay heat removal	Minimize the potential for an unmonitored airborne radioactive release per NRC Generic Letter 88-17

	LIMIT	BASIS
3.2.26	Simultaneous filling of RCS and BWST should be carefully monitored	Reduces the potential for underborated water into the core
3.2.27	When going on decay heat, high decay heat loads may be experienced during rapid cooldowns and SBLOCA's	The DH system may not be able to remove decay heat without a > 10°F temperature rise in incores under these conditions
3.2.28	For work located in Radiation Controlled Areas, due consideration must be given to the ALARA Program. This may result in a determination that special preparations and/or precautions are necessary	To ensure that all personnel doses are As Low As Reasonably Achievable

4.0 INSTRUCTIONS

ACTIONS	DETAILS

4.1 INITIAL CONDITIONS

4.1.1 Ensure BWST is within limits of Technical Specification 3.5.4

- o ___ BWST level ≥ 44.9 ft and ≤ 47.1 ft.
- o ___ BWST boron concentration 2270-3000 ppm
- o ___ BWST temperature ≥ 40°F and ≤ 100°F

_____/_____
Initial/Date

4.1.2 Ensure AHF-15A or AHF-15B, DC Pump Air Handling Unit, is operable

_____/_____
Initial/Date

4.1.3 Ensure necessary instrumentation and support systems are available

- o ____ Flow instrumentation
- o ____ Pressure instrumentation
- o ____ Temperature instrumentation
- o ____ Air supply to air operated DH valves
- o ____ RML-5 operable
- o ____ RML-6 operable

_____/_____
Initial/Date

4.1.4 Ensure penetration cooling is provided to penetrations 342, 343, and 344

- o Refer to OP-417, Containment Operating Procedure

_____/_____
Initial/Date

4.2 INITIAL FILLING AND VENTING OF DECAY HEAT CCC SYSTEM

ACTIONS	DETAILS
4.2.1 Complete Valve Check Lists I, and II for applicable Decay Heat CCC Train	_____/_____ Initial/Date
4.2.2 Fill DC surge tanks (DCT-1A/1B)	1. ___ Open/Ensure Open the following valves: ___ o DCV-59 (DCT 1A) ___ o DCV-60 (DCT 1B) 2. ___ Monitor DCV-10 and DCV-12 for proper control of tank levels (8 ft 6 in - 11 ft 4 in) _____/_____ Initial/Date
4.2.3 Pressurize DC surge tanks with nitrogen (DCT-1A/1B)	1. ___ Open/Ensure Open the following valves: ___ o DCV-186 (DCT 1A) ___ o DCV-188 (DCT 1B) 2. ___ Monitor tanks for proper pressure (5 - 10 PSIG) _____/_____ Initial/Date

ACTIONS	DETAILS

NOTE: Maintain DC Surge tank level and pressure to ensure proper system venting.

4.2.4 Vent DC piping

Slowly open the following valves until no more air escapes, then close the valves

___ DCV-123, "A" Supply Vent
___ DCV-125, DHHE-1A Inlet Vent
___ DCV-129, DHHE-1A Outlet Vent
___ DCV-160, "A" Return Vent
___ DCV-124, "B" Supply Vent
___ DCV-126, DHHE-1B Inlet Vent
___ DCV-130, DHHE-1B Outlet Vent
___ DCV-159, "B" Return Vent
___ DCV-164, DCHE-1A Outlet Vent
___ DCV-179, DCHE-1A Vent
___ DCV-163, DCHE-1B Outlet Vent
___ DCV-180, DCHE-1B Vent
___ DCV-161, AHF-15A Outlet Vent
___ DCV-162, AHF-15B Outlet Vent
___ DCV-132, MUP-1A Supply Vent
___ DCV-134, MUP-1A Supply Vent
___ DCV-136, MUP-1A Supply Vent
___ DCV-141, MUP-1A Return Vent
___ DCV-143, MUP-1A Return Vent
___ DCV-145, MUP-1A Return Vent
___ DCV-147, MUP-1C Supply Vent
___ DCV-149, MUP-1C Supply Vent
___ DCV-151, MUP-1C Supply Vent
___ DCV-156, MUP-1C Return Vent
___ DCV-158, MUP-1C Return Vent

_____/_____
Initial/Date

ACTIONS	DETAILS

NOTE: RWP-3A/3B is not required to be started if DC temperature is expected to remain less than 105°F without RW heat removal.

NOTE: RWV-150 will not properly control SW system temperature if RWP-3B is running.

4.2.5 Start DC flow to aid in venting system

1. ___ IF required, START RWP-3A AND RWP-3B
2. ___ START DCP-1A AND DCP-1B
3. ___ WHEN DCP-1A and DCP-1B have run for approximately 5 min, THEN STOP DCP-1A/1B AND RWP-3A/3B (if started)

_____/_____
Initial/Date

4.2.6 Repeat Step 4.2.4

_____/_____
Initial/Date

4.3 FILLING AND VENTING DHP-1A/"A" DECAY HEAT TRAIN

ACTIONS	DETAILS
4.3.1 Ensure Valve Check List III is complete	o Refer to Enclosure 3 _____/_____ Initial/Date
NOTE: Opening DHV-10 may cause backflow from the BWST.	
4.3.2 Align fill and vent flow	1. ___ OPEN DHV-8, "A" DH Loop path Recirc Isolation 2. ___ OPEN DHV-10, DH Recirc Isolation Bypass _____/_____ Initial/Date
4.3.3 Fill and vent "A" DH train	1. ___ Using the motor operator handwheel, OPEN DHV-34 slowly until BWST flow is audibly detected 2. ___ Slowly open the following valves until no more air escapes, then close the valves ___ DHV-19, DHP-1A Vent and observe DH-50-FI while venting DHP-1A casing ___ DHV-84, DHP-1A Suction Header Vent ___ DHV-16, DHP-1A Discharge Vent 3. ___ WHEN venting is complete, THEN CLOSE the following: ___ DHV-34 ___ DHV-8 ___ DHV-10 _____/_____ Initial/Date

4.4 FILLING AND VENTING DHP-1B "B" DECAY HEAT TRAIN

	ACTIONS	DETAILS
4.4.1	Ensure Valve Check List III is complete	o Refer to Enclosure 3 _____/_____ Initial/Date
	NOTE: Opening DHV-10 may cause backflow from the BWST.	
4.4.2	Align fill and vent flow path	1. ___ OPEN DHV-7, "B" DH Loop Recirc Isolation 2. ___ OPEN DHV-10, DH Recirc Isolation Bypass _____/_____ Initial/Date
4.4.3	Fill and vent "B" DH train	1. ___ Using the motor operator handwheel, OPEN DHV-35 slowly until BWST flow is audibly detected 2. ___ Slowly open the following valves until no more air escapes, then close the valves ___ DHV-30, DHP-1B Vent and observe DH-51-FI while venting DHP-1B casing ___ DHV-83, DHP-1B Suction Header Vent ___ DHV-26, DHP-1B Discharge Vent 3. ___ WHEN venting is complete, THEN CLOSE the following: ___ DHV-35 ___ DHV-7 ___ DHV-10 _____/_____ Initial/Date

4.5 ESTABLISHING DECAY HEAT REMOVAL

ACTIONS	DETAILS

4.5.1 Initial Conditions

4.5.1.1 Plant cooldown is in progress per OP-209, Plant Cooldown

_____/_____
Initial/Date

4.5.1.2 Conduct a Pre-job briefing with all personnel involved

_____/_____
SSOD /Date

4.5.1.3 Ensure plant conditions will allow DH removal operation

o Ensure the following conditions exist:
- ___ RC temperature < 280°F
- ___ RC pressure within limits of OP-103B, curve 5 or 6
- ___ Reactor vessel level Within the Acceptable region of OP-103B, curves 16 and 18

_____/_____
Initial/Date

4.5.1.4 Ensure that there is no maintenance or testing of the switchyard supplying power to the DH train that will be in service

Stop maintenance, modifications or testing of Switchyard that will be supplying power to DH Train
OR
Consider alternate electrical lineup

_____/_____
Initial/Date

4.5.1.5 Repower DHV-3

o ___ CLOSE/ensure Closed breaker for DHV-3, ES MCC 3A-1 # 3C

_____/_____
Initial/Date

ACTIONS	DETAILS

NOTE: Steps 4.5.1.6 and 4.5.1.7 may be performed any time during the cooldown after reaching Mode 4 but prior to placing decay heat removal inservice.

NOTE: Clockwise rotation of DCV-177-MS simultaneously opens DCV-177 (increasing cooling flow) and closes DCV-17 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1A flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

4.5.1.6 Align DHHE-1A cooler temperature controls for DH system operation

1. ___ Ensure instrument air is aligned to remote control stations and valve operators (Refer to Enclosure 5)
2. ___ CLOSE DCV-195, IA Supply Vent from DCV-177-MS
3. ___ OPEN DCV-194, IA Supply Isolation from DCV-177-MS to temperature control valves
4. ___ Ensure DHHE-1A control switch in 4160V ES Switchgear Room "A" is selected to "Control Room"
5. ___ Start DCP-1A
6. ___ Cycle DHHE-1A temperature control valves from the Control Room to visually verify proper operation of DCV-17 and DCV-177.
7. ___ Position DCV-177-MS rheostat at "0" (Minimum Cooling)
8. ___ Stop DCP-1A at the SSOD's Discretion (you may want to leave this pump running if this is the train you are placing in service)

_____/_____
Initial/Date

ACTIONS	DETAILS

NOTE: Clockwise rotation of DCV-178-MS simultaneously opens DCV-178 (increasing cooling flow) and closes DCV-18 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1B flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

4.5.1.7 Align DHHE-1B cooler temperature controls for DH system operation

1. ___ Ensure instrument air is aligned to remote control stations and valve operators (Refer to Enclosure 5)
2. ___ CLOSE DCV-197, IA Supply Vent from DCV-178-MS
3. ___ OPEN DCV-196, IA Supply Isolation from DCV-178-MS to temperature control valves
4. ___ Ensure DHHE-1B control switch in 4160V ES Switchgear Room "B" is selected to "Control Room"
5. ___ Start DCP-1B
6. ___ Cycle DHHE-1B temperature control valves from the Control Room to visually verify proper operation of DCV-18 and DCV-178
7. ___ Position DCV-178-MS rheostat at "0" (Minimum cooling)
8. ___ Stop DCP-1B at the SSOD's Discretion (you may want to leave this pump running if this is the train you are placing in service)

_____/_____
Initial/Date

4.5.1.8 Determine whether RWV-150 should remain in service

- o Evaluate current/desired SW operating conditions
- o Evaluate STS requirements
- o Evaluate which DH train is to be placed in service
- o Refer to OP-408 to remove RWV-150 from service

_____/_____
Initial/Date

ACTIONS	DETAILS
4.5.2 IF DHP-1A is to be used for DH removal, THEN continue with this step, OTHERWISE GO TO Step 4.5.3	1. ___ Ensure the following are CLOSED: ___ DHV-8, "A" DH BWST Recirc Isolation ___ DHV-11, MUP Crosstie ___ DHV-34, BWST Suction Isolation ___ DHV-42, RB Sump Suction Isolation ___ DHV-75, "A" DH Purification Return Isolation ___ DHV-76, "B" DH Purification Return Isolation ___ DHV-105, "A" DH Purification Supply Isolation ___ DHV-106, "B" DH Purification Supply Isolation

NOTE: TS 3.6.6 must be entered when disabling BS Train.

2. Isolate BSP-1A suction to prevent transfer of RCS to spray header.
   1. ___ Ensure BSV-16 is open with breaker in lock/reset.
   2. ___ Place BSP-1A Control Switch in Normal-after-Stop and red tag to the SSOD
   3. ___ Rack out BSP-1A Breaker and red tag to the SSOD
   4. ___ Unlock and close breaker for BSV-17
   5. ___ Close BSV-17
   6. ___ Open Breaker for BSV-17 and lock in Lock Reset
3. OPEN the following:
   1. ___ DHV-39, "A" DH Supply isolation

      IF excessive differential pressure exists when opening, THEN DHV-120 may be cycled to equalize pressure
   2. ___ DHV-5, "A" DH Outlet isolation

_____/_____
Initial/Date

ACTIONS	DETAILS

NOTE: Auxiliary spray is not available via this valve alignment.

4.5.3 IF DHP-1B is to be used for DH removal,
THEN continue with this step,
OTHERWISE GO TO Step 4.5.4

1. ___ Ensure the following are CLOSED:
   - ___ DHV-7, "B" DH BWST Recirc Isolation
   - ___ DHV-12, MUP Crosstie
   - ___ DHV-35, BWST Suction Isolation
   - ___ DHV-43, RB Sump Suction Isolation
   - ___ DHV-75, "A" DH Purification Return Isolation
   - ___ DHV-76, "B" DH Purification Return Isolation
   - ___ DHV-105, "A" DH Purification Supply Isolation
   - ___ DHV-106, "B" DH Purification Supply Isolation

NOTE: TS 3.6.6 must be entered when disabling BS Train.

2. Isolate BSP-1B suction to prevent transfer of RCS to spray header
   1. ___ Ensure BSV-17 is open with breaker in lock/reset
   2. ___ Place BSP-1B Control Switch in Normal-after-Stop and Red Tag to the SSOD
   3. ___ Rack out BSP-1B breaker and Red Tag to the SSOD
   4. ___ Unlock and close breaker for BSV-16
   5. ___ Close BSV-16
   6. ___ Open Breaker for BSV-16 and lock in Lock Reset

(4.5.3 Continued on following page)

ACTIONS	DETAILS
4.5.3 (Cont'd)	3. OPEN the following: 1. ___ DHV-40, "B" DH Supply Isolation IF excessive differential pressure exists when opening, THEN DHV-121 may be cycled to equalize pressure 2. ___ DHV-6 "B" DH Outlet Isolation _____/_____ Initial/Date
4.5.4 IF Loop A RCPs are in operation, THEN reduce RCS PRESS below ACIS settings	1. ___ RC Loop A < 225 PSIG per SPDS Low Range RCS PRESS (RC-147-PT) on Alpha Page, or RC-147-PI1 on Remote Shutdown Panel Section AB 2. ___ RC Loop B < 275 PSIG per RC-132-PI located in ES channel test cabinet 3 3. ___ Within limits of OP-103B, curve 5 or 6 4. Bypass DHV-4 ACIS interlock; ___ Place ACI Bypass Key in BYPASS (Act Chan Cab # 3) ___ Verify "DH VALVE ACI SYSTEM TROUBLE" annunciator is actuated _____/_____ Initial/Date

ACTIONS	DETAILS
4.5.5 IF Loop B RCPs are in operation, THEN reduce RCS PRESS below ACIS settings	1. ___ RC Loop A < 275 PSIG per SPDS Low Range RCS PRESS (RC-147-PT) on Alpha Page, or RC-147-PI1 on Remote Shutdown Panel Section AB 2. ___ RC Loop B PRESS < 225 PSIG per RC-132-PI located in ES channel test cabinet 3 3. ___ Within limits of OP-103B, curve 5 or 6 4. Bypass DHV-3 ACIS interlock; ___ Place ACI Bypass Key in BYPASS (Act Chan Cab # 1) ___ Verify "DH VALVE ACI SYSTEM TROUBLE" annunciator is actuated _____/_____ Initial/Date
4.5.6 Perform valve stroke timing checks on DHV-3, DHV-4, DHV-5, and DHV-6. These checks are not required if the valves have been checked within the past three months	o Refer to SP-435, Valve Testing During Cold Shutdown _____/_____ Initial/Date

ACTIONS	DETAILS
4.5.7 Align DH dropline and auxiliary spray for operation	o OPEN the following: ___ DHV-3 ___ DHV-4 ___ DHV-41 ___ DHV-91 _____/_____ Initial/Date
4.5.8 IF DHP-1A is to be used for DH removal, THEN continue with this step, OTHERWISE Go to Step 4.5.12 Start DH flow	1. ___ START DCP-1A 2. ___ START RWP-3A 3. ___ START DHP-1A 4. ___ Adjust DHV-110 to obtain a flowrate of approximately 3000 gpm 5. ___ Adjust DHP-1A low amp alarm as desired per Section 4.31 _____/_____ Initial/Date
4.5.9 Ensure proper lubrication of DHP-1A	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date
4.5.10 Perform Cyclone Separator adjustment if required	1. ___ Throttle DHV-103 to obtain a reading on DH-32-PI of 80 to 110 PSIG less than indicated on DH-31-PI 2. ___ Throttle DHV-104 to obtain a reading on DH-33-PI of 80 to 110 PSIG less than indicated on DH-31-PI 3. ___ Ensure DHV-103 and DHV-104 are sealed in their throttled position _____/_____ Initial/Date

ACTIONS	DETAILS

NOTE: A maximum step change of 25°F is allowable when stopping all RCPs with DH system in operation. A step change is defined as RCS T-Cold prior to stopping all RCPs, minus operating DH Cooler Outlet temperature after stopping all RCPs.

NOTE: Clockwise rotation of DCV-177-MS simultaneously opens DCV-177 (increasing cooling flow) and closes DCV-17 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1A flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

NOTE: Suspected failures of DCV-17 and/or DCV-177 can be cross-checked against expected DHHE-1A outlet temperatures (DH-2-TI1), DCP-1A discharge pressure, and DC 'A' system flow (DC-61-FI, local at DCPs).

NOTE: When required, the details for adjusting/controlling, (DCV-177-MS) DHHE-1A outlet temperature can be achieved by manually throttling DCV-177 and DCV-17 to obtain the desired position and action of the detail. For local manual operation of DCV-17 and DCV-177, refer to Enclosure 6 for guidance.

4.5.11 WHEN DHHE-1A outlet temperature has equalized with RCS,
THEN determine DH and DC systems are thermally coupled,
AND establish RCS cooling using the DH system

1. ___ WHEN DHHE-1A outlet temperature (DH-2-TI1) rises to RCS temperature,
THEN adjust DCV-177-MS (MCB, PSA panel) clockwise to obtain a small but noticeable delta-T across DHHE-1A (DHP-1A suction, DH-6-TI1, minus DHHE-1A outlet, DH-2-TI1).
2. ___ WHEN DHHE-1A delta-T indicates adequate thermal coupling between DH and DC,
THEN shutdown operating RCPs in accordance with Section 4.2 of OP-209.
3. ___ Adjust DCV-177-MS as required for desired cooldown rate and continue to perform SP-422, RCS Heatup & Cooldown Surveillance

(4.5.11 Continued on following page)

ACTIONS	DETAILS
4.5.11 (Cont'd)	4. ___ Following DCV-177-MS adjustments, monitor DHHE-1A outlet temperature for expected temperature changes 5. ___ Ensure DCHE-1A delta RW temperature (RW-13-TI & RW-33-TI) is maintained < 10°F 6. ___ Monitor PZR level for decreasing trends which could be indicative of overcooling or leaks in the DH system 7. ___ WHEN RCS is < 110°F, THEN establish the Programmable Computer Alarm at 115°F for an Incore Thermocouple (preferably R258) _____/_____ Initial/Date

NOTE: RWV-150 will not properly control SW system temperature if RWP-3B is running.

4.5.12 IF DHP-1B is to be used for DH removal, THEN continue with this step Start DH flow	1. ___ START DCP-1B 2. ___ START RWP-3B 3. ___ START DHP-1B 4. ___ Adjust DHV-111 to obtain a flowrate of approximately 3000 gpm 5. ___ Adjust DHP-1B low amp alarm as desired per Section 4.31 _____/_____ Initial/Date

4.5.13 Ensure proper lubrication of DHP-1B	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date

ACTIONS	DETAILS
4.5.14 Perform Cyclone Separator adjustments as required	1. ___ Throttle DHV-100 to obtain a reading on DH-35-PI of 80 to 110 PSIG less than indicated on DH-34-PI 2. ___ Throttle DHV-101 to obtain a reading on DH-36-PI of 80 to 110 PSIG less than indicated on DH-34-PI 3. ___ Ensure DHV-100 and DHV-101 are sealed in their throttled position _____/_____ Initial/Date

ACTIONS	DETAILS

NOTE: A maximum step change of 25°F is allowable when stopping all RCPs with DH system in operation. A step change is defined as RCS T-Cold prior to stopping all RCPs, minus operating DH Cooler Outlet temperature after stopping all RCPs.

NOTE: Clockwise rotation of DCV-178-MS simultaneously opens DCV-178 (increasing cooling flow) and closes DCV-18 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1B flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

NOTE: Suspected failures of DCV-18 and/or DCV-178 can be cross-checked against expected DHHE-1B outlet temperatures (DH-2-TI2), DCP-1B discharge pressure, and DC 'B' system flow (DC-62-FI, local at DCPs).

NOTE: When required, the details for adjusting/controlling, (DCV-178-MS) DHHE-1B outlet temperature can be achieved by manually throttling DCV-178 and DCV-18 to obtain the desired position and action of the detail. For local manual operation of DCV-18 and DCV-178, refer to Enclosure 6 for guidance.

