

**PSEG NUCLEAR L.L.C.
SALEM/OPERATIONS**

S2.OP-SO.CVC-0002(Q) REV. 38

CHARGING PUMP OPERATION

USE CATEGORY: **I**

-
- ◆ Biennial Review Performed: Yes ___ No ___ NA
 - ◆ DCP Packages and Affected Document Numbers incorporated into this revision: None
 - ◆ The following OTSCs were incorporated into this revision: None
-

REVISION SUMMARY:

- ◆ Added Step 5.1.3.L, and Step 5.2.3 at Substeps B & C. [70103274]
Incorporates guidance that will allow 23 Charging Pump to satisfy the requirements of the Outage Risk Assessment Model (ORAM) on Unit 1 when 11-12 Safety Injection Pumps and 11-13 Charging Pumps are unsuccessful in maintaining Unit 1 RCS inventory.
- ◆ Section 4.0, removed outdated oil types from procedure. [70096469]
Oil types are obtained from the “Lube Screen” in SAP.
- ◆ Sections 5.3 and 5.7, added steps to adjust 13 PDP linkage based on RCS pressure. [70095943]
Editorial change as previously reviewed and approved in Section 5.1 of this procedure.

IMPLEMENTATION REQUIREMENTS

Effective Date: October 29, 2009

None

CHARGING PUMP OPERATION

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1.0 **PURPOSE**

- 1.1 To provide instructions necessary to:
 - 1.1.1 Align 23 Charging Pump Flow Path
 - 1.1.2 Recirc 23 Charging Pump to RWST
 - 1.1.3 Start a Charging Pump
 - 1.1.4 Transfer Operating Charging Pumps
 - 1.1.5 Operate Master Flow Controller in Manual
 - 1.1.6 Align 23 Charging Pump for Suction Stabilizer/Discharge Pulsation Dampener Checks

2.0 **PREREQUISITES**

- ___ 2.1 **IDENTIFY** sections of this procedure that are NOT to be performed with "N/A".
- ___ 2.2 **REVIEW** components "Off Normal and Off Normal Tagged" List(s) for system and support system(s) associated with the evolution to be performed in this procedure.
- ___ 2.3 **ENSURE** CVCS Makeup Control System is in AUTO with boron concentration \geq RCS IAW S2.OP-SO.CVC-0006(Q), Boron Concentration Control.
- ___ 2.4 **ENSURE** Component Cooling is aligned IAW S2.OP-SO.CC-0001(Q), Component Cooling System Operation.
- ___ 2.5 IF placing 23 Charging Pump in service, AND maintenance has been performed which could have affected the Suction Stabilizer or Discharge Pulsation Dampener charge, OR routine checks of the Suction Stabilizer/Pulsation Dampener charge are required, THEN ENSURE Maintenance is available to perform Suction Stabilizer and Discharge Pulsation Dampener checks IAW SC.MD-CM.CVC-0005(Q) when directed by Section 5.12 of this procedure.
- ___ 2.6 IF 23 Charging Pump requires "packing break-in" IAW Section 5.10, THEN DIRECT Maintenance to install test gauge at 2PL3610 IAW Attachment 1, Test Equipment Data.
- ___ 2.7 IF fill and vent of 23 Charging Pump suction/discharge piping is to be performed IAW Section 5.10 OR Section 5.12 (refer to Step 3.9.13), THEN ENSURE Outage Services is available to perform Ultrasonic Testing (UT) of affected piping as required to support pump restoration.

3.0 PRECAUTIONS AND LIMITATIONS

- ___ 3.1 Multiple starts of Centrifugal Charging Pumps may result in deterioration of pump motor windings. OP-SA-108-106-1001, Large Motor Starting Criteria and Protective Circuit/Breaker Reset and Reclosure Policy, contains starting restrictions for Centrifugal Charging Pumps.
- ___ 3.2 When performing Section 5.9, Charging Pump Isolation, the WCC Supervisor is to:
- **ENSURE** the associated work scope requires complete pump isolation.
 - **PERFORM** a SAP notification list edit on the Charging Pump high-pressure blocking points to ensure no leakage issues are previously documented.
 - **ENSURE** Operators are briefed on the potential for overpressurization of the applicable Charging Pump suction piping, and actions to taken should an overpressurization event occur.
 - **PROVIDE** additional Operator support, as required.
- ___ 3.3 IF the Reactor Coolant System (RCS) was depressurized AND a charging pump that has been idle for >14 days is to be placed in service, THEN the respective charging pump suction should be vented prior to starting the pump.
- ___ 3.4 When placing a Charging Pump in service that has been idle for a long period of time, RCS parameters should be closely monitored for reactivity affects due to potential differences in boron concentrations.
- ___ 3.5 Prolonged operation of a Centrifugal Charging Pump and 23 Charging Pump in parallel may result in pump damage. Without prior System Engineer approval, parallel operation should be limited to the time necessary to transfer pumps.
- ___ 3.6 When starting a Charging Pump, bearing temperatures, charging flow and charging pressure should be monitored to insure proper operation. Motor current should also be monitored on the Centrifugal Charging Pumps.
- ___ 3.7 Placing the Charging Flow Controller(s) on 2CC2 in MANUAL during unit startup or shutdown is permissible.