4.5.15 WHEN DHHE-1B outlet temperature has equalized with RCS,
THEN determine DH and DC systems are thermally coupled,
AND establish RCS cooling using the DH system

1. ___ WHEN DHHE-1B outlet temperature (DH-2-TI2) rises to RCS temperature,
THEN adjust DCV-178-MS (MCB, PSA panel) clockwise to obtain a small but noticeable delta-T across DHHE-1B (DHP-1B suction, DH-6-TI2, minus DHHE-1B outlet, DH-2-TI2)
2. ___ WHEN DHHE-1B delta-T indicates adequate thermal coupling between DH and DC,
THEN shutdown operating RCPs in accordance with Section 4.2 of OP-209
3. ___ Adjust DCV-178-MS as required for desired cooldown rate and continue to perform SP-422, RCS Heatup & Cooldown Surveillance

(4.5.15 Continued on following page)

ACTIONS	DETAILS
4.5.15 (Cont'd)	4. ___ Following DCV-178-MS adjustments, monitor DHHE-1B outlet temperature for expected temperature changes 5. ___ Ensure DCHE-1B delta RW temperature (RW-12-TI & RW-32-TI) is maintained < 10°F 6. ___ Monitor PZR level for decreasing trends which could be indicative of overcooling or leaks in the DH system 7. ___ WHEN RCS is < 110°F, THEN establish the Programmable Computer Alarm at 115°F for an Incore Thermocouple (preferably R258) _____/_____ Initial/Date

4.6 ALTERNATING DECAY HEAT TRAINS

ACTIONS	DETAILS
4.6.1 IF the RCS is partially filled, establish reactor vessel level watch prior to changing flowpaths or starting equipment in the alternate train, OTHERWISE "N/A" this step	o Refer to Limits and Precautions involving Reduced inventory operation o IF tygon tube level indication is unavailable in the Control Room via a camera/monitor, THEN assign a level watch at the tygon level indicator and establish communications capability with the Control Room
	_____/_____ Initial/Date
4.6.1.1 Ensure that there is no maintenance or testing of the switchyard supplying power to the DH train that will be placed in service	Stop maintenance, modifications, or testing of Switchyard that will be supplying power to DH Train OR Consider alternate electrical lineup
	_____/_____ Initial/Date
4.6.1.2 Inform Health Physics and Chemistry of swapping DH Trains	
	_____/_____ Initial/Date

ACTIONS	DETAILS
4.6.2 IF the "A" DH train is in service, THEN continue with this step, OTHERWISE GO TO Step 4.6.12	Ensure the following are CLOSED: 1.___ DHV-7, "B" DH BWST Recirc Isolation ___ DHV-12, MUP Crosstie ___ DHV-35, BWST Suction Isolation ___ DHV-43, RB Sump Suction Isolation 2. ___ DHV-105, "A" DH Purification Supply Isolation ___ DHV-106, "B" DH Purification Supply Isolation 3. ___ DHV-75, "A" DH Purification Return Isolation ___ DHV-76, "B" DH Purification Return Isolation _____/_____ Initial/Date

NOTE: TS 3.6.6 must be entered when disabling BS Train.

4.6.2.1 IF in Mode IV, THEN isolate BSP-1B, OTHERWISE N/A this step	1. ___ Ensure BSV-17 is open with breaker in lock/reset 2. ___ Ensure BSP-1A Breaker is racked in 3. ___ Place BSP-1B control switch in Normal-after-Stop and red tag to the SSOD 4. ___ Rack out BSP-1B Breaker and red tag to the SSOD 5. ___ Unlock and close breaker for BSV-16 6. ___ Close BSV-16 7. ___ Open breaker for BSV-16 and lock in Lock Reset to prevent inadvertent injection of RCS into BS Header _____/_____ Initial/Date

ACTIONS	DETAILS
4.6.2.2 Open DH Pump isolation valves	OPEN the following: ___ DHV-40, "B" DH Inlet Isolation ___ DHV-6, "B" DH Outlet Isolation _____/_____ Initial/Date
4.6.3 Ensure proper operation of DHHE-1B temperature control valves by cycling DCV-178-MS and visually observing valve movement	o Observe DCV-178 and DCV-18 o When complete, leave the controller and the DC valves in the zero ("0"), no cooling position _____/_____ Initial/Date
4.6.4 Record the "A" DH train outlet temperature	DHHE-1A outlet Temperature: _____ _____/_____ Initial/Date
4.6.5 Decrease "A" DH train flow in anticipation of dual DHP operation	o Adjust DHP-1A low amp alarm as desired per Section 4.31 o Using DHV-110, decrease DH flowrate to approximately 1500 gpm _____/_____ Initial/Date

ACTIONS	DETAILS

****

CAUTION: Starting an idle ambient DH train will cause a cooldown. The intent of the following steps is to expeditiously recover temperature and minimize the resultant effective cooldown

****

NOTE: RWV-150 will not properly control SW temperature if RWP-3B is running.

4.6.6	Start "B" DH train flow	1. ___ START DCP-1B 2. ___ START RWP-3B 3. ___ START DHP-1B 4. ___ THROTTLE DHV-111 to maintain approximately 1500 gpm in "B" DH train _____/_____ Initial/Date
4.6.7	Ensure proper lubrication of DHP-1B	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date
4.6.8	Transfer cooling from DHHE-1A to DHHE-1B	1. Adjust DCV-177-MS to the zero ("0"), no cooling position, while adjusting DCV-178-MS to recover temperature to the value recorded in step 4.6.4 _____/_____ Initial/Date

ACTIONS	DETAILS
4.6.9 Secure "A" DH train	1. ___ STOP DHP-1A 2. ___ STOP RWP-3A 3. ___ STOP DCP-1A 4. ___ CLOSE the following: ___ DHV-5 ___ DHV-39 5. ___ Adjust DHV-111 to approx. 3000 gpm 6. ___ Adjust DCV-178-MS to recover temperature, as close as possible, to the value recorded in step 4.6.4 7. ___ Adjust DHP-1B low amp alarm as desired per Section 4.31 _____/_____ Initial/Date

NOTE: The temperature recorded in this step should be the temperature that was obtained after the "B" DH train has stabilized.

4.6.10 Determine the effective cooldown	1. ___ Record DHHE-1B outlet temperature: _____ 2. ___ Calculate the effective cooldown (temp recorded in step 4.6.4 - the temp recorded above = effective cooldown) _____ - _____ = _____ 3. ___ IF the effective cooldown calculated above is >10°F in any one hour period THEN refer to SP-422 _____/_____ Initial/Date Independent Verification _____ ___

ACTIONS	DETAILS

NOTE: Clockwise rotation of DCV-178-MS simultaneously opens DCV-178 (increasing cooling flow) and closes DCV-18 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1B flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

NOTE: When required, the details for adjusting/controlling, (DCV-178-MS) DHHE-1B outlet temperature can be achieved by manually throttling DCV-178 and DCV-18 to obtain the desired position and action of the detail. For local manual operation of DCV-18 and DCV-178, refer to Enclosure 6 for guidance.

4.6.11 Control RCS cooling by DHR

- o ___ Adjust DCV-178-MS to provide desired cooling
- o ___ Monitor DHP-1B suction temperature (DH-6-TI2) to ensure RCS cooling is effective
- o ___ Monitor DHHE-1B Discharge temperature (DH-2-TI2) and continue SP-422, RC System Heatup and Cooldown Surveillance until cooldown is terminated
- o ___ Monitor RW-12-TI and RW-32-TI Maintain DCHE-1B ΔT less than 10 °F
- o ___ Monitor PZR level. Decrease in PZR level could be due to overcooling or leak in Decay Heat System
- o ___ WHEN the RCS is < 110 °F THEN establish the Programmable Computer Alarm at 115 °F for an Incore Thermocouple (Preferably R258)
- o ___ GO TO Step 4.6.22

_____/_____
Initial/Date

ACTIONS	DETAILS
4.6.12 Align the "A" DH train for operation	Ensure the following are CLOSED: 1. ___ DHV-8, "A" DH BWST Recirc Isolation ___ DHV-11, MUP Crosstie ___ DHV-34, BWST Suction Isolation ___ DHV-42, RB Sump Suction Isolation 2. ___ DHV-105, "A" DH Purification Supply Isolation ___ DHV-106, "B" DH Purification Supply Isolation 3. ___ DHV-75, "A" DH Purification Return Isolation ___ DHV-76, "B" DH Purification Return Isolation _____/_____ Initial/Date

NOTE: TS 3.6.6 must be entered when disabling BS Train.

4.6.12.1	IF in Mode IV, THEN isolate BSP-1A, OTHERWISE N/A this step	1. ___ Ensure BSV-16 is open with breaker in lock/reset 2. ___ Ensure BSP-1B Breaker is racked in 3. ___ Place BSP-1A control switch in Normal-after-Stop and red tag to the SSOD 4. ___ Rack out BSP-1A breaker and red tag to the SSOD 5. ___ Unlock and close breaker for BSV-17 6. ___ Close BSV-17 7. ___ Open breakers for BSV-17 and lock in Lock Reset to prevent inadvertent injection of RCS into BS Header _____/_____ Initial/Date
4.6.12.2	Open DH Pump Isolation valves	OPEN the following: ___ DHV-39, "A" DH Inlet Isolation ___ DHV-5, "A" DH Outlet Isolation _____/_____ Initial/Date

4.6 ALTERNATING DECAY HEAT TRAINS (Cont'd)

	ACTIONS	DETAILS
4.6.13	Ensure proper operation of DHHE-1A temperature control valves by cycling DCV-177-MS and visually observing valve movement	o Observe DCV-177 and DCV-17 o When complete, leave the controller and the DC valves in the zero ("0"), <u>no</u> cooling position ____/____ Initial/Date
4.6.14	Record the "B" DH train outlet temperature	DHHE-1B outlet Temperature: ________ ____/____ Initial/Date
4.6.15	Decrease "B" DH train flow in anticipation of dual DHP operation	o Adjust DHP-1B low amp alarm as desired per Section 4.31 o Using DHV-111, decrease DH flowrate to approximately 1500 gpm ____/____ Initial/Date

****

CAUTION: Starting an idle ambient DH train will cause a cooldown. The intent of the following steps is to expeditiously recover temperature and minimize the resultant effective cooldown

****

4.6.16	Start "A" DH train flow	1. ___ START DCP-1A 2. ___ START RWP-3A 3. ___ START DHP-1A 4. ___ THROTTLE DHV-110 to maintain approximately 1500 gpm in "A" DH train ____/____ Initial/Date

ACTIONS	DETAILS
4.6.17 Ensure proper lubrication of DHP-1A	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date
4.6.18 Transfer cooling from DHHE-1B to DHHE-1A	1. Adjust DCV-178-MS to the zero ("0"), no cooling position, while adjusting DCV-177-MS to recover temperature to the value recorded in step 4.6.14 _____/_____ Initial/Date
4.6.19 Secure "B" DH train	1. ___ STOP DHP-1B 2. ___ STOP RWP-3B 3. ___ STOP DCP-1B 4. CLOSE the following: ___ DHV-6 ___ DHV-40 5. ___ Adjust DHV-110 to approx. 3000 gpm 6. ___ Adjust DCV-177-MS to recover temperature,as close as possible, to the value recorded in step 4.6.14 7. ___ Adjust DHP-1A low amp alarm as desired per Section 4.31 _____/_____ Initial/Date

ACTIONS	DETAILS

NOTE: **The temperature recorded in this step should be the temperature that was obtained after the "A" DH train has stabilized.**

4.6.20 Determine the effective cooldown

1. ___ Record DHHE-1A outlet temperature: _____
2. ___ Calculate the effective cooldown (temp recorded in step 4.6.14 - the temp recorded above = effective cooldown)

   _____ - _____ = _____
3. ___ IF the effective cooldown calculated above is >10°F in any one hour period THEN refer to SP-422

_____/_____
Initial/Date

Independent Verification _____

ACTIONS	DETAILS

NOTE: **Clockwise rotation of DCV-177-MS simultaneously opens DCV-177 (increasing cooling flow) and closes DCV-17 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1A flow within a minimum and maximum range to prevent pump runout and deadhead conditions.**

NOTE: **When required, the details for adjusting/controlling, (DCV-177-MS) DHHE-1A outlet temperature can be achieved by manually throttling DCV-177 and DCV-17 to obtain the desired position and action of the detail. For local manual operation of DCV-17 and DCV-177, refer to Enclosure 6 for guidance.**

4.6.21 Control RCS cooling by DHR

- o ___ Adjust DCV-177-MS to provide desired cooling
- o ___ Monitor DHP-1A suction temperature (DH-6-TI1) to ensure RCS cooling is effective
- o ___ Monitor DHHE-1A Discharge temperature (DH-2-TI1) and continue SP-422, RC System Heatup and Cooldown Surveillance until cooldown is terminated
- o ___ Monitor RW-13-TI and RW-33 TI Maintain DCHE-1A ΔT less than 10 °F
- o ___ Monitor PZR level. Decrease in PZR level could be due to overcooling or leak in Decay Heat System
- o ___ WHEN the RCS is < 110 °F THEN establish the Programmable Computer Alarm at 115 °F for an Incore Thermocouple (Preferably R258)

_____/_____
Initial/Date

ACTIONS	DETAILS
4.6.22 If reactor vessel level is ≥ 132 feet, secure the reactor vessel level watch if stationed, otherwise, "N/A" this step	/ Initial/Date

4.7 RESTARTING DECAY HEAT REMOVAL AFTER PUMP TRIP

ACTIONS	DETAILS

NOTE: IF both Decay Heat Trains fail to operate, THEN immediately GO TO EOP-11, Loss of Decay Heat Removal.

4.7.1 IF the RCS is partially filled, OR cause of DHP tripping is unknown, THEN ensure a system conditions for restarting a Decay Heat train have been reviewed

- o ___ Ensure RCS level Within the Acceptable region of OP-103B curves 16 and 18.
- o ___ Possible system air entrainment or gas binding has been considered. Refer to Sections 4.3 and 4.4 as required
- o ___ Other potential causes for DHP tripping have been considered

_____/_____
Initial/Date

4.7.2 Align the "A" DH train for operation if desired, OTHERWISE go to Step 4.7.6

Ensure the following are CLOSED:
- ___ DHV-8, "A" DH BWST Recirc Isolation
- ___ DHV-11, MUP Crosstie
- ___ DHV-34, BWST Suction Isolation
- ___ DHV-42, RB Sump Suction Isolation
- ___ DHV-75, "A" DH Purification Return Isolation
- ___ DHV-76, "B" DH Purification Return Isolation
- ___ DHV-105, "A", DH Purification Supply Isolation
- ___ DHV-106, "B" DH Purification Supply Isolation
- ___ Position DCV-177-MS rheostat at "0" (Minimum cooling)

_____/_____
Initial/Date

NOTE: TS 3.6.6 must be entered when disabling BS Train.

4.7.2.1 IF in Mode IV, THEN isolate BSP-1A, OTHERWISE N/A this step.

1. ___ Ensure BSV-16 is open with breaker in lock/reset
2. ___ Ensure BSP-1B Breaker is racked in
3. ___ Place BSP-1A control switch in Normal-after-Stop and red tag to the SSOD

(4.7.2.1 Continued on following page)

ACTIONS	DETAILS
4.7.2.1 (Cont'd)	4. ___ Rack out BSP-1A Breaker and red tag to the SSOD 5. ___ Unlock and close breaker for BSV-17 6. ___ Close BSV-17 7. ___ Open breaker for BSV-17 and lock in Lock Reset to prevent inadvertent injection of RCS into BS Header _____/_____ Initial/Date
4.7.2.2 Open DH Pump isolation valves	OPEN the following: 1. ___ DHV-39, "A" DH Inlet Isolation IF excessive differential pressure exists when opening, THEN DHV-120 may be cycled to equalize pressure 2. ___ DHV-5, "A" DH Outlet Isolation _____/_____ Initial/Date
4.7.3 Verify DH Drop line is properly aligned	o ___ OPEN/verify Open the following: ___ DHV-3 ___ DHV-4 ___ DHV-41 _____/_____ Initial/Date
4.7.4 Start "A" DH train flow	1. ___ START DCP-1A 2. ___ START RWP-3A 3. ___ START DHP-1A 4. ___ THROTTLE DHV-110 to maintain approximately 3000 gpm in "A" DH train 5. ___ Adjust DHP-1A low amp alarm as desired per Section 4.31 _____/_____ Initial/Date

ACTIONS	DETAILS
4.7.4.1 Ensure proper lubrication of DHP-1A	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels

Initial/Date

NOTE: Clockwise rotation of DCV-177-MS simultaneously opens DCV-177 (increasing cooling flow) and closes DCV-17 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1A flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

NOTE: When required, the details for adjusting/controlling, (DCV-177-MS) DHHE-1A outlet temperature can be achieved by manually throttling DCV-177 and DCV-17 to obtain the desired position and action of the detail. For local manual operation of DCV-17 and DCV-177, refer to Enclosure 6 for guidance.

4.7.5 Control RCS cooling by DHR	o ___ Adjust DCV-177-MS to provide desired cooling o ___ Monitor DHP-1A suction temperature (DH-6-TI1) to ensure RCS cooling is effective o ___ Monitor DHHE-1A Discharge temperature (DH-2-TI1) and continue SP-422, RC System Heatup and Cooldown Surveillance until cooldown is terminated o ___ Monitor RW-13-TI and RW-33 TI Maintain DCHE-1A ΔT less than 10 °F o ___ Monitor PZR level. Decrease in PZR level could be due to overcooling or leak in Decay Heat System o ___ WHEN the RCS is < 110 °F THEN establish the Programmable Computer Alarm at 115 °F for an Incore Thermocouple (Preferably R258) o ___ GO TO Step 4.7.10

Initial/Date

ACTIONS	DETAILS
4.7.6 Align the "B" DH train for operation	Ensure the following are CLOSED: ___ DHV-7, "B" DH BWST Recirc Isolation ___ DHV-12, MUP Crosstie ___ DHV-35, BWST Suction Isolation ___ DHV-43, RB Sump Suction Isolation ___ DHV-75, "A" DH Purification Return Isolation ___ DHV-76, "B" DH Purification Return Isolation ___ DHV-105, "A" DH Purification Supply Isolation ___ DHV-106, "B" DH Purification Supply Isolation ___ Position DCV-178-MS rheostat at "0" (Minimum cooling) _____/_____ Initial/Date

NOTE: TS 3.6.6 must be entered when disabling BS Train.

4.7.6.1 IF in Mode IV, THEN isolate BSP-1B, OTHERWISE, N/A this step	1. ___ Ensure BSV-17 is open with breaker in lock/reset 2. ___ Ensure BSP-1A Breaker is Racked In 3. ___ Place BSP-1B control switch in Normal-after-Stop and red tag to the SSOD 4. ___ Rack out BSP-1B Breaker and red tag to the SSOD 5. ___ Unlock and close breaker for BSV-16 6. ___ Close BSV-16 7. ___ Open Breaker for BSV-16 and lock in Lock Reset to prevent inadvertent injection of RCS into BS Header _____/_____ Initial/Date

ACTIONS	DETAILS
4.7.6.2 Open DH Pump isolation valves	OPEN the following: 1. ___ DHV-40, "B" DH Inlet Isolation IF excessive differential pressure exists when opening, THEN DHV-121 may be cycled to equalize pressure 2. ___ DHV-6, "B" DH Outlet Isolation _____/_____ Initial/Date
4.7.7 Verify DH Drop line is properly aligned	o ___ OPEN/verify Open the following: ___ DHV-3 ___ DHV-4 ___ DHV-41 _____/_____ Initial/Date

NOTE: RWV-150 will not properly control SW temperature if RWP-3B is running.

4.7.8 Start "B" DH train flow	1. ___ START DCP-1B 2. ___ START RWP-3B 3. ___ START DHP-1B 4. ___ THROTTLE DHV-111 to maintain approximately 3000 gpm in "B" DH train 5. ___ Adjust DHP-1B low amp alarm as desired per Section 4.31 _____/_____ Initial/Date
4.7.8.1 Ensure proper lubrication of DHP-1B	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date

ACTIONS	DETAILS

NOTE: Clockwise rotation of DCV-178-MS simultaneously opens DCV-178 (increasing cooling flow) and closes DCV-18 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1B flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

NOTE: When required, the details for adjusting/controlling, (DCV-178-MS) DHHE-1B outlet temperature can be achieved by manually throttling DCV-178 and DCV-18 to obtain the desired position and action of the detail. For local manual operation of DCV-18 and DCV-178, refer to Enclosure 6 for guidance.

4.7.9 Control RCS cooling by DHR

- o ___ Adjust DCV-178-MS to provide desired cooling
- o ___ Monitor DHP-1B suction temperature (DH-6-TI2) to ensure RCS cooling is effective
- o ___ Monitor DHHE-1B Discharge temperature (DH-2-TI2) and continue SP-422, RC System Heatup and Cooldown Surveillance until cooldown is terminated
- o ___ Monitor RW-12-TI and RW-32-TI Maintain DCHE-1B ΔT less than 10 °F
- o ___ Monitor PZR level. Decrease in PZR level could be due to overcooling or leak in Decay Heat System
- o ___ WHEN the RCS is < 110 °F THEN establish the Programmable Computer Alarm at 115 °F for an Incore Thermocouple (Preferably R258)

_____/_____
Initial/Date

ACTIONS	DETAILS
4.7.10 If reactor vessel level is ≥ 132 feet, secure the reactor vessel watch if stationed, otherwise, "N/A" this step	_____/_____ Initial/Date
4.7.11 Re-establish DH purification as required	o Refer to Section 4.10 or 4.11 _____/_____ Initial/Date

4.8 PLACING DCHE-1A IN LAYUP

ACTIONS	DETAILS

****

CAUTION: Ensure cooling water is maintained to operating makeup pumps prior to securing DCP-1A.

****

4.8.1 IF flow exists in "A" DC train,
THEN secure flow,
OTHERWISE "N/A" this step

1. ___ STOP RWP-3A train,
2. ___ STOP DCP-1A

_____/_____
Initial/Date

4.8.2 Ensure all "B" side ES equipment is operable

_____/_____
Initial/Date

4.8.3 Remove Control power for RWP-3A

- o ___ Open DC knife switch on the breaker for RWP-3A
- o ___ Refer to Technical Specification actions

_____/_____
Initial/Date

4.8.4 Drain seawater side of DCHE-1A

- o ___ OPEN RWV-77, DCHE-1A Drain
- o ___ OPEN RWV-73, DCHE-1A Vent
- o ___ OPEN RWV-75, DCHE-1A Drain

_____/_____
Initial/Date

4.8 **PLACING DCHE-1A IN LAYUP** (Cont'd)

ACTIONS	DETAILS
4.8.5 WHEN DCHE-1A is drained, THEN fill with demin water	1. ___ CLOSE RWV-77, Inlet Drain 2. ___ Connect a hose between DWV-336 and RWV-75 AND OPEN DWV-336 3. ___ WHEN demin water flows from RWV-73, THEN CLOSE DWV-336 4. ___ CLOSE the following valves: 1. ___ RWV-75, Outlet Drain 2. ___ RWV-73, Vent 5. ___ Remove and Store DW hose _____/_____ Initial/Date
4.8.6 WHEN DCHE-1A fill is complete THEN restore RWP-3B to operable status	o ___ Close DC knife switch on the breaker for RWP-3A and verify power indications in control room o ___ Exit actions of Technical Specifications _____/_____ Initial/Date

4.9 PLACING DCHE-1B IN LAYUP

ACTIONS	DETAILS

****

CAUTION: Ensure cooling water is maintained to operating makeup pumps prior to securing DCP-1B.

****

4.9.1	IF flow exists in "B" DC train, THEN secure flow, OTHERWISE "N/A" this step	1. ___ STOP RWP-3B train, 2. ___ STOP DCP-1B _____/_____ Initial/Date
4.9.2	Ensure all "A" side ES equipment is operable	_____/_____ Initial/Date
4.9.3	Remove Control power for RWP-3B	o ___ Open DC knife switch on the breaker for RWP-3B o ___ Refer to Technical Specifications actions _____/_____ Initial/Date
4.9.4	Drain seawater side of DCHE-1B	o ___ OPEN RWV-78, DCHE-1B Drain o ___ OPEN RWV-74, DCHE-1B Vent o ___ OPEN RWV-76, DCHE-1B Drain _____/_____ Initial/Date

4.9 PLACING DCHE-1B IN LAYUP (Cont'd)

ACTIONS	DETAILS
4.9.5 WHEN DCHE-1B is drained, THEN fill with demin water	1. ___ CLOSE RWV-78, Inlet Drain 2. ___ Connect a hose between DWV-336 and RWV-76, Outlet drain 3. ___ OPEN DWV-336 4. ___ WHEN demin water flows from RWV-74, THEN CLOSE DWV-336 5. ___ CLOSE the following valves: 1. ___ RWV-76, Outlet drain 2. ___ RWV-74, Vent 6. ___ Remove and store DW hose _____/_____ Initial/Date
4.9.6 WHEN DCHE-1B fill is complete THEN restore RWP-3B to operable status	o ___ Close DC knife switch on the breaker for RWP-3B and verify power indication in control room o ___ Exit actions of Technical Specifications _____/_____ Initial/Date

4.10 DECAY HEAT SYSTEM PURIFICATION USING MAKEUP & PURIFICATION SYSTEM

ACTIONS	DETAILS

****
CAUTION: This flow path shall not be used when RC pressure is ≥ 100 PSIG to prevent lifting MU System relief valves.
****

****
CAUTION: Performance of this section could affect Decay Heat removal during drain down conditions.
****

4.10.1	Ensure flowpath is established between the MU&P pre-filter inlets and the MU&P letdown filter outlets	o Refer to OP-402, Makeup and Purification System _____/_____ Initial/Date
4.10.2	Ensure that the Decay Heat Removal System is in operation per Section 4.5 of this procedure	_____/_____ Initial/Date
4.10.3	Isolate makeup tank from purification flowpath	o ___ CLOSE MUV-357 _____/_____ Initial/Date

****
CAUTION: Closing MUV-90 or MUV-91 may result in damage to letdown filter pressure instrumentation.
****

4.10.4	Align letdown filter outlets for DH purification	o ___ CLOSE MUV-182 MU-18-DPT Iso. o ___ OPEN the following: ___ MUV-203, MUFL-1A Outlet ___ MUV-202, MUFL-1B Outlet ___ MUV-521, MU-18-DPT Isol. _____/_____ Initial/Date

4.10 DECAY HEAT SYSTEM PURIFICATION USING MAKEUP & PURIFICATION SYSTEM (Cont'd)

ACTIONS	DETAILS
4.10.5 Start DH purification	1. ___ OPEN DHV-75 ("A" DH train) OR DHV-76 ("B" DH train), Letdown Filter Supply to DH 2. Monitor Make up Purification pressure at MU-105-PI near Prefilter Room and maintain less than 100 PSIG. ___ Energize and throttle OPEN DHV-105 ("A" DH train) OR DHV-106 ("B" DH train), DH Supply to MU&P, until desired flowrate is obtained 3. ___ Adjust DHV-110 OR DHV-111 to limit DH flow ≤ 3000 gpm _____/_____ Initial/Date
4.10.6 WHEN DH purification is no longer desired, THEN secure purification lineup	1. ___ CLOSE and de-energize: ___ DHV-105 ___ DHV-106 2. ___ CLOSE the following: ___ DHV-75 ___ DHV-76 3. ___ Adjust DHV-110 OR DHV-111 to maintain DH flowrate ≤ 3000 gpm _____/_____ Initial/Date
4.10.7 Restore MU&P lineup	o ___ RESTORE the following: ___ CLOSE MUV-203 ___ CLOSE MUV-202 ___ OPEN MUV-357 ___ CLOSE MUV-521 ___ OPEN MUV-182 _____/_____ Initial/Date

4.11 DECAY HEAT SYSTEM PURIFICATION USING SPENT FUEL SYSTEM

ACTIONS	DETAILS

****
CAUTION: Performance of this section could affect Decay Heat removal during drain down conditions.
****

4.11.1 Notify Chemistry and Health Physics of impending lineup change

_____/_____
Initial/Date

4.11.2 IF Spent Fuel Cooling System is in operation, THEN ensure cooling is being accomplished by SFP-1A and SFHE-1A only

o Refer to OP-406, Spent Fuel Cooling System

_____/_____
Initial/Date

4.11.3 Ensure Decay Heat System is in operation per Section 4.5 of this procedure

_____/_____
Initial/Date

4.11.4 Ensure borated water recirculation is stopped

_____/_____
Initial/Date

4.11.5 Ensure Spent Fuel System can support DH purification

o ___ Ensure the following are filled and vented:
___ SFDM-1
___ SFFL-1A
___ SFFL-1B

o ___ Ensure Spent Fuel System boron concentration is ≥ RCS boron concentration

SF boron _____ ppm
RCS boron _____ ppm

_____/_____
Initial/Date

ACTIONS	DETAILS
4.11.6 Align Spent Fuel Cooling System for DH purification	1. ___ CLOSE/ensure CLOSED the following: ___ SFV-50, SF Train Cross-tie ___ SFV-49, "B" Train Disch ___ SFV-46, BWST Isolation ___ SFV-38, BWST Recirc Iso ___ SFV-66, SF Filter Byp ___ SFV-68, SFFL-1B Inlet ___ SFV-69, SFFL Crosstie ___ SFV-77, SFFL Crosstie ___ SFV-76, SFFL-1B Disch ___ SFV-62, DW Isolation ___ SFV-91, DW Isolation ___ SFV-67, SF Filter Byp ___ SFV-54, SF Pool Iso ___ SFV-55, BWST Isolation 2. ___ OPEN/ensure OPEN the following: ___ SFV-71, SFFL-1A Inlet ___ SFV-75, SFFL-1A Outlet ___ SFV-100, SFDM-1 Inlet ___ SFV-65, SFDM-1 Outlet ___ SFV-70, SFFL-1B Inlet ___ SFV-78, SFFL-1B Disch ___ SFV-43, SF Filter Iso _____/_____ Initial/Date

ACTIONS	DETAILS

****

CAUTION: Ensure spent fuel purification pressure does not approach SF relief valve setting (125 PSIG) when initiating purification flow.

****

4.11.7	Start DH purification flow	1. ___ Ensure CLOSED DHV-9 & 10, BWST Recirc Isolations 2. ___ OPEN SFV-87, DH Supply Iso 3. ___ OPEN SFV-85, DH Suction Iso 4. ___ OPEN DHV-7 OR DHV-8, DH Recirc Isolation, as applicable 5. ___ OPEN DHV-48, DH Outlet to Spent Fuel 6. ___ Throttle DHV-5 OR DHV-6 to achieve approximately 150 gpm at SF-2-FI on 143 ft elevation. This may require readjustment of DHV-110/111 as applicable _____/_____ Initial/Date
4.11.8	WHEN SF purification is no longer desired, THEN secure purification lineup	1. ___ CLOSE the following: ___ SFV-85 ___ SFV-87 ___ DHV-7 OR DHV-8 ___ DHV-48 2. ___ OPEN DHV-5 OR DHV-6. This may require readjustment of DHV-110/111 as applicable 3. ___ Restore Spent Fuel Cooling System as required per OP-406 _____/_____ Initial/Date

4.12 DH OPERATION DURING A LOCA

ACTIONS	DETAILS

****
CAUTION: This procedure section establishes DHR which may result in elevated radiation levels in the Auxiliary Building.
****

NOTE: RCS pressure should be maintained above the RCP NPSH curve for the existing RCP operating combination per Curve 19 of OP-103B unless establishing DHR.

NOTE: This procedure section does not allow simultaneous DHR and RCP operation.

NOTE: The performance of this section will result in one DHP operating in LPI mode, with the other operating in the Decay Heat Removal mode.

4.12.1 Initial Conditions

- o PZR level ≥ 50"
- o RCS cooldown in progress
- o Adequate Subcooling Margin exists

_____/_____
Initial/Date

4.12.2 IF DHV-3 is not powered, THEN close breaker for DHV-3

- o ___ Unlock and Close breaker
- o ___ ES MCC 3A1 95' Aux Bld

_____/_____
Initial/Date

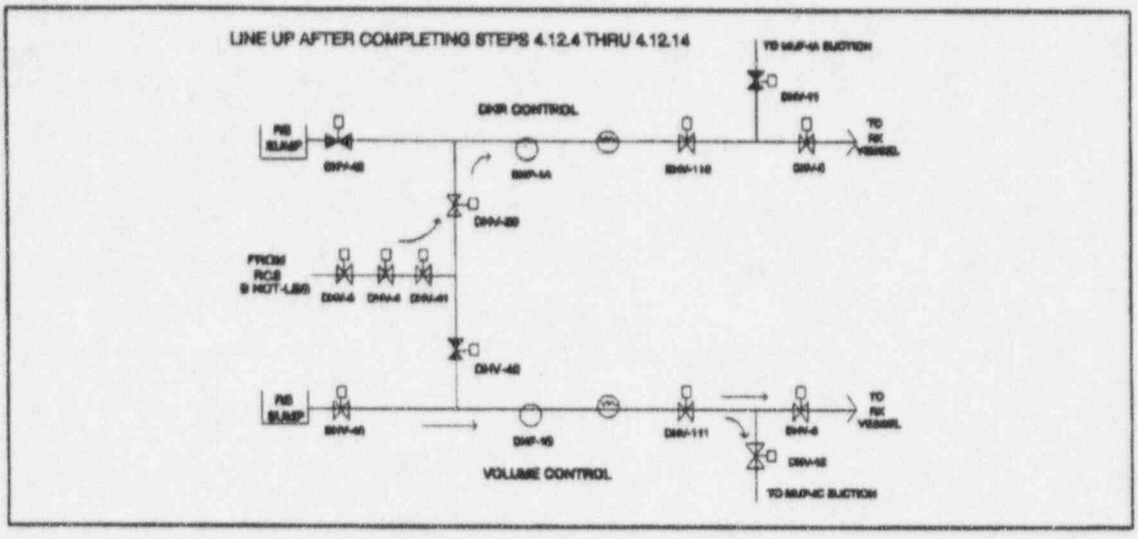
NOTE: Aligning DHP-1A for DH removal is preferred, to enable spray and maintain LPI capabilities using DHP-1B.

4.12.3 IF two LPI pumps are running, THEN determine which LPI pump should be aligned for DH removal

- o ___ IF DHP-1A is to be aligned for DH removal, THEN GO TO Step 4.12.4
- o ___ IF DHP-1B is to be aligned for DH removal, THEN GO TO Step 4.12.19

_____/_____
Initial/Date

ACTIONS	DETAILS



4.12.4 IF DHP-1B is providing suction to HPI pumps, THEN ensure the MUP suction flow path is properly aligned

o ___ OPEN/Ensure OPEN the following:
o ___ DHV-12
o ___ MUV-62
o ___ MUV-69

___/___
Initial/Date

****

CAUTION: IF LPI is providing suction to MUP(s), THEN MUP amps and flow should be carefully monitored while securing a DH pump.

****

4.12.5 Stop DHP-1A

___/___
Initial/Date

4.12.6 Ensure DH cooler is properly aligned for Decay Heat Removal Operation

o ___ Refer to Step 4.5.1.6

___/___
Initial/Date

ACTIONS	DETAILS
4.12.7 Establish DHP-1A for Decay Heat Removal Operation	1. ___ Ensure the following valves are closed: ___ DHV-8 ___ DHV-11 ___ DHV-34 ___ DHV-42 ___ DHV-75 ___ DHV-76 ___ DHV-105 ___ DHV-106 ___ DHV-40 2. ___ Open the following valves: IF DHV-39 binds when opening, THEN DHV-120 may be opened to equalize pressure ___ DHV-39 ___ DHV-5 _____/_____ Initial/Date
4.12.8 Ensure DH/LPI train cooling water pumps are operating	o DCP-1A o RWP-3A _____/_____ Initial/Date

NOTE: Violation of the RCP NPSH curves may be necessary to establish DHR. Operation in this condition with RCP(s) running should be minimized in both magnitude and duration.

4.12.9 Establish RCS conditions to enable placing DHR in service	o Ensure RCS temperature ≤ 280°F o Ensure RCS pressure ≤ 200 PSIG _____/_____ Initial/Date

ACTIONS	DETAILS
4.12.10 Trip all running RCPs	o RCP-1A o RCP-1B o RCP-1C o RCP-1D

_____/_____
Initial/Date

NOTE: Whenever the RB 4 PSIG Isolation ES feature actuates and the RCS pressure is sufficient to overcome the head or height of the Spray Header, then aligning the DH drop line to the RCS may initiate RB Spray and cause the RCS to depressurize.

4.12.11 Isolate 'A' train RB spray header as required and align DH drop line to 'A' train DH suction	1. ___ IF the 4 PSIG Isolation ES feature has actuated, AND it has been BYPASSED, THEN place BSV-3 into MANUAL and close BSV-3 IF NOT actuated then verify BSV-3 closed 2. ___ Open DHV-3 3. ___ Open DHV-4 4. ___ Open DHV-41

_____/_____
Initial/Date

4.12.12 Establish DHR flow	1. ___ Start DHP-1A 2. ___ Establish ≈ 3000 gpm flow by adjusting DHV-110, A-Train flow control valve

_____/_____
Initial/Date

ACTIONS	DETAILS

NOTE: Clockwise rotation of DCV-177-MS simultaneously opens DCV-177 (increasing cooling flow) and closes DCV-17 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1A flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

NOTE: When required, the details for adjusting/controlling, (DCV-177-MS) DHHE-1A outlet temperature can be achieved by manually throttling DCV-177 and DCV-17 to obtain the desired position and action of the detail. For local manual operation of DCV-17 and DCV-177, refer to Enclosure 6 for guidance.

4.12.13 Lower RCS temperature to ≤ 200°F

- o Adjust DHHE cooling using DCV-177-MS for DHHE-1A

_____/_____
Initial/Date

4.12.14 Reduce RCS pressure as low as possible to reduce the leakage from the RCS

- o Reduce RCS pressure in the following order:
  1. ___ IF PZR bubble exists THEN use PZR AUX spray
  2. ___ Reduce operating HPI pumps to one
  3. ___ Throttle HPI flow
  4. ___ OPEN PORV

_____/_____
Initial/Date

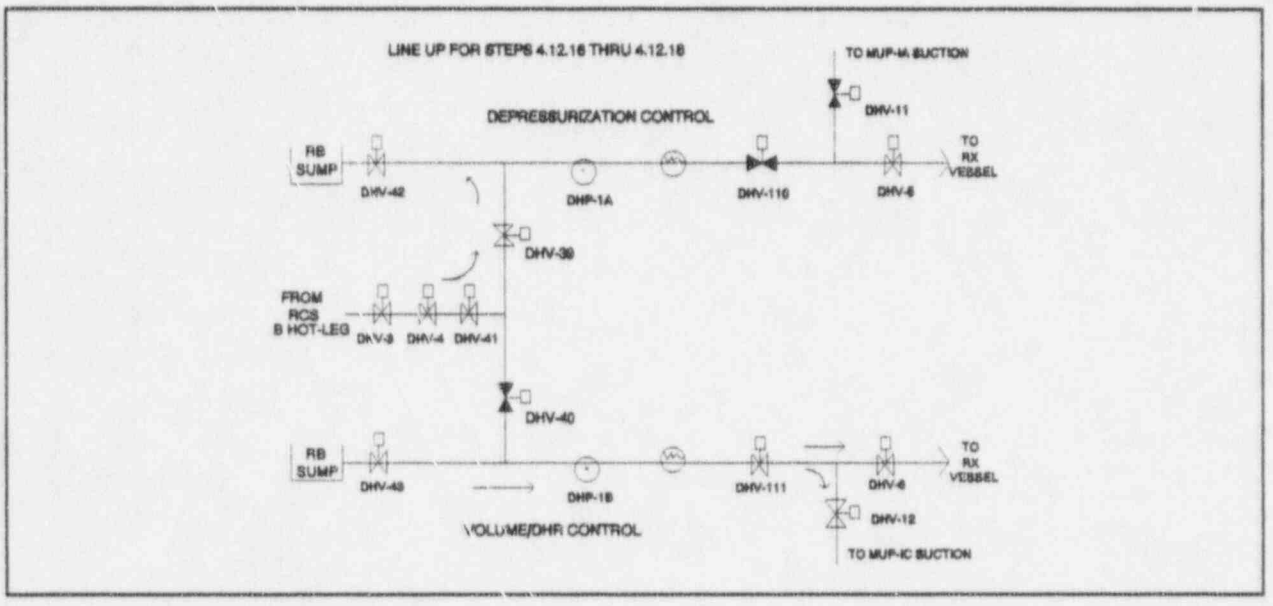
ACTIONS	DETAILS

NOTE: The following step is to protect DHP-1B and should be performed at the lowest possible RCS pressure but MUST be performed prior to exceeding 10 hrs of operating DHP-1B in the restricted flow region (Indicated flow <1400 gpm).

4.12.15 Reduce RCS pressure to ≤ 100 PSIG

- o Reduce RCS pressure in the following order:
  1. ___ IF PZR bubble exists THEN use PZR AUX spray
     IF RCS pressure ≤ 100 PSIG, THEN GO TO Step 4.12.16
  2. ___ Reduce operating HPI pumps to one
     IF RCS pressure ≤ 100 PSIG, THEN GO TO Step 4.12.16
  3. ___ Throttle HPI flow
     IF RCS pressure ≤ 100 PSIG, THEN GO TO Step 4.12.16
  4. ___ OPEN PORV
     IF RCS pressure ≤ 100 PSIG, THEN GO TO Step 4.12.16

Initial/Date



ACTIONS	DETAILS
4.12.16 Secure DHP supplying Decay Heat Removal	o ___ STOP DHP-1A AND CLOSE DHV-110

___/___
Initial/Date

NOTE: The following step aligns the dropline to the RB sump. A rapid RCS depressurization will occur.

4.12.17 Depressurize RCS to RB Sump

1. ___ CLOSE DHV-41
2. ___ OPEN DHV-42
3. ___ OPEN DHV-41

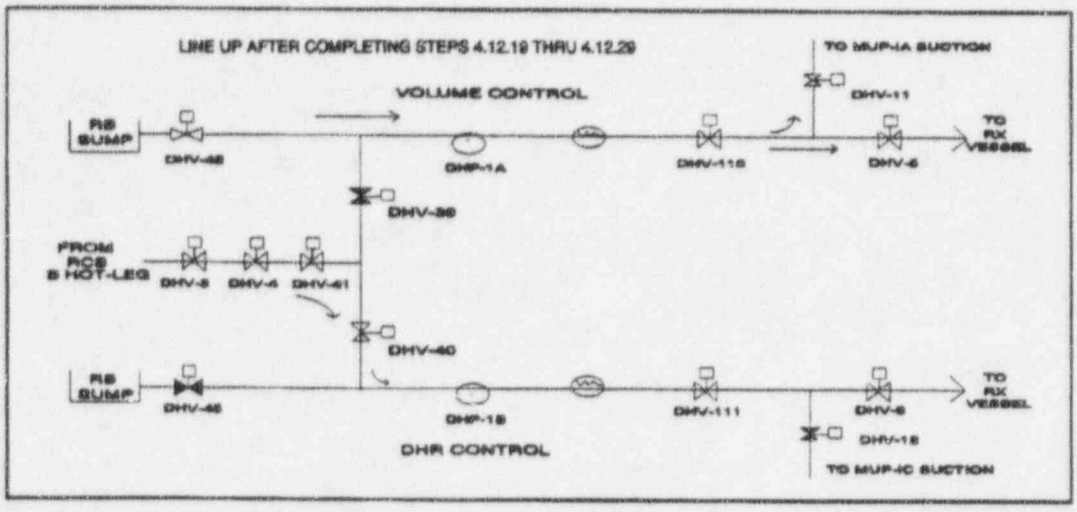
___/___
Initial/Date

4.12.18 Establish LPI flow to RCS

1. ___ Ensure DHV-111 in AUTO with setpoint at 3000 GPM
2. ___ OPEN DHV-7
3. ___ OPEN DHV-8
4. ___ Throttle DHV-5 and DHV-6 to establish balanced LPI flow $\geq$ HPI flow
5. ___ Secure running HPI pump(s)
6. ___ OPEN DHV-5 and DHV-6
7. ___ Ensure CLOSED:
   - o MUV-23
   - o MUV-24
   - o MUV-25
   - o MUV-26
   - o DHV-11
   - o DHV-12
8. ___ Exit this procedure

___/___
Initial/Date

ACTIONS	DETAILS



****

CAUTION: IF LPI is providing suction to MUP(s), THEN MUP amps and flow should be carefully monitored while securing a DH pump.

****

4.12.19 IF DHP-1A is providing suction to HPI pumps, THEN ensure the MUP suction flow path is properly aligned

- o ___ OPEN/Ensure OPEN the following:
- o ___ DHV-11
- o ___ MUV-62
- o ___ MUV-69

_____/_____
Initial/Date

4.12.20 STOP DHP-1B

_____/_____
Initial/Date

ACTIONS	DETAILS
4.12.21 Ensure DH cooler is properly aligned for DHR Operation	o Refer to Step 4.5.1.7 _____/_____ Initial/Date
4.12.22 Establish DHP-1B for DHR	1. ___ Ensure the following valves are closed: ___ DHV-7 ___ DHV-12 ___ DHV-35 ___ DHV-43 ___ DHV-75 ___ DHV-76 ___ DHV-105 ___ DHV-106 ___ DHV-39 2. ___ Open the following valves: IF DHV-40 binds when opening, THEN DHV-121 may be opened to equalize pressure ___ DHV-40 ___ DHV-6 _____/_____ Initial/Date
4.12.23 Ensure DH/LPI train cooling water pumps are operating	o DCP-1B o RWP-3B _____/_____ Initial/Date

NOTE: Violation of the RCP NPSH may be necessary to establish DHR. Operation in this condition with RCP(s) running should be minimized in both magnitude and duration.