3.8 Centrifugal Charging Pumps:

- ___ 3.8.1 A maximum of one Centrifugal Charging Pump OR one Safety Injection Pump shall be OPERABLE when the temperature of one or more of the RCS cold legs is $\leq 312^{\circ}\text{F}$, with the reactor vessel head installed. However, a second pump may be aligned for testing purposes only, provided the pump is verified in a recirculation flowpath with the manual discharge valve closed prior to aligning the motor circuit breaker to the electrical power circuit. (TSSR 4.5.3.2.b).
- ___ 3.8.2 The design flowrate of the Centrifugal Charging Pumps is 150 gpm.
- ___ 3.8.3 The Centrifugal Charging Pump Speed Increaser Oil Pump should be primed before starting the pump after maintenance activities.
- ___ 3.8.4 Two boration flow paths are required in Modes 1-3. When 2CV55 is isolated, 2CV81 OR 2CV82 must be throttled, with ≥ 33 gpm (as verified by Charging/Letdown mismatch), AND 2CV48 and 2CV53 must be locked open, to satisfy boration flowpath requirements for Centrifugal Charging Pumps.
- ___ 3.8.5 The Control Air Supply to 2CV55 Bypass Valve (2CA2015), which provides full closure capability for the 2CV55 valve, does NOT have a bumpless transfer feature. Charging Flow should be verified to be above the minimum flow setpoint prior to manipulating the 2CA2015 valve.
- ___ 3.8.6 Whenever a Centrifugal Charging Pump Recirc Valve (2CV139 or 2CV140) are CLOSED with a Centrifugal Charging Pump in service Charging flow must be maintained >100 gpm on 2FE128.
- ___ 3.8.7 Centrifugal Charging Pump Casing Drain Line blank flange should be installed prior to pump operation.
- ___ 3.8.8 When a Centrifugal Charging Pump is started, the Auxiliary Oil Pump will start and run until the shaft driven oil pump develops 12 psig. When the charging pump is shutdown, the Auxiliary Oil Pump will start at 8 psig and run until the time delay relay times out. However, it should be noted that after the charging pump breaker is made ready, the Auxiliary Oil Pump will AUTO start and continue to run until the oil pump circuit is reset. By design, the circuit is reset when the charging pump is started and the shaft driven oil pump develops 12 psig [80014165].
- ___ 3.8.9 Upon shutdown of a centrifugal charging pump the verification of auxiliary oil pump operation should be timely, since it only operates for ≈ 1 minute.
- ___ 3.8.10 Centrifugal Charging Pump operability is NOT affected by unavailability of the associated Auxiliary Oil Pump.

3.9 23 Charging Pump (Positive Displacement Pump):

- ___ 3.9.1 23 Charging Pump shall be aligned to Unit 1 OR the pump shall be C/T when 21 or 22 Safety Injection Pump is capable of injection into the core with RCS temperature $\leq 312^{\circ}\text{F}$ with the Reactor Vessel Head installed. [C0565]
- ___ 3.9.2 23 Charging Pump Variable Speed Unit oil temperature should be maintained between 110°F and 150°F .
- ___ 3.9.3 Do NOT operate 23 Charging Pump with suction pressure < 31.8 psig, when aligned from the VCT OR < 5.0 psig when aligned from the RWST.
- ___ 3.9.4 The design flowrate of the 23 Charging Pump is 98 gpm (at 130°F & 2500 psig).
- ___ 3.9.5 23 Charging Pump does NOT receive a trip signal from a SEC MODE I actuation (Accident Loading).
- ___ 3.9.6 The following precautions are applicable for starting 23 Charging Pump after mechanical maintenance:
- ___ ◆ Health Physics is notified prior to filling and venting pump.
 - ___ ◆ Handling of radioactive liquids must be done IAW NC.NA-AP.ZZ-0024(Q) Radiological Safety Program.
 - ___ ◆ Suitable hose is available to direct liquid to a poly bottle.
- ___ 3.9.7 23 Charging Pump is required to be capable of being cross tied to Unit 1 CVCS charging header from the Unit 2 RWST to provide a Post-Fire Safe Shutdown Function IAW 10CFR Part 50 Appendix R Regulation whenever Unit 1 is in Modes 1-4.
- ___ 3.9.8 When operating 23 Charging Pump on recirc to RWST do NOT exceed 1700 rpm on Output Fluid Drive as indicated on the hand held tachometer. [OE 17609]
- ___ 3.9.9 23 Charging Pump provides a support function to maintain the CVC Cross-Connect System available in compliance with 10CFR50 Appendix R whenever Unit 1 is in Modes 1-4. SH.OP-AP.ZZ-0108(Q), Operability Assessment and Equipment Control Program, provides Safe Shutdown Administrative Controls for an unavailable CVC Cross-Connect System.
- ___ 3.9.10 When performing 23 Charging Pump “fill and vent” IAW Section 5.10, Restoration of 23 Charging Pump After Mechanical Maintenance, it should be noted that vent valves 2CV470 and 2CV471 are located in the Unit 1 Charging Valve Alley. Failure to operate the appropriate units vent valves in Step 5.10.7H, 5.10.7H.6, 2.1.2G or Attachment 4 (i.e., incorrectly operating valves 1CV470 and 1CV471 which are located in the Unit 2 Charging valve Alley) will result in loss of Unit 2 VCT level during performance of the system fill and vent.

(step continued on next page)

3.9 (continued)

- 3.9.11 When performing 23 Charging Pump “packing break-in” IAW Section 5.10, Restoration of 23 Charging Pump After Mechanical Maintenance, observe the following:

 - ◆ 2CV141 relief valve is set at ≈2735 psig (P&ID 205328).
 - ◆ Excessive throttling of 2CV485 OR 2CV486, PDP RECIRC TEST LINE ISOLATION VALVES, has the potential to lift 2CV141 discharge relief to the VCT. This could result in a reactivity excursion during power operation.
 - ◆ Valve throttling must be performed slowly to prevent lifting of 2CV141.
 - ◆ VCT level is to be monitored carefully for indications of 2CV141 lifting (unexpected VCT level rise or flow noise).
 - ◆ 23 Charging Pump is to be stopped immediately and 2CV485 AND CV486 are to be closed when 2CV141 is suspected of lifting.

- 3.9.12 Due to potential back leakage through the 2CV63 and 2CV64 valves, 23 Charging Pump suction piping is susceptible to overpressurization anytime 2CV57 is closed with the pump stopped. The Operator should closely monitor pump suction pressure (2PI192C) to ensure suction pressure is maintained within its normal operating range until suction pressure has stabilized at <100 psig (2PI192C). An Engineering Evaluation is required anytime pump suction pressure is suspected of exceeding 225 psig.

- 3.9.13 23 Charging Pump is NOT designed to pump air. [70052001]
 The pump internal (piston) suction valves may be damaged when the system is NOT properly filled and vented. Air voids in the pump suction/discharge piping could result in other adverse conditions such as charging flow oscillations and water hammer. For these reasons, Outage Services is to perform Ultrasonic Testing (UT) of affected pump suction and discharge piping to ensure proper fill and vent with no air voids.

When the UT examination indicate the presents of air voids in the pump suction header path or recirculation header path, the applicable section(s) of Attachment 4 are to be performed to eliminate the air voids.

There are two high points in the pump discharge piping that physically cannot be filled and vented. When UT examinations indicate the presents of air voids in these two sections of piping, the pump is to be placed in recirc with the RWST for at least 2 hours at the highest possible flowrate to sweep the air into the RWST.