4.12.24 Establish RCS conditions to enable placing DHR in service	o Ensure RCS temperature $\leq$ 280°F o Ensure RCS pressure $\leq$ 200 PSIG _____/_____ Initial/Date

ACTIONS	DETAILS
4.12.25 Trip all running RCPs	o RCP-1A o RCP-1B o RCP-1C o RCP-1D _____/_____ Initial/Date

NOTE: Whenever the RB 4 PSIG Isolation ES feature actuates and the RCS pressure is sufficient to overcome the head or height of the Spray Header, then aligning the DH drop line to the RCS may initiate RB Spray and cause the RCS to depressurize.

4.12.26 Isolate 'B' train RB spray header as required and align DH drop line to 'B' train DH suction	1. ___ IF the 4 PSIG Isolation ES feature has actuated, AND it has been BYPASSED, THEN place BSV-4 into MANUAL and close BSV-4 IF NOT actuated then verify BSV-4 closed 2. ___ Open DHV-3 3. ___ Open DHV-4 4. ___ Open DHV-41 _____/_____ Initial/Date
4.12.27 Establish DHR flow	1. ___ Start DHP-1B 2. ___ Establish ≈ 3000 gpm flow by adjusting DHV-111, B-Train flow control valve _____/_____ Initial/Date

ACTIONS	DETAILS

NOTE: Clockwise rotation of DCV-178-MS simultaneously opens DCV-178 (increasing cooling flow) and closes DCV-18 (decreasing bypass flow). Counterclockwise rotation causes the opposite results. The purpose of this is to maintain DCP-1B flow within a minimum and maximum range to prevent pump runout and deadhead conditions.

NOTE: When required, the details for adjusting/controlling, (DCV-178-MS) DHHE-1B outlet temperature can be achieved by manually throttling DCV-178 and DCV-18 to obtain the desired position and action of the detail. For local manual operation of DCV-18 and DCV-178, refer to Enclosure 6 for guidance.

4.12.28 Lower RCS temperature to ≤ 200°F	o Adjust DHHE cooling using DCV-178-MS for DHHE-1B

_____/_____
Initial/Date

4.12.29 Reduce RCS pressure as low as possible to reduce the leakage from the RCS	o Reduce RCS pressure in the following order: 1. ___ IF PZR bubble exists, THEN use PZR AUX spray 2. ___ Reduce operating HPI pumps to one 3. ___ Throttle HPI flow 4. ___ OPEN PORV

_____/_____
Initial/Date

ACTIONS	DETAILS

NOTE: The following step is to protect DHP-1B and should be performed at the lowest possible RCS pressure but MUST be performed prior to exceeding 10 hrs of operating DHP-1B in the restricted flow region (Indicated flow 1400 gpm)

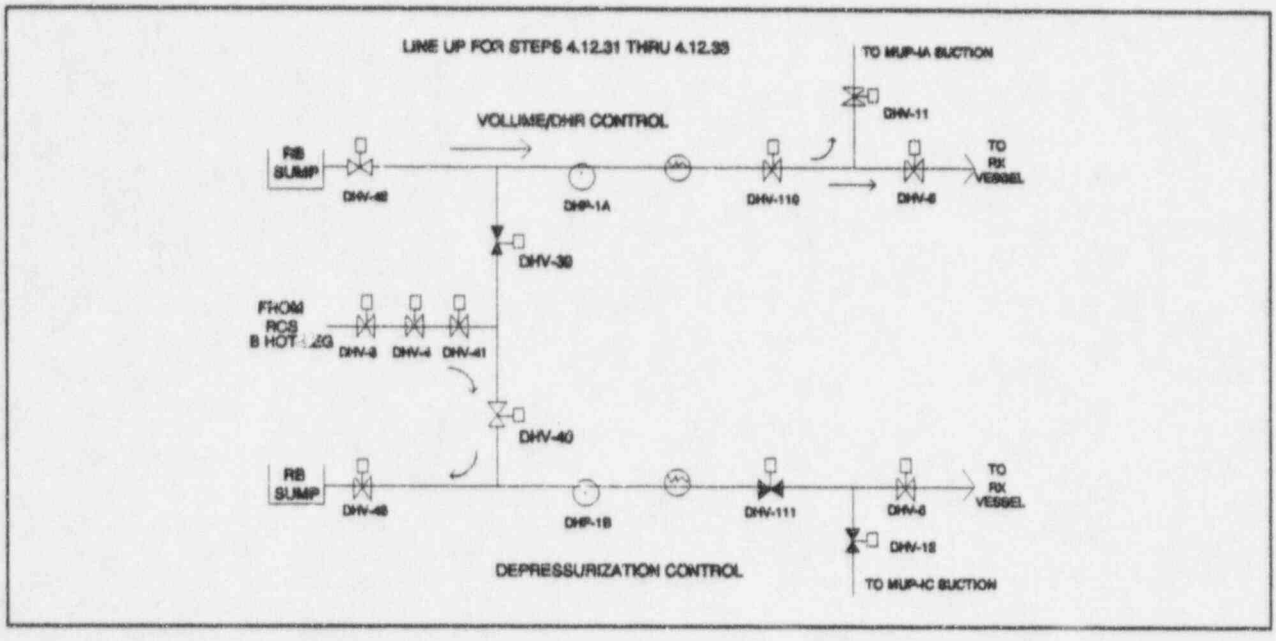
4.12.30 Reduce RCS pressure to ≤ 100 PSIG

o Reduce RCS pressure in the following order:

1. ___ IF PZR bubble exists, THEN use PZR AUX spray
   IF RCS pressure ≤ 100 PSIG, THEN GO TO Step 4.12.31
2. ___ Reduce operating HPI pumps to one
   IF RCS pressure ≤ 100 PSIG, THEN GO TO Step 4.12.31
3. ___ Throttle HPI flow
   IF RCS pressure ≤ 100 PSIG, THEN GO TO Step 4.12.31
4. ___ OPEN PORV
   IF RCS pressure ≤ 100 PSIG, THEN GO TO Step 4.12.31

_____/_____
Initial/Date

ACTIONS	DETAILS



4.12.31 Secure DHP supplying Decay Heat Removal

o ___ STOP DHP-1B AND CLOSE DHV-111

___/___
Initial/Date

NOTE: The following step aligns the dropline to the RB sump. A rapid RCS depressurization will occur.

4.12.32 Depressurize RCS to RB Sump

1. ___ CLOSE DHV-41
2. ___ OPEN DHV-43
3. ___ OPEN DHV-41

___/___
Initial/Date

ACTIONS	DETAILS
4.12.33 Establish LPI flow to RCS	1. ___ Ensure DHV-110 in AUTO with setpoint at 3000 GPM 2. ___ OPEN DHV-7 3. ___ OPEN DHV-8 4. ___ Throttle DHV-5 and DHV-6 to establish balanced LPI flow ≥ HPI flow 5. ___ Secure running HPI pump(s) 6. ___ OPEN DHV-5 and DHV-6 7. ___ Ensure CLOSED o MUV-23 o MUV-24 o MUV-25 o MUV-26 o DHV-11 o DHV-12 8. ___ Exit this procedure

_____/_____
Initial/Date

4.13 LONG-TERM POST-ACCIDENT COOLING

ACTIONS	DETAILS

NOTE: To avoid boron precipitation, the ECCS shall be placed in one of the following conditions within 24 hours after the accident.

4.13.1 IF the "A" DH train is in service taking suction from the RB sump,
THEN GO TO Step 4.13.2

IF the "B" DH train is in service taking suction from the RB sump,
OR
IF the "A" DH train is NOT available,
THEN GO TO Step 4.13.6

_____/_____
Initial/Date

4.13.2 Ensure the "A" decay heat train is in service taking suction from the RB sump

o Refer to EOP-08, LOCA Cooldown

_____/_____
Initial/Date

ACTIONS	DETAILS

NOTE: DH-45-FI is located on back section of Main Control Board by the RCP seal charts. DH-45-FI1 is located at 95' Aux. Building, in hallway, on south wall of the Triangle Room, near the "B" decay heat pit.

4.13.3 Establish core cooling using DHP-1A and the DH drop line (preferred method)

1. ___ Open LPI crossover valves:
   - o DHV-7
   - o DHV-8
2. ___ Stop the following pumps:
   - o DHP-1B
   - o BSP-1B
3. ___ Ensure closed:
   - o DHV-111
   - o DHV-39
4. Open/ensure open:
   - ___ DHV-3
   - ___ DHV-4
   - ___ DHV-41
   - ___ DHV-40
   - ___ DHV-43
   - ___ DHV-42
5. ___ Verify flowrate on drop line flow indicator (DH-45-FI or DH-45-FI1) > 40 gpm

_____/_____
Initial/Date

ACTIONS	DETAILS
4.13.4 IF Step 4.13.3 was performed successfully, THEN GO TO Step 4.13.5. IF NOT, THEN perform this step to establish flow through the auxiliary spray line.	1. ___ Ensure open DHV-42 2. Close: ___ DHV-3 ___ DHV-4 ___ DHV-41 ___ DHV-43 ___ DHV-34 ___ DHV-35 ___ DHV-40 ___ BSV-16 3. ___ Close/ensure closed PZR spray valves: o RCV-13 and/or RCV-14 4. ___ Open auxiliary spray valves: o DHV-91 o RCV-53 5. ___ Throttle DHV-5 and/or DHV-6 as necessary to maintain auxiliary spray flowrate > 40 gpm as indicated on DH-46-FI 6. ___ GO TO Step 4.13.10 _____/_____ Initial/Date
4.13.5 Establish flow through the auxiliary spray line.	1. ___ Close PRZ spray valves: o RCV-13 and/or o RCV-14 2. ___ Open auxiliary spray valves: o DHV-91 o RCV-53 3. ___ Throttle DHV-5 and/or DHV-6 as necessary to maintain auxiliary spray flowrate > 40 gpm as indicated on DH-46-FI 4. ___ GO TO Step 4.13.10 _____/_____ Initial/Date

ACTIONS	DETAILS
4.13.6 Ensure the "B" decay heat train is in service taking suction from the RB sump	o Refer to EOP-08, LOCA Cooldown _____/_____ Initial/Date
4.13.7 Establish core cooling using DHP-1B and the DH drop line (preferred method)	1. ___ Open LPI crossover valves: o DHV-7 o DHV-8 2. ___ Stop the following pumps: o DHP-1A o BSP-1A 3. ___ Ensure closed: o DHV-110 o DHV-40 4. Open/ensure open: ___ DHV-3 ___ DHV-4 ___ DHV-41 ___ DHV-39 ___ DHV-43 ___ DHV-42 5. ___ Verify flowrate on drop line flow indicator (DH-45-FI or DH-45-FI1) > 40 gpm _____/_____ Initial/Date

ACTIONS	DETAILS
4.13.8 IF Step 4.13.7 was performed successfully, THEN GO TO Step 4.13.9 IF NOT, THEN perform this step to establish flow through the auxiliary spray line	1. ___ Ensure open DHV-43 2. Close/ensure closed: ___ DHV-42 ___ DHV-34 ___ DHV-35 ___ DHV-39 ___ BSV-17 3. ___ Close/ensure closed PZR spray valves: o RCV-13 AND/OR o RCV-14 4. ___ Open auxiliary spray valves: o DHV-91 o RCV-53 5. ___ Open DHV-110 5. ___ Throttle DHV-5 and/or DHV-6 as necessary to maintain auxiliary spray flowrate > 40 gpm as indicated on DH-46-FI 6. ___ GO TO Step 4.13.10 _____/_____ Initial/Date
4.13.9 Establish flow through the auxiliary spray line	1. ___ Ensure open DHV-43 2. ___ Close DHV-21 3. Close/ensure closed: ___ DHV-34 ___ DHV-35 ___ BSV-17 4. ___ Close PZR spray valves: o RCV-13 AND/OR o RCV-14 5. ___ Open auxiliary spray valves: o DHV-91 o RCV-53 6. ___ Open DHV-110 7. ___ Throttle DHV-5 and/or DHV-6 as necessary to maintain auxiliary spray flowrate > 40 gpm as indicated on DH-46-FI _____/_____ Initial/Date

ACTIONS	DETAILS
4.13.10 Notify Chemistry to sample RB sump water for boron concentration	IF Chemistry results indicate the RB sump is being diluted, THEN perform the following as required: ___ Check for and attempt to isolate any leaks into the reactor building ___ Determine if any unborated water is being admitted to the reactor building ___ Increase flowrate through the reactor vessel to minimize boron precipitation ___ Commence boron addition to the RCS as necessary to maintain adequate shutdown margin _____/_____ Initial/Date

4.14 ISOLATION AND RESTORATION OF INDIVIDUAL DECAY HEAT PUMPS AND HEAT EXCHANGERS

ACTIONS	DETAILS

NOTE: The components listed below may be tagged per CP-115 as requested by Maintenance at the discretion of the SSOD.

4.14.1 Isolate DHP-1A and DHHE-1A

1. ___ Ensure "B" DH train is operable
2. ___ Rack out DHP-1A breaker
3. CLOSE the following:
   - o ___ DHV-110, Flow Control
   - o ___ DHV-105, MU&P Inlet
   - o ___ DHV-92, Aux Spray Isol
   - o ___ DHV-21, DHP-1A Suction
   - o ___ DHV-39, Suction Crosstie
   - o ___ DHV-120, DHV-39 Bypass
   - o ___ DHV-34, BWST Suction Isol
4. Isolate cooling water to DHP-1A if required
   - o ___ DCV-95, DHP-1A Brg Inlet
   - o ___ DCV-96, DHP-1A Brg Outlet
   - o ___ DCV-29, DHP-1A Mtr Inlet
   - o ___ DCV-35, DHP-1A Mtr Outlet
5. OPEN the following:
   - o ___ DHV-15 DHHE-1A Drain
   - o ___ DHV-20 DHP-1A Drain
   - o ___ DHV-16, Line Vent
   - o ___ DHV-19, DHP-1A Vent

_____/_____
Initial/Date

4.14.2 IF desired to isolate DHHE-1A DC cooling water and drain DHHE-A, THEN position valves as follows:

1. ___ Close DCV-5, DHHE-1A DC Inlet Valve
2. ___ Close DCV-7, DHHE-1A DC Outlet Valve
3. ___ Open DCV-183, DHHE-1A DC Drain Valve
4. ___ Open DCV-125, DHHE-1A DC Vent Valve
5. ___ Open DCV-129, DHHE-1A DC Vent Valve

_____/_____
Initial/Date

4.14 ISOLATION AND RESTORATION OF INDIVIDUAL DECAY HEAT PUMPS AND HEAT EXCHANGERS (Cont'd)

ACTIONS	DETAILS
4.14.3 IF DHHE-1A DC cooled side is to be isolated but not drained, THEN position valves as follows:	1. ___ Close DCV-7, DHHE-1A DC Outlet Valve 2. ___ Close DCV-5, DHHE-1A DC Inlet Valve 3. ___ Open DCV-125, DHHE-1A Vent Valve 4. ___ Open DCV-129, DHHE-1A Vent Valve _____/_____ Initial/Date
4.14.4 WHEN DHP-1A maintenance is complete, THEN fill and vent DHP-1A and DHHE-1A	1. Install temporary vent lines from the following to available floor drain: o ___ DHV-16, Line Vent o ___ DHV-19, DHP-1A Vent 2. CLOSE the following: o ___ DHV-16 o ___ DHV-19 o ___ DHV-20, DHP-1A Drain o ___ DHV-15, DHHE-1A Drain 3. OPEN the following: o ___ DHV-34, BWST Isolation o ___ DHV-21 (sealed), DHP-1A Suction 4. OPEN the following until water flow is detected, THEN CLOSE: o ___ DHV-16 o ___ DHV-19 _____/_____ Initial/Date

4.14 ISOLATION AND RESTORATION OF INDIVIDUAL DECAY HEAT PUMPS AND HEAT EXCHANGERS (Cont'd)

ACTIONS	DETAILS
4.14.5 Restore DHP-1A	1. OPEN/THROTTLE the following (refer to Valve Check List II for specified DC valve positions): o ___ DCV-95 (sealed), DHP-1A Brg Inlet o ___ DCV-96 (sealed), DHP-1A Brg Outlet o ___ DCV-29 (sealed), DHP-1A Mtr Inlet o ___ DCV-35 (sealed), DHP-1A Mtr Outlet o ___ DHV-92, Aux Spray Isol 2. CLOSE the following: o ___ DHV-105, MU&P Inlet o ___ DHV-39, Suction Crosstie o ___ DHV-120, DHV-39 Bypass 3. ___ Place DHV-110 controller in manual and throttle open for 10 - 15 seconds 4. ___ Place DHV-110 in AUTO and controller at 3000 gpm 5. ___ Rack in DHP-1A breaker _____/_____ Initial/Date _____/_____ Verified by/Date
4.14.6 IF DHHE-1A DC cooled side has been isolated and drained, THEN restore as follows:	1. Install temporary vent lines from the following to available floor drains o ___ DCV-125, Vent Valve o ___ DCV-129, Vent Valve 2. ___ Close DCV-183, Drain Valve ___ Close DCV-125, Vent Valve ___ Close DCV-129, Vent Valve 3. ___ Open DCV-5, DHHE-1A Inlet Valve 4. Open the following until water flow is detected THEN Close: o ___ DCV-125, Vent Valve o ___ DCV-129, Vent Valve 5. ___ Open DCV-7, DHHE-1A Outlet Valve _____/_____ Initial/Date

4.14 **ISOLATION AND RESTORATION OF INDIVIDUAL DECAY HEAT PUMPS AND HEAT EXCHANGERS** (Cont'd)

ACTIONS	DETAILS
4.14.7 IF DHHE-1A DC cooled side has been isolated but not drained, THEN restore as follows:	1. ___ Close DCV-125, Vent Valve 2. ___ Close DCV-129, Vent Valve 3. ___ Open DCV-5, Inlet Valve 4. ___ Open DCV-7, Outlet Valve _____/_____ Initial/Date
4.14.8 Isolate DHP-1B and DHHE-1B	1. ___ Ensure "A" DH train is operable 2. ___ Rack out DHP-1B breaker 3. CLOSE the following: o ___ DHV-111, Flow Control o ___ DHV-106, MU&P Inlet o ___ DHV-32, DHP-1B Suction o ___ DHV-40, Suction Crosstie o ___ DHV-121, DHV-40 Bypass o ___ DHV-35, BWST Suction Isol 4. Isolate DHP-1B Cooling water if required o ___ DCV-119, DHP-1B Brg Inlet o ___ DCV-120, DHP-1B Brg Outlet o ___ DCV-30, DHP-1B Mtr Inlet o ___ DCV-36, DHP-1B Mtr Outlet 5. OPEN the following: o ___ DHV-27 DHHE-1B Drain o ___ DHV-31 DHP-1B Drain o ___ DHV-26, Line Vent o ___ DHV-30, DHP-1B Vent _____/_____ Initial/Date

4.14 ISOLATION AND RESTORATION OF INDIVIDUAL DECAY HEAT PUMPS AND HEAT EXCHANGERS (Cont'd)

ACTIONS	DETAILS
4.14.9 IF desired to isolate DC cooling water and drain DHHE-1B, THEN position valves as follows:	1. ___ Close DCV-6, DHHE-1B DC Inlet Valve 2. ___ Close DCV-8, DHHE-1B DC Outlet Valve 3. ___ Open DCV-184, DHHE-1B DC Drain Valve 4. ___ Open DCV-126, DHHE-1B DC Vent Valve 5. ___ Open DCV-130, DHHE-1B DC Vent Valve _____/_____ Initial/Date
4.14.10 IF DHHE-1B DC cooled side is to be isolated but not drained, THEN position valves as follows:	1. ___ Close DCV-8, DHHE-1B DC Outlet Valve 2. ___ Close DCV-6, DHHE-1B DC Inlet Valve 3. ___ Open DCV-126, DHHE-1B DC Vent Valve 4. ___ Open DCV-130, DHHE-1B DC Vent Valve _____/_____ Initial/Date
4.14.11 WHEN DHP-1B maintenance is complete, THEN fill and vent DHP-1B and DHHE-1B	1. Install temporary vent lines from the following to available floor drain: o ___ DHV-26, Line Vent o ___ DHV-30, DHP-1B Vent 2. CLOSE the following: o ___ DHV-26 o ___ DHV-30 o ___ DHV-31, DHP-1B Drain o ___ DHV-27, DHHE-1B Drain 3. OPEN the following: o ___ DHV-35, BWST Isolation o ___ DHV-32 (sealed), DHP-1B Suction 4. OPEN the following until water flow is detected, THEN CLOSE: o ___ DHV-26 o ___ DHV-30 _____/_____ Initial/Date

4.14 ISOLATION AND RESTORATION OF INDIVIDUAL DECAY HEAT PUMPS AND HEAT EXCHANGERS (Cont'd)

ACTIONS	DETAILS
4.14.12 Restore DHP-1B	1. OPEN/THROTTLE the following (refer to Valve Check List II for specified DC valve positions): o ___ DCV-119 (sealed), DHP-1B Brg Inlet o ___ DCV-120 (sealed), DHP-1B Brg Outlet o ___ DCV-30 (sealed), DHP-1B Mtr Inlet o ___ DCV-35 (sealed), DHP-1B Mtr Outlet 2. CLOSE the following: o ___ DHV-106, MU&P Inlet o ___ DHV-40, Suction Crosstie o ___ DHV-121, DHV-40 Bypass 3. ___ Place DHV-111 controller in manual and throttle open for 10 - 15 seconds 4. ___ Place DHV-111 in AUTO and controller at 3000 gpm 5. ___ Rack in DHP-1B breaker _____/_____ Initial/Date _____/_____ Verified by /Date
4.14.13 IF DHHE-1B DC cooled side has been isolated and drained, THEN restore as follows:	1. Install temporary vent lines from the following to available floor drains o ___ DCV-126, Vent Valve o ___ DCV-130, Vent Valve 2. ___ Close DCV-184, Drain Valve ___ Close DCV-126, Vent Valve ___ Close DCV-130, Vent Valve 3. ___ Open DCV-6, DHHE-1B Inlet Valve 4. Open the following until water flow is detected THEN Close: o ___ DCV-126, Vent Valve o ___ DCV-130, Vent Valve 5. ___ Open DCV-8, DHHE-1B Outlet Valve _____/_____ Initial/Date

4.14 **ISOLATION AND RESTORATION OF INDIVIDUAL DECAY HEAT PUMPS AND HEAT EXCHANGERS** (Cont'd)

ACTIONS	DETAILS
4.14.14 IF DHHE-1B DC cooled side has been isolated but not drained, THEN restore as follows:	1. ___ Close DCV-126, Vent Valve 2. ___ Close DCV-130, Vent Valve 3. ___ Open DCV-6, Inlet Valve 4. ___ Open DCV-8, Outlet Valve

_____/_____
Initial/Date

4.15 DCHE ISOLATION/RESTORATION FOR MAINTENANCE

ACTIONS	DETAILS

NOTE: Ensure RWV-33 is open prior to closing RWV-32.

NOTE: The following components may be tagged per CP-115 as requested by Maintenance at the discretion of the SSOD.

4.15.1 Isolate DCHE-1A for maintenance

1. ___ STOP RWP-3A and rack out breaker if required
2. ___ CLOSE the following:
   - o RWV-18, Inlet Isolation
   - o RWV-32, SWHE Outlet Cross Connect
   - o RWV-28, RW Drain
   - o DOV-124, DO Fill
   - o RWV-110, RML-7 Outlet
3. ___ De-energize cathodic protection
4. ___ OPEN the following:
   - o RWV-77, DCHE-1A Inlet Drain
   - o RWV-75, DCHE-1A Outlet Drain
   - o RWV-73, DCHE-1A Vent
   - o RWV-9, RW-29-PI Isolation

_____/_____
Initial/Date

4.15.2 WHEN maintenance is complete, THEN fill and vent DCHE-1A

1. ___ CLOSE RWV-77, Inlet Drain
2. ___ Attach hose from DWV-336 to RWV-75, Outlet Drain
3. ___ OPEN DWV-336, and RWV-75 to fill DCHE-1A
4. ___ WHEN water issues from RWV-73, vent,
   THEN close DWV-336
5. ___ Close the following valves:
   - ___ RWV-73, Vent
   - ___ RWV-75, Outlet Drain
6. ___ Remove and store DW hose

_____/_____
Initial/Date

ACTIONS	DETAILS
4.15.3 Restore DCHE-1A	1. ___ OPEN the following: o RWV-18 (sealed), Inlet Isolation o RWV-32, SWHE Outlet Cross Connect 2. ___ Ensure OPEN: o RWV-9, RW-29-PI Isolation 3. ___ Energize cathodic protection ___/___ Initial/Date ___/___ Verified by /Date

NOTE: Ensure RWV-32 is open prior to closing RWV-33.

NOTE: The following components may be tagged per CP-115 as requested by Maintenance at the discretion of the SSOD.

4.15.4 Isolate DCHE-1B for maintenance	1. ___ STOP RWP-3B and rack out breaker if required 2. ___ CLOSE the following: o RWV-17, Inlet Isolation o RWV-33, SWHE Outlet Cross Connect o RWV-44, RW Drain o DOV-125, DO Fill o RWV-109, RML-7 Outlet 3. ___ De-energize cathodic protection 4. ___ OPEN the following: o RWV-78, DCHE-1B Inlet Drain o RWV-76, DCHE-1B Outlet Drain o RWV-74, DCHE-1B Vent o RWV-4, RW-28-PI Isolation ___/___ Initial/Date

4.15 DCHE ISOLATION/RESTORATION FOR MAINTENANCE (Cont'd)

ACTIONS	DETAILS
4.15.5 WHEN maintenance is complete, THEN fill and vent DCHE-1B	1. ___ CLOSE RWV-78, Inlet Drain 2. ___ Attach hose from DWV-336 to RWV-76, Outlet Drain 3. ___ OPEN DWV-336 and RWV-76 to fill DCHE-1B 4. ___ WHEN water issues from RWV-74, Vent, THEN close DWV-336 5. ___ CLOSE the following valves: ___ RWV-74, Vent ___ RWV-76, Outlet Drain 6. ___ Remove and store DW hose _____/_____ Initial/Date
4.15.6 Restore DCHE-1B	1. ___ OPEN the following: o RWV-17 (sealed), Inlet Isolation o RWV-33, SWHE Outlet Cross Connect 2. ___ Ensure OPEN: o RWV-4, RW-28-PI Isolation 3. ___ Energize cathodic protection _____/_____ Initial/Date _____/_____ Verified by/Date

4.16 DHCCC PUMP ISOLATION/RESTORATION FOR MAINTENANCE

ACTIONS	DETAILS

NOTE: The following components may be tagged per CP-115 as requested by Maintenance at the discretion of the SSOD.

4.16.1 Isolate and drain DCP-1A for maintenance

1. ___ STOP DCP-1A
2. ___ CLOSE the following:
   - o DCV-1, DCP-1A Suction
   - o DCV-3, DCP-1A Discharge
   - o DCV-19, Surge Tank Outlet
3. ___ Install temporary drain line between DCV-121, Surge Line Drain, and available floor drain
4. ___ OPEN the following:
   - o DCV-121
   - o DCP-1A casing vent
5. ___ Reinstall casing vent when pump is drained

_____/_____
Initial/Date

4.16.2 WHEN DCP-1A maintenance is complete,
THEN fill and vent pump

1. ___ CLOSE DCV-121, Surge Line Drain
2. ___ OPEN DCP-1A casing vent
3. ___ OPEN DCV-19, Surge Tank Outlet, 1-3 turns to fill pump
4. ___ CLOSE DCV-19 and reinstall pump casing vent when water flows from vent

_____/_____
Initial/Date

ACTIONS	DETAILS
4.16.3 Restore DCP-1A lineup	o OPEN and seal the following: o DCV-1, DCP-1A Suction o DCV-3, DCP-1A Discharge o DCV-19, Surge Tank Outlet _____/_____ Initial/Date _____/_____ Verified by /Date
4.16.4 Isolate and drain DCP-1B for maintenance	1. ___ STOP DCP-1B 2. ___ CLOSE the following: o DCV-2, DCP-1B Suction o DCV-4, DCP-1B Discharge o DCV-20, Surge Tank Outlet 3. ___ Install temporary drain line between DCV-122, Surge Line Drain, and available floor drain 4. ___ OPEN the following: o DCV-122 o DCP-1B casing vent 5. ___ Reinstall casing vent when pump is drained _____/_____ Initial/Date
4.16.5 WHEN DCP-1B maintenance is complete, THEN fill and vent pump	1. ___ CLOSE DCV-122, Surge Line Drain 2. ___ OPEN DCP-1B casing vent 3. ___ OPEN DCV-20, Surge Tank Outlet, 1-3 turns to fill pump 4. ___ CLOSE DCV-20 and reinstall pump casing vent when water flows from vent _____/_____ Initial/Date

ACTIONS	DETAILS
4.16.6 Restore DCP-1B lineup	o OPEN and seal the following: o DCV-2, DCP-1B Suction o DCV-4, DCP-1B Discharge o DCV-20, Surge Tank Outlet _____/_____ Initial/Date _____/_____ Verified by /Date

4.17 FILLING THE FUEL TRANSFER CANAL: "A" DH SYSTEM IN SERVICE, "B" DH SYSTEM RECIRC OF BWST

ACTIONS	DETAILS
4.17.1 Fuel transfer tube flanges removed and FTC Drain Flange installed	o Flanges removed per MP-125, Fuel Transfer Tube Covers (FHX-1A & FHX-1B) and Drain Line Cover _____/_____ Initial/Date
4.17.2 Cavity seal plate port covers installed	o Plate port covers installed per FP-411, Seal Plate Inspection and Port Cover Installation _____/_____ Initial/Date
4.17.3 Ensure drain line screen installed in FTC 4" deep end drain to RB sump	_____/_____ Initial/Date
4.17.4 Notify Maintenance Supt. or designee of impending FTC fill operation	o Inspection of seal plate welds may be required prior to fill o Maintenance personnel are required for seal plate leak checks per FP-411 _____/_____ Initial/Date
4.17.5 Pre-job briefing conducted with all personnel Operations, Maintenance, Health Physics) involved	_____/_____ Initial/Date
4.17.5.1 BWST boron concentration meets the requirements of Technical Specification 3.9.1	_____/_____ Initial/Date

ACTIONS	DETAILS
4.17.6 Test FTC level alarm	o ___ Close annunciator link 0347, "Fuel Xfer Canal Lvl" o ___ At local station, turn "Horn Silence" on, then off, to verify alarm operability _____/_____ Initial/Date
4.17.7 Ensure "A" DH System is in service	o Refer to Section 4.5 _____/_____ Initial/Date
4.17.8 Align "B" DH System to recirculate the BWST	1. ___ CLOSE DHV-40 2. ___ CLOSE DHV-8 3. ___ OPEN DHV-35 4. ___ Adjust DHV-111 controller to approx. 1500 gpm 5. ___ OPEN DHV-7 6. ___ OPEN DHV-9 _____/_____ Initial/Date

NOTE: Minimum continuous DH pump flow is 1400 gpm.

NOTE: RWV-150 will not properly control SW temperature if RWP-3B is running.

4.17.9 Commence BWST recirculation	1. ___ START DCP-1B 2. ___ START RWP-3B if required 3. ___ START DHP-1B 4. ___ THROTTLE DHV-111 to maintain approximately 1500 gpm 5. ___ Adjust DHP-1B low amp alarm as desired per Section 4.31 _____/_____ Initial/Date

4.17 FILLING THE FUEL TRANSFER CANAL: "A" DH SYSTEM IN SERVICE, "B" DH SYSTEM RECIRC OF BWST (Cont'd)

ACTIONS	DETAILS
4.17.9.1 Ensure proper lubrication of DHP-1B	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date

NOTE: Technical Specification cooldown rates do not apply when filling the Fuel Transfer Canal IF step changes of ≤ 60°F are maintained.

4.17.10 Verify delta temperature between Reactor Coolant and BWST is less than 60°F	1. Record DH Pump Suction and BWST temperatures: o DH Pump (Supplying Core Cooling) Suction Temperature _____°F o BWST Temperature _____°F 2. Calculate the delta temperature: _____°F - _____°F = _____°F (DH Suct) (BWST) (ΔT) 3. ___ Delta temperature is less than or equal to 60°F _____/_____ Initial/Date

4.17.11 Ensure proper Fuel Transfer Canal valve alignment	o ___ SFV-180 Closed o ___ SFV-181 Closed o ___ RCV-38 Closed o ___ RCV-37 Closed o ___ SFV-83 Closed o ___ SFV-84 Closed _____/_____ Initial/Date

ACTIONS	DETAILS
4.17.12 Station operators to monitor level while filling	o Station operators at the following: ___ Reactor vessel level indication ___ Fuel transfer canal ___ 95 foot elevation of Reactor Building ___/___ Initial/Date

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CAUTION: Do not remove or alter any permanent or temporary radiation shielding while checking for seal plate leakage without authorization from Health Physics and the SSOD.

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NOTE: The primary method of seal plate leakage detection is R.B. sump level indication. Should drains to the sump become blocked then water seepage from between lead bricks at "doghouse" will be indicative of seal plate leakage. Seepage from lead bricks may not appear for several hours.

4.17.13 Begin periodic monitoring for leakage from Fuel Transfer Canal	o ___ Monitor shielded access ("doghouse") to reactor vessel vessel cavity for water leakage o ___ Monitor R.B. sump level in the Control Room ___/___ Initial/Date

NOTE: During FTC fill, DH flow is maintained at approximately 1500 gpm to minimize the transport of corrosion products from the core to the FTC water surface.

4.17.14 Commence FTC fill	1. ___ OPEN DHV-6 2. ___ CLOSE DHV-7 if required 3. ___ Throttle DHV-111 to maintain ~1500 gpm ___/___ Initial/Date

4.17 **FILLING THE FUEL TRANSFER CANAL: "A" DH SYSTEM IN SERVICE, "B" DH SYSTEM RECIRC OF BWST** (Cont'd)

ACTIONS	DETAILS
4.17.15 WHEN FTC level increases to approximately 146 foot elevation, THEN stop FTC fill, AND monitor for seal plate leakage	1. ___ OPEN DHV-7 if closed 2. ___ CLOSE DHV-6 _____/_____ Initial/Date
4.17.16 IF Fuel Transfer Canal leakage is unsatisfactory, THEN inform SSOD, AND drain FTC to approx. 6 inches below shallow end elevation, OTHERWISE "N/A" this step	1. ___ STOP DHP-1B 2. ___ STOP RWP-3B 3. ___ STOP DCP-1B 4. ___ CLOSE DHV-7 5. ___ CLOSE/ENSURE CLOSED DHV-6 6. ___ CLOSE DHV-35 7. ___ GO TO Section 4.19 _____/_____ Initial/Date
4.17.17 Continue FTC fill	1. ___ OPEN DHV-6 2. ___ CLOSE DHV-7 if required 3. ___ Throttle DHV-111 to maintain ~1500 gpm 4. ___ Monitor BWST for level and DHP-1B for cavitation 5. ___ When BWST level decreases to 5 ft place the "BWST HTR3A/3B" control switch in the "Local" position _____/_____ Initial/Date

4.17 **FILLING THE FUEL TRANSFER CANAL: "A" DH SYSTEM IN SERVICE, "B" DH SYSTEM RECIRC OF BWST** (Cont'd)

ACTIONS	DETAILS
4.17.18 WHEN FTC level increases to approximately 158 foot elevation, THEN stop FTC fill	1. ___ OPEN DHV-7 if closed 2. ___ CLOSE DHV-6 3. ___ STOP DHP-1B 4. ___ STOP RWP-3B if started 5. ___ STOP DCP-1B _____/_____ Initial/Date
4.17.19 Restore "B" DH train to normal	1. Perform and verify the following lineup: ___ CLOSE DHV-35 ___ CLOSE DHV-7 ___ CLOSE DHV-9 ___ DHV-111 in AUTO and controller adjusted to 3000 gpm ___ CLOSE DHV-8 ___ CLOSE DHV-40 2. ___ Monitor BWST level for approx. 5 min for abnormal level change _____ Performed By _____ Verified By
4.17.20 Enable FTC low level horn and energize canal lighting	o ___ Enable local horn for low FTC level by turning horn switch to "ON" (located near Incore pit) o ___ Energize FTC lights if desired by closing Bkr 4, on ACDP-16 (feeder to ACDP-28, the supply to all FTC lighting) _____/_____ Initial/Date

4.18 FILLING THE FUEL TRANSFER CANAL: "B" DH SYSTEM IN SERVICE, "A" DH SYSTEM RECIRC OF BWST

ACTIONS	DETAILS
4.18.1 Fuel transfer tube flanges removed and FTC Drain Flange installed	o Flanges removed per MP-125, Fuel Transfer Tube Covers (FHX-1A & FHX-1B) and Drain Line Cover _____/_____ Initial/Date
4.18.2 Cavity seal plate port covers installed	o Plate port covers installed per FP-411, Seal Plate Inspection and Port Cover Installation _____/_____ Initial/Date
4.18.3 Ensure drain line screen installed in FTC 4" deep end drain to RB sump	_____/_____ Initial/Date
4.18.4 Notify Maintenance Supt. or designee of impending FTC fill operation	o Inspection of seal plate welds may be required prior to fill o Maintenance personnel are required for seal plate leak checks per FP-411 _____/_____ Initial/Date
4.18.5 Pre-job briefing conducted with all personnel (Operations Maintenance, Health Physics) involved	_____/_____ Initial/Date
4.18.5.1 BWST boron concentration meets the requirements of Technical Specification 3.9.1	_____/_____ Initial/Date

4.18 **FILLING THE FUEL TRANSFER CANAL: "B" DH SYSTEM IN SERVICE, "A" DH SYSTEM RECIRC OF BWST** (Cont'd)

ACTIONS	DETAILS
4.18.6 Test FTC level alarm	o ___ Close annunciator link 0347 "Fuel Xfer Canal Lvl" o ___ At local station, turn "Horn Silence" on, then off, to verify alarm operability _____/_____ Initial/Date
4.18.7 Ensure "B" DH System is in service	o Refer to Section 4.5 _____/_____ Initial/Date
4.18.8 Align "A" DH System to recirculate the BWST	1. ___ CLOSE DHV-39 2. ___ CLOSE DHV-7 3. ___ OPEN DHV-34 4. ___ Adjust DHV-110 controller to approx. 1500 gpm 5. ___ OPEN DHV-8 6. ___ OPEN DHV-9 _____/_____ Initial/Date

NOTE: Minimum continuous DH pump flow is 1400 gpm.

4.18.9 Commence BWST recirculation	1. ___ START DCP-1A 2. ___ START RWP-3A 3. ___ START DHP-1A 4. ___ THROTTLE DHV-110 to maintain approximately 1500 gpm 5. ___ Adjust DHP-1A low amp alarm as desired per Section 4.31 _____/_____ Initial/Date

ACTIONS	DETAILS
4.18.9.1 Ensure proper lubrication of DHP-1A	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date

NOTE: Technical Specification cooldown rates do not apply when filling the Fuel Transfer Canal IF step changes of ≤ 60°F are maintained.

4.18.10 Verify delta temperature between Reactor Coolant and BWST is less than 60°F	1. Record DH Pump Suction and BWST temperatures: o DH Pump (Supplying Core Cooling) Suction Temperature _____°F o BWST Temperature _____°F 2. Calculate the delta temperature: _____°F - _____°F = _____°F (DH Suct) (BWST) (ΔT) 3. ___ Delta temperature is less than or equal to 60°F _____/_____ Initial/Date

4.18.11 Ensure proper Fuel Transfer Canal valve alignment	o ___ SFV-180 Closed o ___ SFV-181 Closed o ___ RCV-38 Closed o ___ RCV-37 Closed o ___ SFV-83 Closed o ___ SFV-84 Closed _____/_____ Initial/Da

4.18 FILLING THE FUEL TRANSFER CANAL: "B" DH SYSTEM IN SERVICE, "A" DH SYSTEM RECIRC OF BWST (Cont'd)

ACTIONS	DETAILS
4.18.12 Station operators to monitor level while filling	o Station operators at the following: ___ Reactor vessel level indication ___ Fuel transfer canal ___ 95 foot elevation of Reactor Building _____/_____ Initial/Date

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CAUTION: Do not remove or alter any permanent or temporary radiation shielding while checking for seal plate leakage without authorization from Health Physics and the SSOD.

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NOTE: The primary method of seal plate leakage detection is R.B. sump level indication. Should drains to the sump become blocked then water seepage from between lead bricks at "doghouse" will be indicative of seal plate leakage. Seepage from lead bricks may not appear for several hours.

4.18.13 Begin periodic monitoring for leakage from Fuel Transfer Canal	o ___ Monitor shielded access ("doghouse") to reactor vessel cavity for water leakage o ___ Monitor R.B. sump level in the Control Room _____/_____ Initial/Date

NOTE: During FTC fill, DH flow is maintained at approximately 1500 gpm to minimize the transport of corrosion products from the core to the FTC water surface.

4.18.14 Commence FTC fill	1. ___ OPEN DHV-5 2. ___ CLOSE DHV-8 if required 3. ___ Throttle DHV-110 to maintain ~1500 gpm _____/_____ Initial/Date

4.18 FILLING THE FUEL TRANSFER CANAL: "B" DH SYSTEM IN SERVICE, "A" DH SYSTEM RECIRC OF BWST (Cont'd)

ACTIONS	DETAILS
4.18.15 WHEN FTC level increases to approximately 146 foot elevation, THEN stop FTC fill AND monitor for seal plate leakage	1. ___ OPEN DHV-8 if closed 2. ___ CLOSE DHV-5 ___/___ Initial/Date
4.18.16 IF Fuel Transfer Canal leakage is unsatisfactory, THEN inform SSOD AND drain FTC to approx. 6 inches below shallow end elevation, OTHERWISE "N/A" this step	1. ___ STOP DHP-1A 2. ___ STOP RWP-3A 3. ___ STOP DCP-1A 4. ___ CLOSE DHV-8 5. ___ CLOSE/ENSURE CLOSED DHV-5 6. ___ CLOSE DHV-34 7. ___ GO TO Section 4.20 ___/___ Initial/Date
4.18.17 Continue FTC fill	1. ___ OPEN DHV-5 2. ___ CLOSE DHV-8 if required 3. ___ Throttle DHV-110 to maintain ~1500 gpm 4. ___ Monitor BWST for level and DHP-1A for cavitation 5. ___ When BWST level decreases to 5 ft place the "BWST HTR 3A/3B" control switch in the "Local" position ___/___ Initial/Date

4.18 FILLING THE FUEL TRANSFER CANAL: "B" DH SYSTEM IN SERVICE, "A" DH SYSTEM RECIRC OF BWST (Cont'd)

ACTIONS	DETAILS
4.18.18 WHEN FTC level increases to approximately 158 foot elevation, THEN stop FTC fill	1. ___ OPEN DHV-8 if closed 2. ___ CLOSE DHV-5 3. ___ STOP DHP-1A 4. ___ STOP RWP-3A 5. ___ STOP DCP-1A _____/_____ Initial/Date
4.18.19 Restore "A" DH train to normal	1. Perform and verify the following lineup: ___ CLOSE DHV-34 ___ CLOSE DHV-8 ___ CLOSE DHV-9 ___ DHV-110 in AUTO and controller adjusted to 3000 gpm ___ CLOSE DHV-7 ___ CLOSE DHV-39 2. ___ Monitor BWST level for approx. 5 min to detect any abnormal level change _____ Performed By _____ Verified By
4.18.20 Enable FTC low level and energize canal lighting	o ___ Enable local horn for low FTC level by turning horn switch to "ON" (located near Incore pit) o ___ Energize FTC lights if desired by closing Bkr 4, on ACDP-16 (feeder to ACDP-28, the supply to all FTC lighting) _____/_____ Initial/Date

4.19 DRAINING FUEL TRANSFER CANAL VIA "A" DH SYSTEM

ACTIONS	DETAILS
4.19.1 Ensure "A" DH train in service and removing decay heat	_____/_____ Initial/Date
4.19.2 Ensure Fuel Transfer Tubes are isolated	1. Ensure Transfer Tube isolation valve seats are clear prior to closing isolation valves, per FP-601D, Operation of Fuel Transfer Carriages and Upenders FHCR-4A/4B 2. ___ Close SFV-119 ___ Close SFV-120 _____/_____ Initial/Date
4.19.3 Disable FTC low level alarm and turn off FTC underwater lights	o ___ Turn local horn switch to "OFF" o ___ Open annunciator link #0347, "Fuel Transfer Canal Level Low" o ___ Open breaker #4 on ACDP-16 (feeder to ACDP-28 for FTC underwater lighting panel RB-4) AND red tag to CEOD in accordance with CP-115 o Clearance number _____ o Accepted by _____ _____/_____ Initial/Date
4.19.4 Station operators to monitor level	o Station operators at: ___ Fuel transfer canal ___ Reactor vessel level indication _____/_____ Initial/Date

ACTIONS	DETAILS

****

CAUTION: Carefully monitor "A" decay heat cooler outlet temperature and DHP-1A parameters (flow, pressures, and amperage) while adjusting flow.