4.0 **EQUIPMENT/MATERIAL REQUIRED**

- 4.1 IF performing Section 5.4, Placing 23 Charging Pump On Recirc To RWST, THEN a hand held Photoelectric Tachometer will be required.
- 4.2 IF performing Section 5.10, Restoration of 23 Charging Pump After Mechanical Maintenance THEN the following equipment will be required:
- ◆ 0-3000 Pressure Gauge with Accuracy of $\pm 2\%$ of Full Scale or better
(Required for 23 Charging Pump “packing break-in” only)
 - ◆ A hand held Photoelectric Tachometer
 - ◆ 3/8 inch wrench
 - ◆ Adjustable wrench
 - ◆ Hose(s) as specified in the Safety Manual, Section for “Hose Control Program”
 - ◆ ½ inch inside diameter Tygon Tubing
 - ◆ Poly Bottle with filter

5.0 **PROCEDURE**5.1 **Aligning 23 Charging Pump for Normal Operation****NOTE**

The CVC Cross Connect System is considered available for 10CFR Part 50 Appendix R purposes during the performance of this section, except for the period of time 2CV464 is closed.

- ___ 5.1.1 **ENSURE** Primary Packing Leak Rate Of 23 Charging Pump has been calculated within the previous 7 days IAW S2.OP-DL.ZZ-0006(Q), Primary Plant Log.
- ___ 5.1.2 **ENSURE** 23 Charging Pump is out-of-service.
- ___ 5.1.3 **EQUALIZE** boron concentration in the pump recirc piping as follows:
 - ___ A. **ENSURE** the linkage of 23 Charging Pump is in the low pressure position.
 - ___ B. **ENSURE** CVCS makeup is available to the VCT IAW S2.OP-SO.CVC-0006(Q), Boron Concentration Control.
 - ___ C. **ENSURE** 2CV64, 23 CHG PUMP DISCH VALVE is CLOSED.
 - ___ D. **CLOSE** 2CV468, CROSS TIE RWST SUCTION ISOLATION VALVE.
 - ___ E. **OPEN AND LOCK** 2CV57, 23 CHG PUMP SUCT VALVE.
 - ___ F. **NOTIFY** Unit 1 CRS that 23 Charging Pump will NOT be available to provide post-fire safe shutdown capabilities while 2CV464 is CLOSED.
 - ___ G. **CLOSE** 2CV464, CHARGING CROSS-TIE ISOLATION VALVE (located in Unit 1 Charging Valve Alley).
 - ___ H. **UNLOCK AND OPEN** 2CV485, PDP RECIRC TEST LINE ISOLATION VALVE.
 - ___ I. **OPEN** 2CV486, PDP RECIRC TEST LINE ISOLATION VALVE.

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5.1.3 (continued)

NOTE

Flow from the VCT to the RWST may begin when 2CV462 is opened. The flowrate is dependent on pump piston position when the valve is opened. Pump operation may be required to obtain the desired flowrate. The intent of the flush is satisfied when at least 200 gallons has passed from the VCT to the RWST. VCT level should be closely monitored to determine the volume of water passed through the recirc piping.

- ___ J. **OPEN** 2CV462, CHARGING CROSS-TIE MOV.
- ___ K. IF flow from VCT to RWST begins (VCT level lowering)
AND the desired flow rate is obtained,
THEN:
 - ___ 1. **MONITOR** VCT level for at least a 200 gallon change in volume.
 - ___ 2. When \approx 200 gallons has passed through the pump recirc piping,
CLOSE 2CV462, CHARGING CROSS-TIE MOV.
- ___ L. IF 23 Charging Pump breaker is RACKED OUT,
THEN **MAKE** 2AX1AX7X, 23 CHARGING PUMP ready for operation.
- ___ M. IF flow from VCT to RWST does NOT begin (VCT level stable)
OR the desired flow rate is NOT obtained,
THEN **START** 23 Charging Pump as follows:
 - ___ 1. **ESTABLISH** communication between Control Room
and 23 Charging Pump.
 - ___ 2. **PLACE** 23 Charging Pump in MANUAL.
 - ___ 3. **SET** 23 Charging Pump Speed Controller Demand to 10-12%.
 - ___ 4. Simultaneously **PERFORM** the following:
 - ___ **◆** **MONITOR** 23 Charging Pump Output Fluid Drive speed
using the hand held tachometer.
 - ___ **◆** **START** 23 Charging Pump
AND immediately **INCREASE** speed demand to couple pump.

(step continued on next page)

5.1.3 (continued)

NOTE

12-13% speed demand on 23 Charging Pump is \approx 1500 rpm when aligned for RWST recirc following pump coupling.

CAUTION

Do NOT exceed Output Fluid Drive Speed of 1700 rpm as indicated on the hand held tachometer.

- ___ 5. **ADJUST** 23 Charging Pump to \approx 1500 rpm, as indicated on hand held tachometer, do **NOT** exceed 1700 rpm.
- ___ 6. When 23 Charging Pump has run for \approx 2 minutes:
 - ___ a. **ADJUST** 23 Charging Pump speed demand to 10-12%.
 - ___ b. **STOP** 23 Charging Pump.
 - ___ c. **CLOSE** 2CV462, CHARGING CROSS-TIE MOV.
- ___ N. **CLOSE AND LOCK** 2CV485, PDP RECIRC TEST LINE ISOLATION VALVE.
- ___ O. **CLOSE** 2CV486, PDP RECIRC TEST LINE ISOLATION VALVE.
- ___ P. **OPEN** 2CV464, CHARGING CROSS-TIE ISOLATION VALVE (located in Unit 1 Charging Valve Alley).

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5.1.3 (continued)

NOTE

In order for 23 Charging Pump to be considered available to Post-Fire Safe Shutdown Function IAW 10CFR Part 50 Appendix R Regulation for Unit 1, at least one of the following conditions must be satisfied:

- ◆ The 23 Charging Pump was tested satisfactorily IAW S2.OP-ST.CVC-0005(Q), Inservice Testing - 23 Charging Pump,
- OR
- ◆ The 23 Charging Pump was tested satisfactorily IAW S2.OP-PT.CVC-0003(Q), Appendix R Testing - 23 Charging Pump AND reasonable assurance exists that the pump can perform the Appendix R function with Unit 1 pressurized (NOP/NOT). System Engineering assistance may be required in making this determination.

___ Q. **NOTIFY** Unit 1 CRS that 23 Charging Pump is available to provide post-fire safe shutdown capabilities.

___ R. **NOTIFY** Chemistry to sample the RWST for boron.

___ 5.1.4 **REMOVE** clear bezel cover placed on 23 Charging Pump bezel in Step 5.2.5.

___ 5.1.5 IF Unit 2 RCS pressure is <1000 psig,
THEN MAINTAIN the linkage of 23 Charging Pump in the low pressure position.