****

4.19.5 Commence FTC drain

1. ___ OPEN DHV-8
2. ___ OPEN DHV-9
3. ___ THROTTLE DHV-5 to establish desired flowrate to BWST
4. ___ When the BWST level is > 5 ft, place the "BWST HTR 3A/3B" control switch to Auto 3A or Auto 3B

Initial/Date

NOTE: Lowering FTC level < 136 feet via the SF system, taking a suction on the deep end, is the desired method to limit the amount of debris that can enter the vessel.

NOTE: Maintain DHP Flow and Vessel Level Within the Acceptable regions of OP-103B, curves 16 and 18.

4.19.6 Determine the final level desired in the Fuel Transfer Canal or Vessel

- o ___ IF desired to draindown the FTC and maintain vessel level, THEN Go to Step 4.19.7 and N/A Steps 4.19.9 through 4.19.14
- o ___ IF the vessel is defueled and it is desired to lower the FTC and vessel level using the DHP THEN Go to Step 4.19.9 and N/A Steps 4.19.7 and 4.19.8

Initial/Date

4.19.7 WHEN FTC level decreases to approximately 136 feet, THEN stop FTC draindown

1. ___ Fully open DHV-5
2. Close:
   ___ DHV-8
   ___ DHV-9
3. Monitor BWST level for approximately 5 min to detect any abnormal level change

Initial/Date

ACTIONS	DETAILS
4.19.8 Continue draining per OP-406, Spent Fuel Cooling System	o ___ GO TO OP-406, Section 4.8

___/___
Initial/Date

****
CAUTION: Vessel level will lower very rapidly when water level drops below the vessel flange if flow rate to the BWST is not decreased.
****

4.19.9 WHEN FTC level decreases to approximately 136 feet, THEN reduce DHP flow to ≈1700 gpm

1. ___ Mon or vessel level and DHP operating conditions closely
2. ___ Adjust DHV-110 as required to attain ≈1700 gpm DHP flow
3. ___ Adjust DHV-5 to maintain desired flow to the BWST

___/___
Initial/Date

4.19.10 WHEN the vessel level decreases below 135'6" (below the seal plate flange), THEN concurrently perform FTC draindown to the desired level per OP-406, Spent Fuel Cooling System

o ___ GO to OP-406, section 4.8
o ___ Draindown FTC to desired level (Normally ≈ 6" below the shallow end lip if the plenum is in the deep end)

___/___
Initial/Date

4.19.11 WHEN Vessel level decreases to approximately 133 feet, THEN stop the draindown and vent the RCP seal packages

1. ___ Fully open DHV-5
2. ___ Close DHV-8
3. ___ Maintain DHP flow ≥ 1500 gpm
4. Vent all RCP seals:
   ___ Break Seal Injection flanges
   or
   ___ Open top hat vents or
   ___ Open Seal Injection line vents

___/___
Initial/Date

ACTIONS	DETAILS
4.19.12 WHEN all RCP seals have been verified to be vented, THEN continue draindown	1. ___ Open DHV-8 2. ___ Adjust DHV-110 as required to maintain ≈1700 gpm 3. ___ Adjust DHV-5 to control flow to the BWST _____/_____ Initial/Date
4.19.13 WHEN Vessel level has decreased to ≥ 129.5', THEN stop vessel draindown	1. ___ Fully open DHV-5 2. Close: ___ DHV-8 ___ DHV-9 3. ___ Monitor BWST and Vessel level for approximately 5 min to detect any abnormal level changes _____/_____ Initial/Date
4.19.14 Establish an activity to restore RCP seal packages to normal prior to subsequent refill to ≥ 133 feet	o ___ Activity established to restore RCP Seal Packages prior to refill to include the following as required: - Seal Injection flanges restored - Top hat vents closed - Seal Injection line vents closed _____/_____ Initial/Date

4.20 DRAINING FUEL TRANSFER CANAL VIA "B" DH SYSTEM

ACTIONS	DETAILS
4.20.1 Ensure "B" DH train in and removing decay heat	_____/_____ Initial/Date
4.20.2 Ensure Fuel Transfer Tubes are isolated	1. Ensure Transfer Tube isolation valve seats are clear prior to closing isolation valves, per FP-601D, Operation of Fuel Transfer Carriages and Upenders FHCR-4A/4B 2. ___ Close SFV-119 ___ Close SFV-120 _____/_____ Initial/Date
4.20.3 Disable FTC low level alarm and turn off FTC underwater lights	o ___ Turn local horn switch to "OFF" o ___ Open annunciator link #0347, "Fuel Transfer Canal Level Low" o ___ Open breaker #4 on ACDP-16 (feeder to ACDP-28 for FTC underwater lighting panel RB-4) AND red tag to the CEOD in accordance with CP-115 o Clearance number _____ o Accepted by _____ _____/_____ Initial/Date
4.20.4 Station operators to monitor level	o Station operators at: ___ Fuel transfer canal ___ Reactor vessel level indication _____/_____ Initial/Date

ACTIONS	DETAILS

****

CAUTION: Carefully monitor "B" decay heat cooler outlet temperature and DHP-1B parameters (flow, pressures, and amperage) while adjusting flow.

****

4.20.5 Commence FTC drain

1. ___ OPEN DHV-7
2. ___ OPEN DHV-9
3. ___ THROTTLE DHV-6 to establish desired flowrate to BWST
4. ___ When the BWST level is > 5 ft, place the "BWST HTR 3A/3B" control switch to Auto 3A or Auto 3B

_____/_____
Initial/Date

NOTE: Lowering FTC level < 136 feet via the SF system, taking a suction on the deep end, is the desired method to limit the amount of debris that can enter the vessel.

NOTE: Maintain DHP Flow and Vessel Level Within the Acceptable regions of OP-103B, curves 16 and 18.

4.20.6 Determine the final level desired in the Fuel Transfer Canal or Vessel

- o ___ IF desired to draindown the FTC and maintain vessel level, THEN Go to Step 4.20.7 and N/A Steps 4.20.9 through 4.20.14
- o ___ IF the vessel is defueled and it is desired to lower the FTC and vessel level using the DHP, THEN Go to Step 4.20.9 and N/A Steps 4.20.7 and 4.20.8

_____/_____
Initial/Date

ACTIONS	DETAILS
4.20.7 WHEN FTC level decreases to approximately 136 feet, THEN stop FTC draindown	1. ___ Fully open DHV-6 2. Close: ___ DHV-7 ___ DHV-9 3. Monitor BWST level for approximately 5 min to detect any abnormal level change _____/_____ Initial/Date
4.20.8 Continue draining per OP-406, Spent Fuel Cooling System	o ___ GO TO OP-406, Section 4.8 _____/_____ Initial/Date

****

CAUTION: Vessel level will lower very rapidly when water level drops below the vessel flange if flow rate to the BWST is not decreased.

****

4.20.9 WHEN FTC level decreases to approximately 136 feet, THEN reduce DHP flow to ≈1700 gpm	1. ___ Monitor vessel level and DHP operating conditions closely 2. ___ Adjust DHV-111 as required to attain ≈1700 gpm DHP flow 3. ___ Adjust DHV-6 to maintain desired flow to the BWST _____/_____ Initial/Date
4.20.10 WHEN the vessel level decreases below 135'6" (below the seal plate flange), THEN concurrently perform FTC draindown to the desired level per OP-406, Spent Fuel Cooling System	o ___ GO to OP-406, Section 4.8 o ___ Draindown FTC to desired level (Normally ≈ 6" below the shallow end lip if the plenum is in the deep end) _____/_____ Initial/Date

4.20 DRAINING FUEL TRANSFER CANAL VIA "B" DH SYSTEM (Cont'd)

ACTIONS	DETAILS
4.20.11 WHEN Vessel level decreases to approximately 133 feet, THEN stop the draindown and vent the RCP seal packages	1. ___ Fully open DHV-6 2. ___ Close DHV-7 3. ___ Maintain DHP flow ≥ 1500 gpm 4. Vent all RCP seals: ___ Break Seal Injection flanges or ___ Open top hat vents or ___ Open Seal Injection line vents _____/_____ Initial/Date
4.20.12 WHEN all RCP seals have been verified to be vented, THEN continue draindown	1. ___ Open DHV-7 2. ___ Adjust DHV-111 as required to maintain ≈1700 gpm 3. ___ Adjust DHV-6 to control flow to the BWST _____/_____ Initial/Date
4.20.13 WHEN Vessel level has decreased to ≥ 129.5', THEN stop vessel draindown	1. ___ Fully open DHV-6 2. Close: ___ DHV-7 ___ DHV-9 3. ___ Monitor BWST and Vessel level for approximately 5 min to detect any abnormal level changes _____/_____ Initial/Date
4.20.14 Establish an activity to restore RCP seal packages to normal prior to subsequent refill to ≥ 133 feet	o ___ Activity established to restore RCP Seal Packages prior to refill to include the following as required: - Seal Injection flanges restored - Top hat vents closed - Seal Injection line vents closed _____/_____ Initial/Date

4.21 BWST RECIRCULATION WITH ALTERNATE SUCTION TO DECAY HEAT PUMPS

ACTIONS	DETAILS
4.21.1 Ensure the Spent Fuel Cooling System is shut down	o Ensure STOPPED: o SFP-1A o SFP-1B o SFP-2 o These components may be tagged per CP-115 at the discretion of the SSOD _____/_____ Initial/Date

****

CAUTION: Carefully monitor spent fuel pool and BWST levels while performing this section. Be alert for the possibility of an inadvertent water transfer.

****

4.21.2 Establish BWST recirc path via the SF system

1. ___ CLOSE the following:
   - ___ SFV-8, "A" SF Pool Outlet
   - ___ SFV-10, SFP-1A Suction
   - ___ SFV-11, SFP-1B Suction
   - ___ SFV-14, SFP-2 Return Isol
   - ___ SFV-134, RML-4 Isolation
   - ___ SFV-21, SFP-2 Suction X-tie
   - ___ SFV-88, Fuel Transfer Canal Outlet
   - ___ SFV-9, "B" SF Pool Outlet
   - ___ SFV-6, Boric Acid Pump Outlet
   - ___ DHV-39, DHP-1A Inlet
   - ___ DHV-40, DHP-1B Inlet
2. ___ OPEN the following:
   - ___ SFV-12, Suction Header Isol
   - ___ SFV-13, BWST Outlet
   - ___ SFV-7, SFP Suction Crosstie
   - ___ SFV-89, SF Outlet to DH
   - ___ DHV-9, BWST Recirc Isolation

_____/_____
Initial/Date

ACTIONS	DETAILS

NOTE: RWP-3A is not required to be started if DC temperature is expected to remain less than 105°F without RW heat removal.

4.21.3 IF DHP-1A is to be used, THEN perform this step, OTHERWISE GO TO Step 4.21.6

1. ___ OPEN the following:
   - o DHV-39, DHP-1A Inlet
   - o DHV-8, "A" DH Recirc Isol
2. ___ START DCP-1A
3. ___ START RWP-3A if required
4. ___ CLOSE DHV-34, BWST Outlet
5. ___ Adjust DHV-110 controller to control flow at 1500-1800 gpm
6. ___ START DHP-1A
7. ___ Adjust DHP-1A low amp alarm as desired per Section 4.31

_____/_____
Initial/Date

4.21.3.1 Ensure proper lubrication of DHP-1A

- o ___ Observe proper operation of Slinger Rings
- o ___ Ensure proper oil levels

_____/_____
Initial/Date

4.21.4 WHEN BWST recirc is no longer desired, THEN secure recirc and realign decay heat system

1. ___ STOP DHP-1A
2. ___ STOP RWP-3A if running
3. ___ STOP DCP-1A
4. ___ CLOSE the following:
   - o DHV-39
   - o DHV-8
5. ___ OPEN DHV-34
6. ___ Adjust DHV-110 controller to control flow at approx. 3000 gpm and select "AUTO"
7. ___ Monitor BWST level for approx. 5 min to detect any abnormal level changes

_____/_____
Initial/Date

ACTIONS	DETAILS
4.21.5 Realign SF and DH Systems to normal	1. Close/Ensure closed the following: ___ SFV-89 ___ SFV-13 2. Perform Valve Check List IV (Enclosure 4) 3. Exit this procedure _____/_____ Initial/Date

NOTE: RWP-3B is not required to be started if DC temperature is expected to remain less than 105°F without RW heat removal.

NOTE: RWV-150 will not properly control SW temperature if RWP-3B is running.

4.21.6 Commence BWST recirculation	1. ___ OPEN the following: o DHV-40, DHP-1B Inlet o DHV-7, "B" DH Recirc Isol 2. ___ START DCP-1B 3. ___ START RWP-3B if required 4. ___ CLOSE DHV-35, BWST Outlet 5. ___ Adjust DHV-111 controller to control flow at 1500-1800 gpm 6. ___ START DHP-1B 7. ___ Adjust DHP-1B low amp alarm as desired per Section 4.31 _____/_____ Initial/Date
4.21.6.1 Ensure proper lubrication of DHP-1B	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date

ACTIONS	DETAILS
4.21.7 WHEN BWST recirc is no longer desired, THEN secure recirc and realign decay heat system	1. ___ STOP DHP-1B 2. ___ STOP RWP-3B if running 3. ___ STOP DCP-1B 4. ___ CLOSE the following: o DHV-40 o DHV-7 5. ___ OPEN DHV-35 6. ___ Adjust DHV-111 controller to control flow at approx. 3000 gpm and select "AUTO" 7. ___ Monitor BWST level for approx. 5 min to detect any abnormal level changes _____/_____ Initial/Date
4.21.8 Realign SF and DH Systems to normal	1. Close/Ensure closed the following: ___ SFV-13 ___ SFV-89 2. Perform Valve Check List IV (Enclosure 4) _____/_____ Initial/Date

4.22 CROSS TIE OF DECAY HEAT FLOW TO REACTOR VESSEL "A" DECAY HEAT PUMP IN SERVICE

ACTIONS	DETAILS
4.22.1 Ensure "A" DH train in service	o Refer to Section 4.5

Initial/Date

NOTE: If DHV-7 or 8 do not open electrically due to high differential pressure across the valve(s), it may be necessary to open the valve(s) manually.

4.22.2 Cross-connect DH trains

1. ___ CLOSE DHV-111, "B" DH Train Flow Control
2. ___ OPEN the following:
   - o DHV-8, "A" DH Crosstie
   - o DHV-7, "B" DH Crosstie
   - o DHV-6, "B" DH Outlet

Initial/Date

4.22.3 Transfer DHP-1A flow to "B" DH train

1. ___ Monitor crossover flow on DH-38-FI
2. ___ CLOSE DHV-5, "A" DH Outlet
3. ___ Adjust DHV-110 to maintain desired flowrate
4. ___ Adjust DHP-1A low amp alarm as desired per Section 4.31

Initial/Date

4.22.4 WHEN cross connected operation is no longer desired,
THEN restore normal lineup

1. ___ OPEN DHV-5
2. ___ CLOSE the following:
   - o DHV-7
   - o DHV-8
   - o DHV-6
3. ___ Adjust DHV-110 to maintain desired flowrate
4. ___ Adjust DHV-111 controller to control at approximately 3000 and place in "AUTO"

Initial/Date Verified by/Date

4.23 CROSS TIE OF DECAY HEAT FLOW TO REACTOR VESSEL "B" DECAY HEAT PUMP IN SERVICE

ACTIONS	DETAILS
4.23.1 Ensure "B" DH train in service	o Refer to Section 4.5 _____/_____ Initial/Date

NOTE: If DHV-7 or 8 do not open electrically due to high differential pressure across the valve(s), it may be necessary to open the valve(s) manually.

4.23.2 Cross-connect DH trains	1. ___ CLOSE DHV-110, "A" DH Train Flow Control 2. ___ OPEN the following: o DHV-8, "A" DH Crosstie o DHV-7, "B" DH Crosstie o DHV-5, "A" DH Outlet _____/_____ Initial/Date
4.23.3 Transfer DHP-1B flow to "A" DH train	1. ___ Monitor crossover flow on DH-38-FI 2. ___ CLOSE DHV-6, "B" DH Outlet 3. ___ Adjust DHV-111 to maintain desired flowrate 4. ___ Adjust DHP-1B low amp alarm as desired per Section 4.31 _____/_____ Initial/Date
4.23.4 WHEN cross connected operation is no longer desired, THEN restore normal lineup	1. ___ OPEN DHV-6 2. ___ CLOSE the following: o DHV-7 o DHV-8 o DHV-5 3. ___ Adjust DHV-111 to maintain desired flowrate 4. ___ Adjust DHV-110 controller to control at approximately 3000 gpm and place in "AUTO" _____/_____ Initial/Date _____/_____ Verified by/Date

4.24 RAISING LEVEL IN PARTIALLY DRAINED RCS

ACTIONS	DETAILS
4.24.1 Ensure the decay heat system is on purification using the MU&P System	o Refer to Section 4.10 ____/____ Initial/Date
4.24.2 Establish RCS level watch	IF tygon tube level indication is unavailable in the Control Room via a camera/monitor, THEN assign a level watch at the tygon level indicator and establish communications capability while changing level ____/____ Initial/Date
4.24.3 IF at anytime during the RCS level increase, RC-202-L1 (Computer Point R330) does not agree within ± 3" with the clear tygon tubing level indication, THEN investigate the abnormality. Perform SP-195, Remote Reactor Vessel Level Instrumentation Calibration, if required	____/____ Initial/Date

****

CAUTION: RC level instrumentation must be monitored continuously while changing level.

****

4.24.4 Reduce purification flow to approximately 25-30 gpm	o Adjust DHV-105 or DHV-106 as applicable ____/____ Initial/Date

ACTIONS	DETAILS

****

CAUTION: Ensure the boron concentration of water added to the RCS is equal to or greater than required boron concentration for shutdown margin per Curve 18 or 19 of OP-103C.

****

NOTE: Batch feeds from two sources may be used provided that:

1) The resultant boron concentration of the batch feed is greater than or equal to the required boron concentration for shutdown margin per Curve 18 or 19 of OP-103C;

AND

2) The source of higher boron concentration is added to the RCS first.

4.24.5	Add desired water volume from a suitable source to the RCS	o Make a batch addition per Section 4.6 of OP-402, Makeup & Purification System _____/_____ Initial/Date
4.24.6	Monitor RCS level for at least 15 min after making addition WHEN level readings have stabilized, THEN record level	1. ___ Record level readings in Nuclear Operator's Log 2. ___ Secure watch (if applicable) at RC level instrumentation if reactor vessel level is ≥ 132 feet _____/_____ Initial/Date
4.24.7	Restore purification flow to previous flowrate	o Adjust DHV-105 or DHV-106 as applicable _____/_____ Initial/Date

4.25 LOWERING LEVEL IN PARTIALLY DRAINED RCS

ACTIONS	DETAILS
4.25.1 Ensure the decay heat system is on purification using the MU&P System	o Refer to Section 4.10 ____/____ Initial/Date
4.25.2 Ensure RCS conditions are monitored during level change	o Refer to SP-301, Enclosure 2, "RCS Level and Temperature Logsheet" for monitoring requirements ____/____ Initial/Date
4.25.3 Establish RCS level watch	IF tygon tube level indication is unavailable in the Control Room via a camera/monitor, THEN assign a level watch at the tygon level indicator and establish communications capability while changing level ____/____ Initial/Date
4.25.4 IF at any time during the RCS Draindown, RC-202-L1 (Computer Point R330) does not agree within ± 3" with the Clear Tygon Tubing Level Indication, THEN stop the Draindown and investigate the abnormality. Perform SP-195, Remote Reactor Vessel Level Instrumentation Calibration, if required	____/____ Initial/Date

ACTIONS	DETAILS
NOTE: Maintain DHP Flow and Vessel Level Within the Acceptable regions of OP-103B, curves 16 and 18.	
4.25.5 Remove water from the RCS to achieve desired level	o Make a batch bleed per Section 4.5 of OP-402, Makeup & Purification System _____/_____ Initial/Date
4.25.6 Monitor RCS level for at least 15 min after level is lowered WHEN level readings have stabilized, THEN record level	1. ___ Record level readings in Nuclear Operator's Log _____/_____ Initial/Date
NOTE: Maintain DHP Flow and Vessel Level Within the Acceptable regions of OP-103B, curves 16 and 18.	
4.25.7 IF RC level is <132', THEN maintain level watch	IF tygon tube level indication is unavailable in the Control Room via a camera/monitor, THEN maintain a level watch at the tygon level indicator and maintain continuous communications capability with the Control Room _____/_____ Initial/Date

4.26 BWST RECIRCULATION WITH DHP-1A

ACTIONS	DETAILS
4.26.1 Align the DH System for recirculation using DHP-1A	1. ___ OPEN the following: o DHV-34, BWST Suction Iso o DHV-8, "A" DH Recirc Iso o DHV-9, BWST Recirc Hdr Iso 2. ___ THROTTLE DHV-110 to approx. 3000 gpm 3. ___ Ensure CLOSED: o DHV-39, "A" DH Isolation o DHV-7, "B" DH Recirc Iso _____/_____ Initial/Date

NOTE: RWP-3A is not required to be started if DC temperature is expected to remain less than 105°F without RW heat removal.

4.26.2 Commence BWST recirculation	1. ___ START DCP-1A 2. ___ START RWP-3A if required 3. ___ START DHP-1A _____/_____ Initial/Date
4.26.2.1 Ensure proper lubrication of DHP-1A	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date
4.26.3 <u>WHEN</u> BWST recirculation is no longer desired, <u>THEN</u> stop recirc flow	1. ___ Ensure DHV-110 controller to approximately 3000 gpm and in "AUTO" 2. ___ STOP DHP-1A 3. ___ STOP RWP-3A if started 4. ___ STOP DCP-1A _____/_____ Initial/Date

ACTIONS	DETAILS
4.26.4 Secure recirculation lineup	1. ___ CLOSE the following: o DHV-34 o DHV-8 o DHV-9 2. ___ Monitor BWST level for approx. 5 min to detect any abnormal level change _____/_____ Initial/Date _____/_____ Verified By/Date

4.27 BWST RECIRCULATION WITH DHP-1B

ACTIONS	DETAILS
4.27.1 Align the DH System for recirculation using DHP-1B	1. ___ OPEN the following: o DHV-35, BWST Suction Iso o DHV-7, "B" DH Recirc Iso o DHV-9, BWST Recirc Hdr Iso 2. ___ THROTTLE DHV-111 to approx. 3000 gpm 3. ___ Ensure CLOSED: o DHV-40, "B" DH Isolation o DHV-8, "A" DH Recirc Iso _____/_____ Initial/Date

NOTE: RWP-3B is not required to be started if DC temperature is expected to remain less than 105°F without RW heat removal.