___ 5.1.6 IF Unit 2 RCS pressure is ≥ 1000 psig,
THEN PLACE the linkage of 23 Charging Pump in the high pressure position.

___ 5.1.7 **ALIGN** the flow path to Unit 2 as follows:

___ A. **ENSURE** 2CV462, CHARGING CROSS TIE MOV is CLOSED.

___ B. **OPEN AND LOCK** 2CV64, 23 CHG PUMP DISCH VALVE.

___ 5.1.8 **DIRECT** a second Operator to perform an Independent Verification IAW Attachment 2, Section 1.0.

___ 5.1.9 **ENSURE** Primary Packing Leak Rate Of 23 Charging Pump is evaluated IAW S2.OP-DL.ZZ-0006(Q), Primary Plant Log.

5.2 **Aligning 23 Charging Pump for Appendix R Only (Unit 1)****NOTE**

This section aligns 23 Charging Pump to Unit 1 CVCS charging header from the Unit 2 RWST to provide a Post-Fire Safe Shutdown Function IAW 10CFR Part 50 Appendix R Regulation.

- ___ 5.2.1 **IF** 23 Charging Pump is in-service to the Unit 2 CVCS flow path,
THEN TRANSFER to a Centrifugal Pump IAW Section 5.6.
- ___ 5.2.2 **ADJUST** the linkage of 23 Charging Pump to the high pressure position.
- ___ 5.2.3 **ALIGN** the flow path to Unit 1 as follows:
 - ___ A. **ENSURE** 2CV462, CHARGING CROSS TIE MOV is CLOSED.
 - ___ B. **IF** Unit **1** Reactor Coolant System (all RCS Cold Legs) is >312°F,
THEN ENSURE 2CV464, CHARGING CROSS-TIE ISOLATION VALVE is OPEN (Unit 1 Charging Valve Alley).
 - ___ C. **IF** Unit **1** Reactor Coolant System (one or more RCS Cold Legs) is ≤312°F,
THEN:
 - ___ 1. **RACK OUT** 2AX1AX7X, 23 CHARGING PUMP.
 - ___ 2. **ENSURE** 2CV464, CHARGING CROSS-TIE ISOLATION VALVE is CLOSED IAW S1.OP-IO.ZZ-0006(Q) (Unit 1 Charging Valve Alley).
 - ___ D. **UNLOCK AND CLOSE** 2CV64, 23 CHG PUMP DISCH VALVE

CAUTION

Step 5.2.3E will isolate the Charging Pump. The pump suction pressure gauge should be closely monitored for indication of leak-by past the discharge isolation valves.

- ___ E. **UNLOCK AND CLOSE** 2CV57, 23 CHG PUMP SUCT VALVE,
AND MONITOR 23 Charging Pump suction pressure at 2PI192C.

(step continued on next page)

5.2.3 (continued)

- ___ F. IF excessive leak-by is indicated by rising pump suction pressure,
THEN:
- ___ 1. **OPEN** 2CV57 to relieve the pressure.
- ___ 2. **NOTIFY** SM/CRS of excessive leak-by.
- ___ G. **OPEN** 2CV468, CROSS TIE RWST SUCTION ISOLATION VALVE

NOTE

In order for 23 Charging Pump to be considered available to Post-Fire Safe Shutdown Function IAW 10CFR Part 50 Appendix R Regulation for Unit 1, at least one of the following conditions must be satisfied:

- ◆ The 23 Charging Pump was tested satisfactorily IAW S2.OP-ST.CVC-0005(Q), Inservice Testing - 23 Charging Pump,
- OR
- ◆ The 23 Charging Pump was tested satisfactorily IAW S2.OP-PT.CVC-0003(Q), Appendix R Testing - 23 Charging Pump AND reasonable assurance exists that the pump can perform the Appendix R function with Unit 1 pressurized (NOP/NOT). System Engineering assistance may be required in making this determination.

- ___ H. **NOTIFY** Unit 1 CRS that 23 Charging Pump is available to provide post-fire safe shutdown capabilities.

___ 5.2.4 **DIRECT** a second Operator to perform an Independent Verification IAW Attachment 2, Section 2.0.

___ 5.2.5 **INSTALL** a clear bezel cover over 23 Charging Pump bezel indicating alignment to provide post-fire safe shutdown capability.

5.3 **Start 23 Charging Pump**

- ___ 5.3.1 **ENSURE** 23 Charging Pump is aligned for Normal Operation IAW Section 5.1.
- ___ 5.3.2 **IF** Unit 2 RCS pressure is <1000 psig,
THEN MAINTAIN the linkage of 23 Charging Pump in the low pressure position.
- ___ 5.3.3 **IF** Unit 2 RCS pressure is \geq 1000 psig,
THEN PLACE the linkage of 23 Charging Pump in the high pressure position.
- ___ 5.3.4 **PLACE** 23 Charging Pump in MANUAL.
- ___ 5.3.5 **PLACE** Charging Master Flow Controller in MANUAL.
- ___ 5.3.6 **SET** 23 Charging Pump Speed Controller Demand to 10-12%.
- ___ 5.3.7 **START** 23 Charging Pump
AND immediately **INCREASE** speed demand to couple pump.
- ___ 5.3.8 **ADJUST** 23 Charging Pump to desired flow.
- ___ 5.3.9 When PZR Level is stable at programmed value:
- ___ A. **SET** Charging Master Flow Controller Demand to match
23 Charging Pump Speed Demand.
- ___ B. **PLACE** Charging Master Flow Controller in AUTO.
- ___ C. **PLACE** 23 Charging Pump Speed Controller in AUTO.
- ___ 5.3.10 **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump
NOT to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4).

5.4 **Placing 23 Charging Pump On Recirc To RWST**

- ___ 5.4.1 **IF** 23 Charging Pump is in service to the Unit 2 CVCS flow path,
THEN TRANSFER to a Centrifugal Charging Pump IAW Section 5.6.
- ___ 5.4.2 **ENSURE** the linkage of 23 Charging Pump is in the low pressure position.
- ___ 5.4.3 **ENSURE** 2CV462, CHARGING CROSS TIE MOV is CLOSED.
- ___ 5.4.4 **ENSURE** 2CV466 **AND** 2CV467, BORATION FOR CROSS-TIE is CLOSED.
- ___ 5.4.5 **IF** 23 Charging Pump is aligned for Normal Operation IAW Section 5.1,
THEN:
 - ___ A. **UNLOCK AND CLOSE** 2CV64, 23 CHG PUMP DISCH VALVE.

CAUTION

Step 5.4.5B will isolate the Charging Pump. The pump suction pressure gauge should be closely monitored for indication of leak-by past the discharge isolation valves.

- ___ B. **UNLOCK AND CLOSE** 2CV57, 23 CHG PUMP SUCT VALVE,
AND MONITOR 23 Charging Pump suction pressure at 2PI192C.
- ___ C. **IF** excessive leak-by is indicated by rising pump suction pressure,
THEN:
 - ___ 1. **OPEN** 2CV57 to relieve the pressure.
 - ___ 2. **NOTIFY** SM/CRS of excessive leak-by.
- ___ D. **OPEN** 2CV468, CROSS TIE RWST SUCTION ISOLATION VALVE.
- ___ 5.4.6 **IF** 23 Charging Pump is aligned for Appendix R Only (Unit 1) IAW Section 5.2,
THEN:
 - ___ A. **REMOVE** clear bezel cover on 23 Charging Pump bezel.
 - ___ B. **ENSURE** 2CV64, 23 CHG PUMP DISCH VALVE is CLOSED.
 - ___ C. **ENSURE** 2CV57, 23 CHG PUMP SUCT VALVE is CLOSED.
 - ___ D. **ENSURE** 2CV468, CROSS TIE RWST SUCTION ISOLATION VALVE is OPEN.

- ___ 5.4.7 **NOTIFY** Unit 1 CRS that 23 Charging Pump will NOT be available to provide post-fire safe shutdown capabilities while 2CV464 is CLOSED.
- ___ 5.4.8 **CLOSE** 2CV464, CHARGING CROSS-TIE ISOLATION VALVE (located in Unit 1 Charging Valve Alley).
- ___ 5.4.9 **OPEN** 2CV462, CHARGING CROSS-TIE MOV.
- ___ 5.4.10 **UNLOCK AND OPEN** 2CV485, PDP RECIRC TEST LINE ISOLATION VALVE
- ___ 5.4.11 **OPEN** 2CV486, PDP RECIRC TEST LINE ISOLATION VALVE
- ___ 5.4.12 **ESTABLISH** communication between Control Room and 23 Charging Pump.
- ___ 5.4.13 **PLACE** 23 Charging Pump in MANUAL.
- ___ 5.4.14 **SET** 23 Charging Pump Speed Controller Demand to 10-12%.
- ___ 5.4.15 Simultaneously **PERFORM** the following:
 - ___ ◆ **MONITOR** 23 Charging Pump Output Fluid Drive speed using the hand held tachometer.
 - ___ ◆ **START** 23 Charging Pump AND immediately **INCREASE** speed demand to couple pump.

NOTE

12-13% speed demand on 23 Charging Pump is \approx 1500 rpm when aligned for RWST recirc following pump coupling.

CAUTION

Do NOT exceed Output Fluid Drive Speed of 1700 rpm as indicated on the hand held tachometer.

- ___ 5.4.16 **ADJUST** 23 Charging Pump to desired speed as indicated on the hand held tachometer, do NOT exceed 1700 rpm.
- ___ 5.4.17 When Recirc operation of 23 Charging Pump is no longer required:
 - ___ A. **ADJUST** 23 Charging Pump speed demand to 10-12%.
 - ___ B. **STOP** 23 Charging Pump.

- ___ 5.4.18 **CLOSE AND LOCK** 2CV485, PDP RECIRC TEST LINE ISOLATION VALVE.
- ___ 5.4.19 **CLOSE** 2CV486, PDP RECIRC TEST LINE ISOLATION VALVE.
- ___ 5.4.20 **CLOSE** 2CV462, CHARGING CROSS-TIE MOV.
- ___ 5.4.21 **OPEN** 2CV464, CHARGING CROSS-TIE ISOLATION VALVE
(located in Unit 1 Charging Valve Alley).
- ___ 5.4.22 **NOTIFY** Unit 1 CRS that 23 Charging Pump is available
to provide post-fire safe shutdown capabilities.
- ___ 5.4.23 **DIRECT** a second operator to perform an Independent Verification
IAW Attachment 2, Section 3.0.
- ___ 5.4.24 **ALIGN** 23 Charging Pump for Normal Operation IAW Section 5.1,
OR for Appendix R Only (Unit 1) IAW Section 5.2, as required.

5.5 **Start A Centrifugal Charging Pump**

- ___ 5.5.1 **IF** pump casing has been drained since last use,
THEN ENSURE Maintenance has filled and vented pump mechanical seals.
- ___ 5.5.2 **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump controller is in AUTO.
- ___ 5.5.3 **IF** Centrifugal Charging Pump is being returned from maintenance activities,
THEN PRIME the Mechanical Speed Increaser Oil Pump for pump to be started:
- ___ A. **REMOVE** Priming Inlet plug
(vertical line located directly above oil pump)
- ___ B. **ADD** ≈ 1-2 ounces of oil.
- ___ C. **INSTALL** Priming Inlet plug.
- ___ 5.5.4 **ENSURE** the following valves are OPEN:
- ___ ◆ 2CV139, CHARGING MINIFLOW
- ___ ◆ 2CV140, CHARGING MINIFLOW
- ___ 5.5.5 **IF** the CVCS Cross-Connect is in-service from Unit 1,
THEN Direct the Unit 1 CRS to **RESTORE** the Cross-Connect Alignment
IAW S1.OP-SO.CVC-0023(Q), CVCS Cross-Connect Alignment to Unit 2.
- ___ 5.5.6 **IF** 2CV55 is available,
THEN:
- ___ A. **RECORD** the “As Found” Position of 2CA2015, CONTROL AIR SUPPLY
TO CV55 BYPASS VALVE on Attachment 2, Section 4.0.
- ___ B. **PLACE** 2CA2015, CONTROL AIR SUPPLY TO
CV55 BYPASS VALVE, in BYPASS.
- ___ C. **CLOSE** 2CV55.
- ___ D. **START** Centrifugal Charging Pump.
- ___ E. **ENSURE** Centrifugal Charging Pump lube oil pressure is
≥ 10 psig at Lube Oil Filter Strainer Outlet Pressure Gauge
(2PL8486 for 21Pump or 2PL8487 for 22 Pump) as applicable.