NOTE: RWV-150 will not properly control SW temperature if RWP-3B is running.

4.27.2 Commence BWST recirculation	1. ___ START DCP-1B 2. ___ START RWP-3B if required 3. ___ START DHP-1B _____/_____ Initial/Date
4.27.2.1 Ensure proper lubrication of DHP-1B	o ___ Observe proper operation of Slinger Rings o ___ Ensure proper oil levels _____/_____ Initial/Date
4.27.3 <u>WHEN</u> BWST recirculation is no longer desired, <u>THEN</u> secure recirc flow	1. ___ Ensure DHV-111 controller to approximately 3000 gpm and in "AUTO" 2. ___ STOP DHP-1B 3. ___ STOP RWP-3B if started 4. ___ STOP DCP-1B _____/_____ Initial/Date

ACTIONS	DETAILS
4.27.4 Secure recirculation lineup	1. ___ CLOSE the following: o DHV-35 o DHV-7 o DHV-9 2. ___ Monitor BWST level for approx. 5 min to detect any abnormal level change _____/_____ Initial/Date _____/_____ Verified By/Date

4.28 FEED AND BLEED OF DC SYSTEM FOR CHEMISTRY CONTROL

ACTIONS	DETAILS
4.28.1 Ensure that the DC surge tank level alarms are operable and tank levels are maintained by DCV-10 or DCV-12 as applicable	o High level alarm - 11 ft 4 in o Low level alarm - 8 ft 6 in _____/_____ Initial/Date
4.28.2 Start feed and bleed as requested by Chemistry	1. ___ Designate an operator to monitor drain valve and close as required 2. ___ OPEN applicable drain valve and adjust flow to approx. 1.5 gpm o DCV-181, DCHE-1A Drain o DCV-182, DCHE-1B Drain _____/_____ Initial/Date
4.28.3 Secure feed and bleed when; 1. Notified by Chemistry that DC System water chemistry is within specifications OR 2. Automatic Engineered Safeguards Actuation Occurs	o CLOSE applicable drain: o DCV-181 o DCV-182 _____/_____ Initial/Date

4.29 COOLDOWN OF PRESSURIZER WITH AUXILIARY SPRAY (RCV-53)

ACTIONS	DETAILS

****
CAUTION: Do not use Aux spray to degas the PZR.
****

NOTE: Whenever Auxiliary Pressurizer spray is required then the pressurizer heaters must be off and the A T_{HOT} temperature should be monitored.

NOTE: "A" DH train is preferred due to increased auxiliary spray flow.

4.29.1 Ensure sufficient pressurizer heaters available

_____/_____
Initial/Date

4.29.2 Ensure No OTSG's are on recirculation

Ensure CGP-2 is off
Ensure closed:

___ MSV-130
___ MSV-148
___ CGV-17
___ CGV-18

_____/_____
Initial/Date

****
CAUTION: Verify subcooled conditions in both A and B loop hot legs while pressurizer is on spray.
****

4.29.3 Ensure RCV-53 is closed — Close RCV-53

_____/_____
Initial/Date

4.29.4 Open DHV-91

_____/_____
Initial/Date

4.29 COOLDOWN OF PRESSURIZER WITH AUXILIARY SPRAY (RCV-53) (Cont'd)

ACTIONS	DETAILS
4.29.5 Throttle open RCV-53 to achieve desired spray flow Throttle open RCV-53	_____/_____ Initial/Date
4.29.6 WHEN auxiliary spray flow is no longer desired, THEN secure spray flow	1. ___ Close RCV-53 2. ___ Close DHV-91 _____/_____ Initial/Date

4.30 SECURING DECAY HEAT REMOVAL

ACTIONS	DETAILS

****

CAUTION: Ensure cooling water is maintained to operating makeup pumps prior to securing DCP-1A/1B.

****

4.30.1 IF securing DHP-1A,
THEN continue with this step,
OTHERWISE GO TO Step 4.30.2

1. ___ STOP DHP-1A
2. ___ STOP RWP-3A
3. ___ STOP DCP-1A
4. ___ CLOSE the following:
   - ___ DHV-39
   - ___ DHV-5
5. ___ GO TO Step 4.30.3

_____/_____
Initial/Date

4.30.2 Secure "B" DH flow

1. ___ STOP DHP-1B
2. ___ STOP RWP-3B
3. ___ STOP DCP-1B
4. ___ CLOSE the following:
   - ___ DHV-6
   - ___ DHV-40

_____/_____
Initial/Date

4.30.3 IF terminating DH removal,
THEN continue with this step,
OTHERWISE mark "N/A"

o ___ CLOSE the following:

___ DHV-3	___ DHV-39
___ DHV-4	___ DHV-40
___ DHV-5	___ DHV-41
___ DHV-6	___ DHV-91
	___ RCV-53

_____/_____
Initial/Date

ACTIONS	DETAILS
4.30.4 Return ES valves to standby	o ___ CLOSE/ensure CLOSED the following: ___ DHV-34 ___ DHV-35 o ___ Place the following in AUTO with controller set at 300 gpm: ___ DHV-110 ___ DHV-111 o ___ Close/Ensure closed the following valves with breaker in lock/reset ___ DHV-3* ___ DHV-105 ___ DHV-106 _____/_____ Initial/Date _____/_____ Verified by /Date *DHV-3 must have breaker locked to eye bolt on breaker cubicle door

NOTE: Refer to Enclosure 5.

4.30.5 Align DHHE-1A to ES standby	1. ___ Position the DCV-177-MS rheostat to "0" (minimum cooling) 2. ___ CLOSE DCV-194, IA Supply from DCV-177-MS to temperature control valves 3. ___ OPEN DCV-195, IA Vent from DCV-177-MS _____/_____ Initial/Date _____/_____ Verified by /Date

ACTIONS	DETAILS
NOTE: Refer to Enclosure 5.	
4.30.6 Align DHHE-1B to ES standby	1. ___ Position the DCV-178-MS rheostat to "0" (minimum cooling) 2. ___ CLOSE DCV-196, IA Supply from DCV-178-MS to temperature control valves 3. ___ OPEN DCV-197, IA Vent from DCV-178-MS _____/_____ Initial/Date _____/_____ Verified by /Date

4.31 SETTING DHP LOW AMPS ALARM SETPOINT

ACTIONS	DETAILS
4.31.1 IF desired to adjust the Decay Heat Pump low amperage alarm, THEN perform this section	o Adjustment will normally be required following a pump start or a flow change when the RCS is in a draindown condition _____/_____ Initial/Date
4.31.2 WHEN DH flow has stabilized and flow is at the desired setpoint, THEN adjust potentiometer until alarm is just received (or clears)	o Pots are located inside the MCB on DH-56-IR for DHP-1A and DH-57-IR for DHP-1B o Pots are a 0-100%, 10 turn vernier dials _____/_____ Initial/Date
NOTE: An alarm setpoint as close to the operating amps of the pump without causing nuisance alarms is desired.	
4.31.3 Lower the setpoint to an operator desired value below the existing pump amp value	o Decrease setting on the potentiometer to a value as desired such that the alarm is clear and the setpoint is slightly below the operating amperage of the running DHP _____/_____ Initial/Date
4.31.4 Periodically verify the setpoint is close to the DHP operating amps	o This will ensure that as conditions change (equipment warms up, RCS temperature changes, etc.) the setpoint will not drift too far away from the operating amps _____/_____ Initial/Date

5.0 FOLLOW-UP ACTIONS

ACTIONS	DETAILS
None	

6.0 RESTORATION INSTRUCTIONS

ACTIONS	DETAILS
None	

System: Decay Heat Seawater System			Flow Diagram No. FD-302-611
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
	**** "A" Train ****		
RWV-31	Isolation to RW-62-PS and RW-7-PI	Open	/
RWV-39	Isolation to RW-9-PI	Open	/
RWV-18	3A Decay Heat Seawater Pump Discharge Valve	Sealed Open	/
RWV-28	Drain	Closed	/
RWV-9	RW-29-PI Root Valve	Open	/
RWV-50	RW-44-CX Root Valve	Closed	/
RWV-40	3A DH Seawater Train Isolation to Discharge Canal	Sealed Open	/
RWV-73	3A DHHE Seawater Vent	Closed	/
RWV 75	3A DHHE Seawater Drain	Closed	/
RWV-77	3A DHHE Seawater Drain	Closed	/
RWV-32	SW-RW Outfall Valve	*Sealed Open/Closed	/
RWV-110	Secondary Release Outlet	Locked Closed	/
RWV-111	RW Sample	Closed	/
RWV-146	Flow Instrument Isolation Vlv	Closed	/
	**** "B" Train ****		
RWV-47	RW-8-PT Root Valve	Open	/
RWV-48	RW-6-PI and RW-61-PS Root Valves	Open	/
RWV-17	3B Decay heat Seawater Pump Discharge Valve	Sealed Open	/
RWV-44	Drain	Closed	/
RWV-4	RW-28-PI Root Valve	Open	/
RWV-49	RW-43-CX Root Valve	Closed	/
RWV-41	Isolation of DH Seawater to Discharge Canal	Sealed Open	/
RWV-74	3B DHHE Seawater Vent	Closed	/
RWV-76	3B DHHE Seawater Drain	Closed	/

NOTE: *At least 1 valve (RWV-32 or 33) open at all times.

System: Decay Heat Seawater System		Flow Diagram No. FD-302-611	
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
RWV-78	3B DHHE Seawater Drain	Closed	/
RWV-33	SW-RW Outfall Valve	*Sealed Open/Closed	/
RWV-109	Secondary Release Outlet	Locked Closed	/
RWV-147	Flow Instrument Isolation Vlv.	Closed	/
****Secondary Release Sample Station, Turb. Exterior Wall****			
RWV-124	Secondary Release Sample (A)	Closed	/
RWV-126	Secondary Release Flush	Closed	/
****RWP-4 Pump House at Discharge Canal****			
RWV-127	RWP-4 Suction	Open	/
RWV-120	Suction Crossconnect	Closed	/
****RW Flush Water to DO Seawater Room Aux. 95'****			
RWV-145	RWP-3A Flush Water to DO	Sealed Open	/
RWV-135	"A" Train Flush Water RW to DO	Sealed Open	/
RWV-144	Line Drain	Closed	/
RWV-138	Line Drain	Closed	/
RWV-143	RWP-3B Flush Water to DO	Sealed Open	/
RWV-139	Line Drain	Closed	/
RWV-140	Line Drain	Closed	/
RWV-136	"B" Train RW Flush Water to DO	Sealed Open	/
RWV-137	RWP-2A Flush Water to DO	Sealed Open	/
RWV-142	RWP-2B Flush Water to DO	Sealed Open	/
RWV-141	RWP-1 Flush Water to DO	Open	/

NOTE: *At least 1 valve (RWV-32 or 33) open at all times.

System: Decay Heat CCC System			Flow Diagram No. FD-302-631
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
	**** 3A DHCCC Surge Tank ****		
DCV-67	3A Surge Tank Level Indication Isolation Valve	Open	/
DCV-101	DC-59-PI Instrument Isolation	Open	/
DCV-61	WD Vent 3A Surge Tank	Open	/
DCV-168	Vent 3A Surge Tank	Closed	/
DCV-176	Demineralized Water Line Drain at 3A Surge Tank	Closed	/
DCV-59	Demineralized Water Inlet to 3A Surge Tank Note 1	Open	/
DCV-169	Level Transmitter Isolation for 3A Surge Tank	Open	/
DCV-68	Level Indication Isolation for 3A Surge Tank	Open	/
DCV-72	Level Transmitter Isolation for 3A Surge Tank	Open	/
DCV-100	Level Indication Drain for 3A Surge Tank	Closed	/
DCV-63	3A Surge Tank Drain	Closed	/
DCV-19	3A Surge Tank Discharge	Sealed Open	/
DCV-121	3A Surge Tank Drain	Closed	/
DCV-187	WD Vent 3A Surge Tank	Closed	/
DCV-186	Nitrogen Supply Note 1	Open	/
	**** 3B DHCCC Surge Tank ****		
DCV-69	3B Surge Tank Level Indication Isolation Valve	Open	/
DCV-102	DC-60-PI Instrument Isolation	Open	/
DCV-62	3B Surge Tank WD Vent	Open	/
DCV-167	3B Surge Tank Vent	Closed	/
DCV-175	Demineralized Water Drain at 3B Surge Tank	Closed	/
DCV-60	3B Surge Tank Demineralized Water Inlet Note 1	Open	/
DCV-170	Level Transmitter Isolation 3B Surge Tank	Open	/
DCV-70	Level Indication Isolation 3B Surge Tank	Open	/

NOTE 1: Ensure system integrity prior to opening these valves.

System: Decay Heat CCC System			Flow Diagram No. FD-302-631
Valve No.	Description	Position	Initials Perform/Verify
DCV-74	Level Transmitter Isolation 3B Surge Tank	Open	/
DCV-99	Level Indication Drain 3B Surge Tank	Closed	/
DCV-64	3B Surge Tank Drain	Closed	/
DCV-20	3B Surge Tank Discharge	Sealed Open	/
DCV-122	3B Surge Tank Drain	Closed	/
DCV-189	WD Vent 3B Surge Tank	Closed	/
DCV-188	Nitrogen Supply Note 1	Open	/
	**** 3A DHCCC Train ****		
DCV-1	3A DHCCC Pump Suction	Sealed Open	/
DCV-91	Chemical Addition Isolation to 3A DHCCC Pump	Closed	/
DCV-75	Isolation to DC-1-PI	Open	/
DCV-88	Isolation to RM-L5	Open	/
DCV-171	Flush Line RML-5	Closed	/
DCV-202	RM-L5 Outlet Isolation	Open	/
DCV-201	RM-L5 Vent	Closed	/
DCV-200	RM-L5 Flush Line	Closed	/
DCV-204	RM-L5 Drain	Closed	/
DCV-203	RM-L5 Inlet Isolation	Open	/
DCV-172	Flush Line RML-5	Closed	/
DCV-87	Isolation to DC-45-FI	Open	/
DCV-3	3A DHCCC Pump Discharge	Sealed Open	/
DCV-77	PI-3 Isolation	Closed	/
DCV-79	PT-5 Isolation	Open	/
DCV-73	DC-61-FI Isolation	Open	/
DCV-71	DC-61-FI Isolation	Open	/
DCV-85	PS-55 Isolation	Open	/
DCV-97	Sample Isolation	Closed	/
	**** 3B DHCCC Train ****		
DCV-2	3B DHCCC Pump Suction	Sealed Open	/
DCV-92	Chemical Addition Isolation to 3B DHCCC Pump	Closed	/

NOTE 1: Ensure system integrity prior to opening these valves.

System: Decay Heat CCC System			Flow Diagram No. FD-302-631
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
DCV-76	Isolation to DC-2-PI	Open	/
DCV-89	RM-L6 Sample Line Isolation	Open	/
DCV-173	RML-6 Drain	Closed	/
DCV-209	RM-L6 Isolation	Open	/
DCV-208	RML-6 Vent	Closed	/
DCV-207	Flush Line RML-6	Closed	/
DCV-211	RM-L6 Drain	Closed	/
DCV-210	RM-L6 Isolation	Open	/
DCV-174	RML-6 Drain	Closed	/
DCV-90	RML-6 Sample Line Isolation	Open	/
DCV-4	3B DHCCC Pump Discharge	Sealed Open	/
DCV-78	Isolation to DC-4-PI	Closed	/
DCV-80	Isolation to DC-6-PT	Open	/
DCV-93	DC-62-FI Isolation	Open	/
DCV-94	DC-62-FI Isolation	Open	/
DCV-86	Isolation to DC-56-PS	Open	/
DCV-98	Sample Isolation	Closed	/
	**** 3A DHCCC Train ****		
DCV-131	Drain	Closed	/
DCV-123	Vent	Closed	/
DCV-5	3A Decay Heat Removal Heat Exchanger Inlet	Sealed Open	/
DCV-17 Manual Handjack	3A Decay Heat Removal Heat Exchanger Inlet/Outlet X-tie Manual Handjack	Sealed in Full Counterclockwise Position	/
DCV-177 Manual Handjack	3A Decay Heat Removal Heat Exchanger Outlet Manual Handjack	Sealed 1-1/4 Turns from the Full Counterclockwise Position	/
DCV-125	3A Decay Heat Exchanger Vent	Closed	/
DCV-129	3A Decay Heat Exchanger Vent	Closed	/
DCV-127	Drain	Closed	/
DCV-7	3A Decay Heat Exchanger Isolation	Sealed Open	/
DCV-160	Vent	Closed	/

System: Decay Heat CCC System			Flow Diagram No. FD-302-631
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
DCV-13	3A DHCCCS Heat Exchanger Inlet	Sealed Open	/
DCV-81	Isolation to DC-41-PI	Open	/
DCV-82	Isolation tc DC-42-PI	Open	/
DCV-181	3A DHCCC Heat Exch. Drain	Closed	/
DCV-183	3A DH Removal HE Drain	Closed	/
	**** 3B DHCCC Train ****		
DCV-146	Drain	Closed	/
DCV-124	Vent	Closed	/
DCV-6	3B Decay Heat Removal Heat Exchanger Inlet	Sealed Open	/
DCV-18 Manual Handjack	3B Decay Heat Removal Heat Exchanger Inlet/Outlet X-tie Manual Handjack	Sealed in Full Counterclockwise Position	/
DCV-178 Manual Handjack	3B Decay Heat Removal Heat Exchanger Outlet Manual Handjack	Sealed 5-3/4 Turns from the Full Counterclockwise Position	/
DCV-126	3B Decay Heat Exchanger Vent	Closed	/
DCV-130	3B Decay Heat Exchanger Vent	Closed	/
DCV-128	Drain	Closed	/
DCV-8	3B Decay Heat Exchanger Isolation	Sealed Open	/
DCV-159	Vent	Closed	/
DCV-14	3B DHCCCS Heat Exchanger Inlet	Sealed Open	/
DCV-83	Isolation to DC-43-PI	Open	/
DCV-84	Isolation to DC-44-PI	Open	/
DCV-182	3B DHCCC Heat Exch. Drain	Closed	/
DCV-184	3B DH Removal HE Drain	Closed	/
	**** 3A DHCCC Train ****		
DCV-15	3A DHCCCS Heat Exchanger Outlet	Sealed Open	/
DCV-164	Vent	Closed	/
DCV-179	Vent	Closed	/

System: Decay Heat CCC System			Flow Diagram No. FD-302-631
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
	**** 3A Decay Heat Pump Air Handling Unit ****		
DCV-32	3A Air Handling Fan Inlet	Sealed Open	/
DCV-38	3A Air Handling Fan Outlet	Sealed 1-3/4 Turns Open	/
DCV-161	Vent	Closed	/
	****3A Decay Heat Pump Motor****		
DCV-95	3A Stuffing Box and Bearing Inlet	Sealed 1-1/4 Turns Open	/
DCV-96	3A Stuffing Box and Bearing Outlet	Sealed Open	/
DCV-29	3A Decay Heat Pump Motor Inlet	Sealed Open	/
DCV-35	3A Decay Heat Pump Motor Outlet	Sealed 1 Turn Open	/
	**** 3B DHCCC Train ****		
DCV-16	3B DHCCCS Heat Exchanger Outlet	Sealed Open	/
DCV-163	Vent	Closed	/
DCV-180	Vent	Closed	/
	**** 3B Decay Heat Pump Air Handling Unit ****		
DCV-31	3B Air Handling Fan Inlet	Sealed Open	/
DCV-37	3B Air Handling Fan Outlet	Sealed 1-3/4 Turns Open	/
DCV-162	Vent	Closed	/
	**** 3B Decay Heat Pump Motor ****		
DCV-119	3B Stuffing Box and Bearing Inlet	Sealed 1-1/2 Turns Open	/
DCV-120	3B Stuffing Box and Bearing Outlet	Sealed Open	/
DCV-30	3B Decay Heat Pump Motor Inlet	Sealed Open	/
DCV-36	3B Decay Heat Pump Motor Outlet	Sealed 7/8 Turn Open	/

System: Decay Heat CCC System			Flow Diagram No. FD-302-631
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
	**** 3A DHCCC Train ** ** Reactor Building Spray Pump 3A Motor ****		
DCV-115	3A Stuffing Box and Bearing Inlet	Sealed 2 Turns Open	/
DCV-116	3A Stuffing Box and Bearing Outlet	Sealed Open	/
DCV-27	3A Building Spray Pump Motor Inlet	Sealed Open	/
DCV-33	3A Building Spray Pump Motor Outlet	Sealed 3/4 Turn Open	/
	**** 3A Decay Heat Seawater Pump Motor ****		
DCV-43	3A Raw Water Pump Inlet	Sealed Open	/
DCV-45	3A Raw Water Pump Outlet	Sealed 2 Turns Open	/
DCV-166	Drain	Closed	/
DCV-205	RWP-3A Motor Cooler Vent	Closed	/
	**** 3B DHCCC Train ** ** Reactor Building Spray Pump 3B Motor ****		
DCV-117	3B Stuffing Box and Bearing Inlet	Sealed 2 Turns Open	/
DCV-118	3B Stuffing Box and Bearing Outlet	Sealed Open	/
DCV-28	3B Building Spray Pump Motor Inlet	Sealed Open	/
DCV-34	3B Building Spray Pump Motor Outlet	Sealed 7/8 Turns Open	/
	**** 3B Decay Heat Seawater Pump Motor ****		
DCV-44	3B Raw Water Pump Inlet	Sealed Open	/
DCV-46	3B Raw Water Pump Outlet	Sealed 4 Turns Open	/
DCV-165	Drain	Closed	/
DCV-206	RWP03B Motor Cooler Vent	Closed	/

System: Decay Heat CCC System			Flow Diagram No. FD-302-631
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
**** 3A DHCCC Train ** ** Makeup and Purification 3A Pump Motor ****			
DCV-132	Vent	Closed	/
DCV-133	Drain	Closed	/
DCV-134	Vent	Closed	/
DCV-135	Drain	Closed	/
DCV-136	Vent	Closed	/
DCV-137	Drain	Closed	/
DCV-21	DHCCC Isolation Inlet 3A Makeup and Purif. Motor	*Sealed Closed	/
DCV-39	3A Makeup and Purification	Sealed Open	/
DCV-47	3A Makeup and Purification	Sealed Open	/
DCV-48	3A Makeup and Purification	Sealed Open	/
DCV-41	3A Makeup and Purification	Sealed 5-1/2 Turns Open	/
DCV-51	3A Makeup and Purification	Sealed 2-1/2 Turns Open	/
**** 3B DHCCC Train ** ** Makeup and Purification 3C Pump Motor ****			
DCV-147	Vent	Closed	/
DCV-148	Drain	Closed	/
DCV-149	Vent	Closed	/
DCV-150	Drain	Closed	/
DCV-151	Vent	Closed	/
DCV-152	Drain	Closed	/

* App. R requires MUP-3A to be cooled by SW cooling.

System: Decay heat CCC System		Flow Diagram No. FD-302-631	
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
DCV-22	DHCCC Isolation Inlet 3C Makeup and Purif. Motor	*Sealed Closed/ Open	/
DCV-153	Vent	Closed	/
DCV-40	3C Makeup and Purification Motor Inlet	Sealed Open	/
DCV-49	3C Makeup and Purification Motor Inlet	Sealed Open	/
DCV-50	3C Makeup and Purification Motor Inlet	Sealed Open	/
DCV-42	3C Makeup and Purification Motor Outlet	Sealed 9 Turns Open	/
DCV-53	3C Makeup and Purification Motor Outlet	Sealed 2-1/2 Turns Open	/
**** 3A DHCCC Train ** ** Makeup and Purification 3A Pump Motor ****			
DCV-52	3A Makeup and Purification Motor Outlet	Sealed 3 Turns Open	/
DCV-139	Vent	Closed	/
DCV-140	Drain	Closed	/
DCV-25	NOTE 1 DHCCC Isolation Discharge 3A Makeup and Purif. Motor	Sealed Closed	/
DCV-141	Vent	Closed	/
DCV-142	Drain	Closed	/
DCV-143	Vent	Closed	/
DCV-144	Drain	Closed	/
**** DHR Cooler 3A Temperature Controls ****			
DCV-194	Air Supply Line Iso. Vlv	Open	/
DCV-195	Air Supply Line Vent Vlv	Closed	/

* DC is the normal cooling for MUP 3C.

NOTE 1: App. R requires MUP-3A to be cooled by SW cooling.

System: Decay Heat CCC System		Flow Diagram No. FD-302-631	
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
	**** RCBT Area ****		
DCV-145	Vent	Closed	/
	**** 3B DHCCC Train **** **** Makeup and Purification 3C Pump Motor ****		
DCV-54	3C Makeup and Purification Motor Outlet	Sealed 2-1/4 Turns Open	/
DCV-154	Vent	Closed	/
DCV-155	Drain	Closed	/
DCV-26	NOTE 2 DHCCC Isolation Outlet 3C Makeup and Purif. Motor	Sealed Closed/Open	/
DCV-156	Vent	Closed	/
DCV-157	Drain	Closed	/
DCV-158	Vent	Closed	/
	**** DHR Cooler 3B Temperature Controls ****		
DCV-196	Air Supply Line Iso. Vlv	Open	/
DCV-197	Air Supply Line Vent Vlv	Closed	/

NOTE 2: DC is the normal cooling for MUP-3C.

System: Decay Heat Removal System			Flow Diagram No. FD-302-641
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
	**** "A" Train **** **** Intermediate Area ****		
DHV-39	RC System Isolation to Decay Heat Suction NOTE 2	Open/Closed	/
DHV-86	Drain	Closed	/
DHV-87	Vent	Closed	/
DHV-88	Vent	Closed	/
DHV-41	Motor-Operated Iso.-RC System to Decay Heat Suction NOTE 1	Open/Closed	/
DHV-85	Drain	Closed & Capped	/
DHV-8	Root Valve to Recirculation Header	Closed	/
DHV-48	Decay Heat to Spent Fuel System	Closed	/
DHV-49	Drain to Miscellaneous Waste Storage Tank	Closed	/
DHV-9	Decay Heat Recirculation to BWST	Closed	/
DHV-10	DHV-9 Bypass	Closed	/
DHV-120	DHV-39 Bypass	Closed	/
DHV-5	Decay Heat Isolation to RC System NOTE 2	Open/Closed	/
DHV-79	Drain	Closed & Capped	/
DHV-95	Pressurizer Spray Header Drain	Closed	/
DHV-126	MU to DH Crossconnect throttle Vlv.	Closed	/
DHV-91	Decay Heat Isolation to Pressurizer Spray	Closed	/
DHV-96	Drain	Closed & Capped	/
	**** "B" Train **** **** Intermediate Area ****		
DHV-40	RC System Isolation to Decay Heat Suction NOTE 3	Open/Closed	/
DHV-121	DHV-40 Bypass	Closed	/
DHV-7	Root Valve to Recirculation Header	Closed	/
DHV-6	Decay Heat Isolation to RC System NOTE 3	Open/Closed	/
DHV-80	Drain	Closed & Capped	/

NOTE 1: Open if DH Removal is in operation.
NOTE 2: Open if "A" Train DH Removal is in operation.
NOTE 3: Open if "B" Train DH Removal is in operation.

System: Decay Heat Removal System		Flow Diagram No. FD-302-641	
Valve No.	Description	Position	Initials Perform/Verify
	"A" Train **Decay Heat Pit Area**		
DHV-34	BWST Isolation to Decay Heat System	Closed	/
DHV-42	RB Sump Iso. to DHP Suction	Closed	/
DHV-84	Vent	Closed	/
DHV-82	Drain	Closed	/
DHV-21	3A DHP Suction	Sealed Open	/
DHV-20	3A DHP Drain	Closed	/
DHV-50	3A DHP Suction Test Conn.	Open	/
DHV-19	3A DHP Vent	Closed	/
DHV-59	3A DH Disch. Press. Indication Root Vlv	Closed	/
DHV-16	Vent	Closed	/
DHV-58	3A DHP Disch. Press. Test Conn.	Closed	/
DHV-57	3A DHHE Press. Test Conn.	Closed	/
DHV-15	Drain	Closed	/
DHV-92	Pzr. Spray Root Vlv	Open	/
DHV-102	3A DHP Cyclone Separator Inlet	Sealed Open	/
DHV-104	3A DHP Cyclone Separator Outlet NOTE 4	Sealed ≈ 1½ Turns Open	/
DHV-103	3A DHP Gland Water Supply NOTE 4	Sealed ≈ 1½ Turns Open	/
DHV-110	3A Decay Heat Pump Discharge Valve	Auto/3000	/
DHV-51	3A Decay Heat Pump Flow Transmitter Root Valve	Open	/
DHV-52	3A Decay Heat Pump Flow Transmitter Root Valve	Open	/
DHV-13	Chemical Sample Root Valve	Open	/
DHV-122	DHP-1A Suction Gauge Isolation	Open	/
DHV-123	DHP-1A Suction Gauge Isolation	Closed	/
DHV-198	DHV-42 Guard Pipe Drain	Open	/

NOTE 4: This is a course setting, DHP Cyclone Separator Outlet and Gland Water Supply valves must be throttled while the DHP us running. Refer to Section 4.5 of this procedure.

System: Decay Heat Removal System		Flow Diagram No. FD-302-641	
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
	** "B" Train ** ** Decay Heat Pit Area **		
DHV-35	BWST Isolation to Decay Heat System	Closed	/
DHV-43	RB Sump Iso. to DHP Suction	Closed	/
DHV-83	Vent	Closed	/
DHV-81	Drain	Closed	/
DHV-32	3B DHP Suction	Sealed Open	/
DHV-31	3B DHP Drain	Closed	/
DHV-62	3B DHP Suction Test Conn.	Open	/
DHV-30	3B DHP Vent	Closed	/
DHV-29	3B DH Disch. Press. Indication Root Vlv	Closed	/
DHV-26	Vent	Closed	/
DHV-61	3B DHP Disch. Press. Test Conn.	Closed	/
DHV-60	3B DHHE Press. Test Conn.	Closed	/
DHV-27	Drain	Closed	/
DHV-111	3B DHP Disch. Vlv	Auto/3000	/
DHV-99	3B DHP Cyclone Separator Inlet	Sealed Open	/
DHV-101	3B DHP Cyclone Separator Outlet NOTE 4	Sealed ≈ 1½ Turns Open	/
DHV-100	3B DHP Gland Water Supply NOTE 4	Sealed ≈ 1½ Turns Open	/
DHV-53	3B Decay Heat Pump Flow Transmitter Root Valve	Open	/
DHV-54	3B Decay Heat Pump Flow Transmitter Root Valve	Open	/
DHV-24	Chemical Sample Root Valve	Open	/
DHV-124	DHP-1B Suction Gauge Isolation	Open	/
DHV-125	DHP-1B Suction Gauge Isolation	Closed	/
DHV-199	DHV-43 Guard Pipe Drain	Open	/

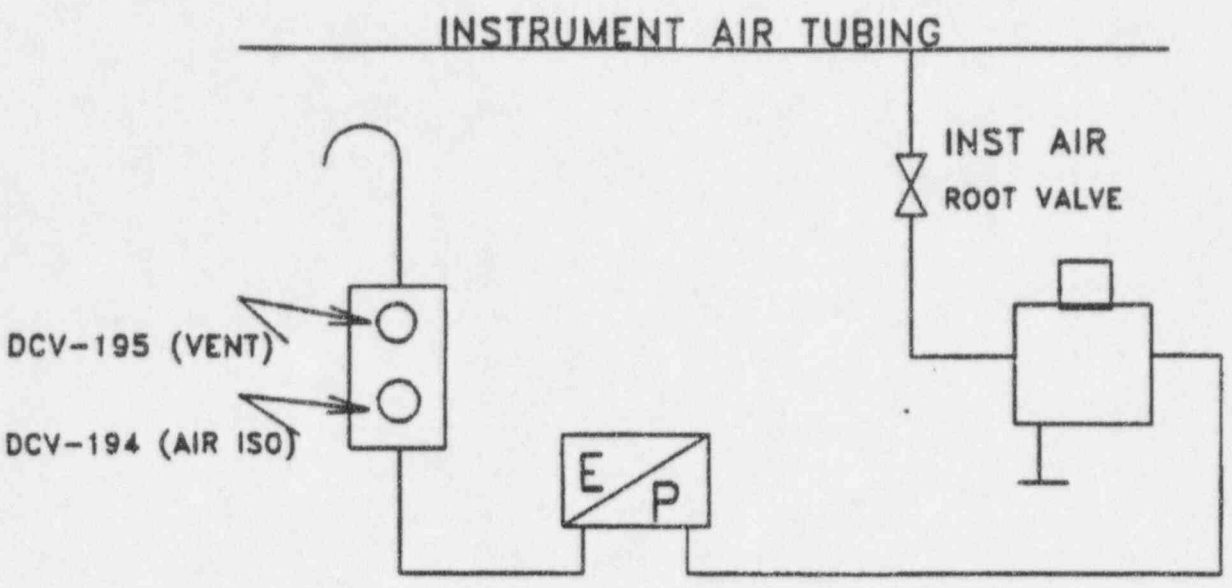
NOTE 4: This is a course setting, DHP Cyclone Separator Outlet and Gland Water Supply valves must be throttled while the DHP is running. Refer to Section 4.5 of this procedure.

System: Decay Heat Removal System			Flow Diagram No. FD-302-641
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
	**** Elevation 95' ****		
DHV-75	Makeup Filter Return to Decay Heat System	Closed	/
DHV-105	Decay Heat System to Makeup Filter	Sealed/Closed	/
DHV-11	Decay Heat System to Makeup Pump Suction	Closed	/
BSV-57	Demin. Water Flush	Locked Closed	/
	**** Elevation 95' ****		
DHV-76	Makeup Filter Return to Decay Heat System	Closed	/
DHV-106	Decay Heat System to Makeup Filter	Sealed/Closed	/
DHV-12	Decay Heat System to Makeup Pump Suction	Closed	/
BSV-58	Demin. Water Flush	Locked Closed	/
	**** "A" Train **** **** Miscellaneous Areas ****		
DHV-68	BWST Drain	Locked Closed	/

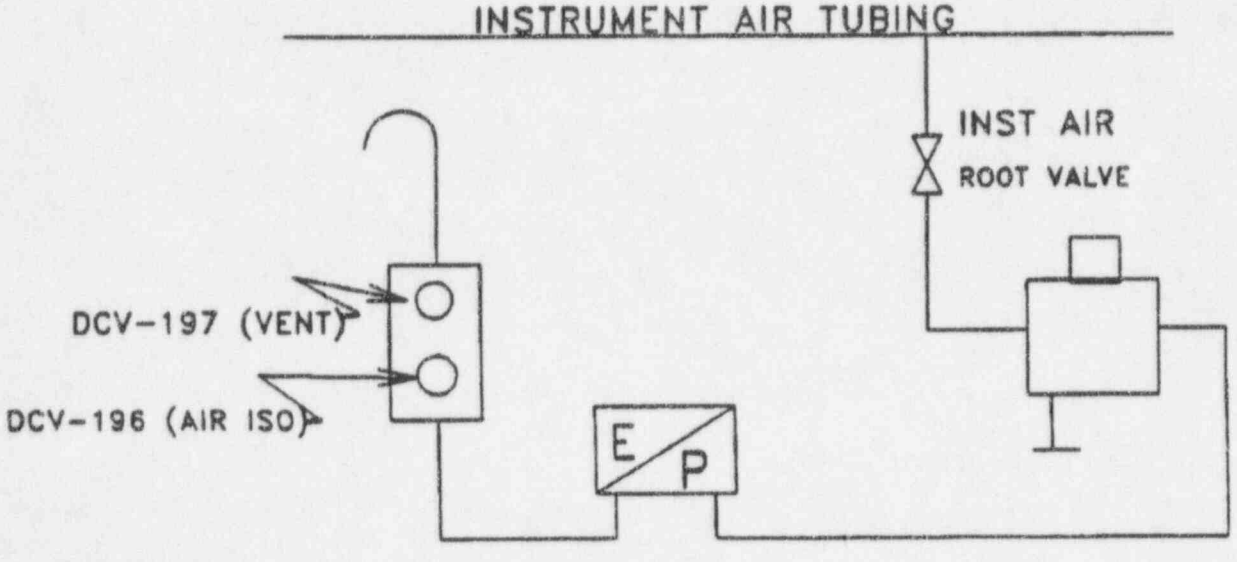
System: Decay Heat Removal System		Flow Diagram No. FD-302-641	
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
DHV-18	Reactor Building Spray Recirculation	Open	/
DHV-46	Spent Fuel Isolation to BWST	Open	/
DHV-65	BWST Instrument Root Valve	Open	/
DHV-117	BWST Instrument Root Valve	Open	/
	**** Reactor Building Area ****		
DHV-94	Decay Heat to Pressurizer Spray Drain	Closed	/
DHV-4	NOTE 1 Motor-Operated Iso.-RC System to Decay Heat System	Open/Closed	/
DHV-3	NOTE 1 Motor-Operated Iso.-RC System to Decay Heat System	Open/Closed	/
	**** "B" Train **** **** Miscellaneous Areas ****		
DHV-90	Spent Fuel Header Drain	Closed	/
DHV-89	Vent on Line to SF Cooler	Closed	/
DHV-97	Iso. Vlv DH-38-DPT	Open	/
DHV-98	Iso. Vlv DH-38-DPT	Open	/
DHV-112	Vent on Loop "A" to RV	Closed	/
DHV-113	Vent on Loop "B" to RV	Closed	/
DHV-114	Equalization Line	Locked 1/2 Turn Open	/
DHV-116	Equalization Line	Locked 1/2 Turn Open	/
DHV-118	Level Tap Isolation	Open	/
DHV-119	Level Tap Isolation	Open	/

NOTE 1: Open if DH Removal is in operation.

System: BWST Recirc with Alternate Suction to D.H. Pumps			
Valve No.	**Description**	**Position**	**Initials Perform/Verify**
SFV-10	SF Pump "A" Suction	Open	/
SFV-11	SF Pump "B" Suction	Open	/
SFV-14	SF Cask Area Isolation	Closed	/
SFV-21	BWR Pump Suction Isolation	Open	/
SFV-88	FTC to SF Pump Suction	Open	/
SFV-9	"B" Pool Outlet	Open	/
SFV-6	BA Pump	Closed	/
SFV-8	"A" Pool Outlet	Open	/
SFV-12	SF BWR Pump Suction Crosstie	Closed	/
SFV-7	SF Pump Suction Crosstie	Open	/
SFV-134	RML-4 Outlet	Closed	/
DHV-39	RC System Isolation to Decay Heat Suction	Closed	/
DHV-40	RC System Isolation to Decay Heat Suction	Closed	/
DHV-110	3A Decay Heat Pump Discharge Valve	Auto/3000	/
DHV-111	3B Decay Heat Pump Discharge Valve	Auto/3000	/
DHV-7	Root Valve to Recirculation Header	Closed	/
DHV-8	Root Valve to Recirculation Header	Closed	/
DHV-9	Decay Heat Recirculation to BWST	Closed	/
DHV-34	BWST Isolation to Decay Heat System	Closed	/
DHV-35	BWST Isolation to Decay Heat System	Closed	/



'A' DC SYSTEM
DCV-177-MS



'B' DC SYSTEM
DCV-178-MS

GUIDELINES FOR OPERATING DCV-17 [DCV-18] AND DCV-177 [DCV-178] MANUALLY

NOTE: **Prior to performing this enclosure, the preferred Operating Practice is to place the other DH Train in service if available.**

NOTE: **Instructions in Steps 1, 2, 5 and 6 are duplicated in the field. Ensure any changes made to these instructions are similarly made to the engraved plaques.**

NOTE: **Valve pairs DCV-17/DCV-177 are for 'A' train and valve pairs [DCV-18]/[DCV-178] are for 'B' train.**

1. IF operating 'A' DH train, THEN transfer both DCV-17 and DCV-177 from AUTOMATIC to MANUAL by performing details 1 through 3 for each valve

DCV-17

1. ___ Unseal and rotate handwheel clockwise until contact exists between handjack and actuator diaphragm.
2. ___ Close filter regulator supply valve V-3.
3. ___ Vent air off filter regulator.

_____/_____
Initial/Date

DCV-177

1. ___ Unseal and rotate handwheel clockwise until contact exists between handjack and actuator diaphragm.
2. ___ Close filter regulator supply valve V-3.
3. ___ Vent air off filter regulator.

_____/_____
Initial/Date

2. IF operating 'B' DH train, THEN transfer both DCV-18 and DCV-178 from AUTOMATIC to MANUAL by performing details 1 through 3 for each valve

DCV-18

1. ___ Unseal and rotate handwheel clockwise until contact exists between handjack and actuator diaphragm.
2. ___ Close filter regulator supply valve V-3.
3. ___ Vent air off filter regulator.

_____/_____
Initial/Date

DCV-178

1. ___ Unseal and rotate handwheel clockwise until contact exists between handjack and actuator diaphragm.
2. ___ Close filter regulator supply valve V-3.
3. ___ Vent air off filter regulator.

_____/_____
Initial/Date

NOTE: **Changes to positioning or throttling of DCV-177, [DCV-178] must always be accompanied by the same changes to DCV-17, [DCV-18] in both direction and magnitude of handwheel rotation.**

NOTE: **Suspected failures of DCV-17, [DCV-18] and/or DCV-177, [DCV-178] can be cross-checked against expected DHHE-1A, [DHHE-1B] outlet temperatures DH-2-TI1, [DH-2-TI2], DCP-1A, [DCP-1B] discharge pressure, and DC 'A', ['B'] system flow DC-61-FI, [DC-62-FI], local at DCPs.**

3.	Throttle operating DH train DC cooling flow as required to obtain desire cooling	1. ___ Manually throttle DCV-177, [DCV-178], as required to increase or decrease DC cooling flow 2. ___ Manually throttle DCV-17, [DCV-18] the same amount and direction as DCV-177, [DCV-178] 3. ___ Following throttling adjustments, monitor the following: o DHHE-1A, [DHHE-1B] outlet temperature to ensure SP-422 heatup or cooldown limits are not exceeded o DCHE-1A, [DCHE-1B] delta RW temperature is maintained < 10°F o Monitor PZR level for decreasing trends; i.e. Potential RCS overcooling, DH system leaks or lifting reliefs o Monitor DC system flow, DC-61-FI, [DC-62-FI] and adjust DCV-17, [DCV-18] as required to maintain near constant flow

_____/_____
Initial/Date

4. Establishment of administrative control over affected valves should be considered

- o ___ As required install a blue tag on the handwheel(s) and instrument air supply valve(s) of the appropriate valve(s)
- o ___ Issue blue tags to NSS
- o ___ Install required blue tags in accordance with CP-115

_____/_____
Initial/Date

5. IF it is desired to return DHHE-1A from MANUAL to AUTOMATIC control, THEN perform details 1 through 4 for both DCV-177 and DCV-17

DCV-17

1. ___ Close filter regulator vent.
2. ___ Open filter regulator supply valve V-3.
3. ___ Monitor DHHE-1A outlet temperature during performance of detail 4.
4. ___ Rotate handwheel to full counterclockwise position and seal.

_____/_____
Initial/Date

DCV-177

1. ___ Close filter regulator vent.
2. ___ Open filter regulator supply valve V-3.
3. ___ Monitor DHHE-1A outlet temperature during performance of detail 4.
4. ___ Rotate handwheel to full counterclockwise position, then rotate in the clockwise direction 1-1/4 turns and seal.

_____/_____
Initial/Date

6. IF it is desired to return DHHE-1B from MANUAL to AUTOMATIC control, THEN perform details 1 through 4 for both DCV-178 and DCV-18

DCV-18

1. ___ Close filter regulator vent.
2. ___ Open filter regulator supply valve V-3.
3. ___ Monitor DHHE-1B outlet temperature during performance of detail 4.
4. ___ Rotate handwheel to full counterclockwise position and seal.

_____/_____
Initial/Date

DCV-178

1. ___ Close filter regulator vent.
2. ___ Open filter regulator supply valve V-3.
3. ___ Monitor DHHE-1B outlet temperature during performance of detail 4.
4. ___ Rotate handwheel to full counterclockwise position, then rotate in the clockwise direction 5-3/4 turns and seal.

_____/_____
Initial/Date