(step continued on next page)

5.5.6 (continued)

- ___ F. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump stops.
- ___ G. **ADJUST** 2CV55 to obtain desired flow.
- ___ H. **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump NOT to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4).
- ___ I. **RESTORE** 2CA2015, CONTROL AIR SUPPLY TO CV55 BYPASS VALVE, to the “As Found” position recorded in Attachment 2, Section 4.0.
- ___ J. IF Pressurizer level is to be maintained at programmed value, THEN:
 - ___ 1. **PLACE** Charging Master Flow Controller in AUTO.
 - ___ 2. **PLACE** 2CV55 in AUTO.
- ___ K. **ENSURE** Service Water supply to lube oil heat exchanger by checking associated Aux. Annunciator Alarm change of state:
 - ___ ♦ Aux. Annunciator Alarm 0793,
21 CHG PMP LUBE OIL CLR CONTR VA 2SW185, OFFNORPOS
 - ___ ♦ Aux. Annunciator Alarm 0804,
22 CHG PMP LUBE OIL CLR CONT VA 2SW199/OFFNORPOS
- ___ L. **DIRECT** a second operator to perform an Independent Verification IAW Attachment 2, Section 4.0.

___ 5.5.7 IF 2CV55 is NOT available, THEN:

- ___ A. **ESTABLISH** communications between Control Room and Charging Pump Valve Alley.
- ___ B. **START** Centrifugal Charging Pump.
- ___ C. **ENSURE** Centrifugal Charging Pump lube oil pressure is ≥ 10 psig at Lube Oil Filter Strainer Outlet Pressure Gauge (2PL8486 for 21 Pump or 2PL8487 for 22 Pump) as applicable.

(step continued on next page)

5.5.7 (continued)

___ D. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump stops.

NOTE

2CV81 and 2CV82 bypass the Charging Flow transmitter (FT128).

- ___ E. Slowly **ADJUST** CHG PMP DISCH V, 2CV81 OR 2CV82 on operating Centrifugal Charging Pump to obtain desired flow.
- ___ F. **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump NOT to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4).
- ___ G. **ENSURE** Service Water supply to lube oil heat exchanger by checking associated Aux. Annunciator Alarm change of state:
- ___ ◆ Aux. Annunciator Alarm 0793,
21 CHG PMP LUBE OIL CLR CONTR VA 2SW185, OFFNORPOS
- ___ ◆ Aux. Annunciator Alarm 0804,
22 CHG PMP LUBE OIL CLR CONT VA 2SW199/OFFNORPOS
- ___ H. When 2CV55 is available:
- ___ 1. Simultaneously **PERFORM** the following:
- ___ ◆ Slowly **CLOSE** CHG PMP DISCH V, 2CV81 OR 2CV82.
- ___ ◆ Slowly **ADJUST** 2CV55 to maintain desired flow.
- ___ I. IF Pressurizer level is to be maintained at programmed value, THEN:
- ___ a. **PLACE** 2CV55 in AUTO.
- ___ b. **PLACE** Charging Master Flow Controller in AUTO.
- ___ J. **RECORD** "N/A" on Attachment 2, Section 4.0.

5.6 **Transfer From 23 Charging Pump To A Centrifugal Charging Pump**

- ___ 5.6.1 **IF** the Centrifugal Charging Pump is being returned from maintenance activities, **THEN PRIME** Mechanical Speed Increaser Oil Pump for pump to be started:
- ___ A. **REMOVE** Priming Inlet plug
(vertical line located directly above oil pump).
- ___ B. **ADD** ≈1-2 ounces of oil.
- ___ C. **INSTALL** Priming Inlet plug.
- ___ 5.6.2 **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump controller is in AUTO.
- ___ 5.6.3 **ENSURE** the following valves are OPEN:
- ___ ◆ 2CV139, CHARGING MINIFLOW
- ___ ◆ 2CV140, CHARGING MINIFLOW
- ___ 5.6.4 **PLACE** 23 Charging Pump in MANUAL.
- ___ 5.6.5 **IF** 2CV55 is available, **THEN**:
- ___ A. **RECORD** the “As Found” Position of 2CA2015, CONTROL AIR SUPPLY TO CV55 BYPASS VALVE on Attachment 2, Section 5.0.
- ___ B. **ENSURE** 2CV55 in MANUAL **AND** OPEN.
- ___ C. **PLACE** 2CA2015, CONTROL AIR SUPPLY TO CV55 BYPASS VALVE, in BYPASS.
- ___ D. **RECORD** Discharge Flowrate (F0128A) “Initial Flow” value on Attachment 3, Quantification Of 2CV47/52 Backleakage.
- ___ E. **CLOSE** 2CV55.
- ___ F. **RECORD** Discharge Flowrate (F0128A) “Final Flow” value on Attachment 3, Quantification Of 2CV47/52 Backleakage.
- ___ G. **COMPLETE** Attachment 3, Quantification of 2CV47/52 Backleakage.

(step continued on next page)

5.6.5 (continued)

- ___ H. **START** a Centrifugal Charging Pump.
- ___ I. **ENSURE** Centrifugal Charging Pump lube oil pressure is ≥ 10 psig at Lube Oil Filter Strainer Outlet Pressure Gauge (2PL8486 for 21Pump or 2PL8487 for 22 Pump) as applicable.
- ___ J. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump stops.
- ___ K. Simultaneously **PERFORM** the following:
- ___ ◆ Slowly **DECREASE** 23 Charging Pump speed demand.
- ___ ◆ **ADJUST** 2CV55 to maintain desired flow.
- ___ ◆ **ADJUST** 2CV71 as required.
- ___ L. When 23 Charging Pump Speed Demand is at MINIMUM, **STOP** 23 Charging Pump.
- ___ M. **ADJUST** 2CV55 to obtain desired flow.
- ___ N. **RESTORE** 2CA2015, CONTROL AIR SUPPLY TO CV55 BYPASS VALVE, to the "As Found" position recorded in Attachment 2, Section 5.0.
- ___ O. IF Pressurizer level is to be maintained at programmed value, THEN:
- ___ 1. **PLACE** Master Flow Controller in AUTO.
- ___ 2. **PLACE** 2CV55 in AUTO
- ___ P. **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump NOT to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4).
- ___ Q. **ENSURE** Service Water supply to lube oil heat exchanger by checking associated Aux. Annunciator Alarm change of state:
- ___ ◆ Aux. Annunciator Alarm 0793,
21 CHG PMP LUBE OIL CLR CONTR VA 2SW185, OFFNORPOS
- ___ ◆ Aux. Annunciator Alarm 0804,
22 CHG PMP LUBE OIL CLR CONT VA 2SW199/OFFNORPOS
- ___ R. **DIRECT** a second operator to perform an Independent Verification IAW Attachment 2, Section 5.0.

- ___ 5.6.6 IF 2CV55 is NOT available,
THEN:
- ___ A. **ESTABLISH** communications between Control Room and Charging Pump Valve Alley.
- ___ B. **START** Centrifugal Charging Pump.
- ___ C. **ENSURE** Centrifugal Charging Pump lube oil pressure is ≥ 10 psig at Lube Oil Filter Strainer Outlet Pressure Gauge (2PL8486 for 21Pump or 2PL8487 for 22 Pump) as applicable.
- ___ D. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump stops.

NOTE

2CV81 and 2CV82 valves bypass FT128 Charging Flow transmitter.

- ___ E. Simultaneously **PERFORM** the following:
 - ___ ◆ Slowly **DECREASE** 23 Charging Pump speed demand.
 - ___ ◆ Slowly **ADJUST** CHG PMP DISCH V, 2CV81 OR 2CV82 to maintain desired flow.
- ___ F. When 23 Charging Pump Speed Demand is at MINIMUM, **STOP** 23 Charging Pump.
- ___ G. **ADJUST** CHG PMP DISCH V, 2CV81 OR 2CV82 to obtain desired flow
- ___ H. **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump NOT to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4).
- ___ I. **ENSURE** Service Water supply to lube oil heat exchanger by checking associated Aux. Annunciator Alarm change of state:
 - ___ ◆ Aux. Annunciator Alarm 0793,
21 CHG PMP LUBE OIL CLR CONTR VA 2SW185, OFFNORPOS
 - ___ ◆ Aux. Annunciator Alarm 0804,
22 CHG PMP LUBE OIL CLR CONT VA 2SW199/OFFNORPOS

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5.6.6 (continued)

___ J. When 2CV55 is available:

___ 1. Simultaneously **PERFORM** the following:

___ ♦ Slowly **CLOSE** CHG PMP DISCH VALVE, 2CV81 OR 2CV82.

___ ♦ Slowly **ADJUST** 2CV55 to maintain desired flow.

___ K. IF Pressurizer level is to be maintained at programmed value,
THEN:

___ a. **ENSURE** Master Flow Controller in AUTO.

___ b. **PLACE** 2CV55 in AUTO.

___ L. **RECORD** "N/A" on Attachment 2, Section 5.0.

___ 5.6.7 IF 23 Charging Pump is to be aligned for Appendix R Only (Unit 1),
THEN **PERFORM** Section 5.2, Aligning 23 Charging Pump for
Appendix R Only (Unit 1).

5.7 **Transfer From Centrifugal Charging Pump To 23 Charging Pump**

- ___ 5.7.1 **ENSURE** 23 Charging Pump is aligned for Normal Operation IAW Section 5.1.
- ___ 5.7.2 **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump controller is in AUTO.
- ___ 5.7.3 **ENSURE** Charging/Letdown flow demand ≤ 98 gpm.
- ___ 5.7.4 **ENSURE** 23 Charging Pump in MANUAL.
- ___ 5.7.5 IF Unit 2 RCS pressure is < 1000 psig,
THEN MAINTAIN the linkage of 23 Charging Pump in the low pressure position.
- ___ 5.7.6 IF Unit 2 RCS pressure is ≥ 1000 psig,
THEN PLACE the linkage of 23 Charging Pump in the high pressure position.
- ___ 5.7.7 **SET** 23 Charging Pump Speed Controller Demand to 10-12%.
- ___ 5.7.8 **START** 23 Charging Pump
AND immediately **INCREASE** speed demand to $\approx 20\%$ to couple pump.
- ___ 5.7.9 IF 2CV55 is available,
THEN:
 - ___ A. **PLACE** 2CV55 in MANUAL.

CAUTION

Rapidly raising 23 Charging Pump speed without closing 2CV55 may cause the Charging Pump relief valve (2CV141) to lift.

- ___ B. Simultaneously **PERFORM** the following:
 - ___ **◆** Slowly **CLOSE** 2CV55.
 - ___ **◆** **ADJUST** 23 Charging Pump speed to maintain desired flow.

NOTE

When 2CV55 is closed to the minimum stop position, the CLOSED light may NOT be illuminated. When 2CV55 is placed in the minimum stop position AND the CLOSED light is NOT illuminated, an Operator should be dispatched to verify valve position.

- ___ C. When 2CV55 is closed,
STOP Centrifugal Charging Pump.

(step continued on next page)

5.7.9 (continued)

NOTE

Upon shutdown of a Centrifugal Charging Pump the Auxiliary Oil Pump will start and run for \approx 1 minute.

- ___ D. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump started.
- ___ E. **OPEN** 2CV55.
- ___ F. **ADJUST** 23 Charging Pump speed to obtain desired flow
- ___ G. IF Pressurizer level is to be maintained at programmed value,
THEN:
 - ___ 1. **PLACE** 23 Charging Pump Speed Controller in AUTO.
 - ___ 2. **PLACE** Charging Master Flow Controller in AUTO
- ___ H. **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump
NOT to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4)
- ___ I. **ENSURE** Service Water supply to lube oil heat exchanger
by checking associated Aux. Annunciator Alarm change of state:
 - ___ ◆ Aux. Annunciator Alarm 0793,
21 CHG PMP LUBE OIL CLR CONTR VA 2SW185, OFFNORPOS
 - ___ ◆ Aux. Annunciator Alarm 0804,
22 CHG PMP LUBE OIL CLR CONT VA 2SW199/OFFNORPOS
- ___ J. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump stops.

___ 5.7.10 IF 2CV55 is NOT available,
THEN:

___ A. **ESTABLISH** communications between Control Room and Charging Pump Valve Alley.

CAUTION

Rapidly raising 23 Charging Pump speed without closing 2CV81 OR 2CV82 may cause the Charging Pump relief valve (2CV141) to lift.

___ B. Simultaneously **PERFORM** the following:

___ ◆ Slowly **CLOSE** CHG PMP DISCH V, 2CV81 OR 2CV82.

___ ◆ **ADJUST** 23 Charging Pump speed demand to maintain desired flow.

___ C. When CHG PMP DISCH V, 2CV81 OR 2CV82 is closed, **STOP** Centrifugal Charging Pump.

NOTE

Upon shutdown of a Centrifugal Charging Pump the Auxiliary Oil Pump will start and run for \approx 1 minute.

___ D. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump starts

___ E. **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump NOT to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4).

___ F. **ENSURE** Service Water supply to lube oil heat exchanger by checking associated Aux. Annunciator Alarm change of state:

___ ◆ Aux. Annunciator Alarm 0793,
21 CHG PMP LUBE OIL CLR CONTR VA 2SW185, OFFNORPOS

___ ◆ Aux. Annunciator Alarm 0804,
22 CHG PMP LUBE OIL CLR CONT VA 2SW199/OFFNORPOS

___ G. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump stops.

___ H. When 2CV55 is available, **OPEN** 2CV55.

5.8 **Transfer Centrifugal Charging Pumps**

- ___ 5.8.1 **IF** RCS temperature is $\leq 312^{\circ}\text{F}$ with the Reactor Vessel Head installed,
THEN:
- ___ A. **ENSURE** Seal Injection is **NOT** required to support RCP Operation.
- ___ B. **ENSURE** Charging Flow is **NOT** required to prevent flashing in the Letdown Line.
- ___ C. **ENTER** Technical Specification 3.1.2.3.
- ___ D. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump controller, for the operating pump is in AUTO.
- ___ E. **PLACE** 2CV55 in MANUAL.
- ___ F. **STOP** the operating Centrifugal Charging Pump.

NOTE

Upon shutdown of a Centrifugal Charging Pump the Auxiliary Oil Pump will start and run for ≈ 1 minute.

- ___ G. **ENSURE** Centrifugal Charging Pump Auxiliary Oil Pump starts.
- ___ H. **C/T** the 4KV breaker for the Centrifugal Charging Pump removed from service to satisfy TSSR 4.5.3.2.a.
- ___ I. **RELEASE** the 4KV breaker for the Centrifugal Charging Pump to be placed in service.
- ___ J. **EVALUATE** T/S 3.1.2.3 for continued applicability.
- ___ K. **PERFORM** Section 5.5, Start A Centrifugal Charging Pump.

- ___ 5.8.2 IF RCS Temperature is >312°F OR the Reactor Vessel Head is removed,
THEN:
- ___ A. IF Centrifugal Charging Pump is being returned from maintenance activities,
THEN PRIME Mechanical Speed Increaser Oil Pump for pump to be started:
- ___ 1. **REMOVE** Priming Inlet plug
(vertical line located directly above oil pump)
- ___ 2. **ADD** ≈ 1-2 ounces of oil.
- ___ 3. **INSTALL** Priming Inlet plug.
- ___ B. **ENSURE** both Centrifugal Charging Pump Auxiliary Oil Pump
controllers are in AUTO.
- ___ C. IF 2CV55 is available,
THEN:
- ___ 1. **PLACE** 2CV55 in MANUAL.
- ___ 2. **START** standby Centrifugal Charging Pump.
- ___ 3. **ENSURE** Centrifugal Charging Pump lube oil pressure is
≥ 10 psig at Lube Oil Filter Strainer Outlet Pressure Gauge
(2PL8486 for 21Pump or 2PL8487 for 22 Pump) as applicable.
- ___ 4. **STOP** remaining Centrifugal Charging Pump.

NOTE

Upon shutdown of a Centrifugal Charging Pump the Auxiliary Oil Pump will start and run for ≈ 1 minute.

- ___ 5. **ENSURE** Auxiliary Oil Pump on stopped
Centrifugal Charging Pump starts.
- ___ 6. IF Pressurizer level is to be maintained at programmed value,
THEN PLACE 2CV55 in AUTO.

(step continued on next page)

5.8.2 (continued)

- ___ 7. **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump NOT to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4).
- ___ 8. **ENSURE** Service Water supply to lube oil heat exchanger by checking associated Aux. Annunciator Alarm change of state:
 - ___ ◆ Aux. Annunciator Alarm 0793,
21 CHG PMP LUBE OIL CLR CONTR VA 2SW185, OFFNORPOS
 - ___ ◆ Aux. Annunciator Alarm 0804,
22 CHG PMP LUBE OIL CLR CONT VA 2SW199/OFFNORPOS
- ___ 9. **ENSURE both** Centrifugal Charging Pump Auxiliary Oil Pumps stop.
- ___ 10. IF either Auxiliary Oil Pump did NOT start and stop, THEN INITIATE NOTF(s).
- ___ D. IF 2CV55 is NOT available, THEN:
 - ___ 1. **ESTABLISH** communications between Control Room and Charging Pump Valve Alley.
 - ___ 2. **START** standby Centrifugal Charging Pump
 - ___ 3. **ENSURE** Centrifugal Charging Pump lube oil pressure is ≥ 10 psig at Lube Oil Filter Strainer Outlet Pressure Gauge (2PL8486 for 21Pump or 2PL8487 for 22 Pump) as applicable.

NOTE

2CV81 and 2CV82 bypass the Charging Flow transmitter (FT128).

- ___ 4. Simultaneously **PERFORM** the following:
 - ___ ◆ Slowly **ADJUST** 2CV81 OR 2CV82, for the Centrifugal Charging Pump being placed in service, to obtain desired flow.
 - ___ ◆ Slowly **CLOSE** 2CV81 OR 2CV82 for the Centrifugal Charging Pump being removed from service.

(step continued on next page)

5.8.2 (continued)

- ___ 5. **STOP** Centrifugal Charging Pump being removed from service.

NOTE

Upon shutdown of a Centrifugal Charging Pump the Auxiliary Oil Pump will start and run for \approx 1 minute.

- ___ 6. **ENSURE** remaining Centrifugal Charging Pump Auxiliary Oil Pump starts.
- ___ 7. **ENSURE** Seal Injection Flow 6-12 gpm to each Reactor Coolant Pump **NOT** to exceed 40 gpm total Seal Injection Flow (T/S 3.5.4)
- ___ 8. **ENSURE** Service Water supply to lube oil heat exchanger by checking associated Aux. Annunciator Alarm change of state:
- ___ ◆ Aux. Annunciator Alarm 0793,
21 CHG PMP LUBE OIL CLR CONTR VA 2SW185, OFFNORPOS
- ___ ◆ Aux. Annunciator Alarm 0804,
22 CHG PMP LUBE OIL CLR CONT VA 2SW199/OFFNORPOS
- ___ 9. When 2CV55 is available:
- ___ a. Simultaneously **PERFORM** the following:
- ___ ◆ Slowly **CLOSE** 2CV81 OR 2CV82
CHG PMP DISCH V.
- ___ ◆ Slowly **ADJUST** 2CV55 to maintain desired flow
- ___ b. **IF** Pressurizer level is to be maintained at programmed value,
THEN:
- ___ ◆ **ENSURE** Charging Master Flow Controller in AUTO.
- ___ ◆ **PLACE** 2CV55 in AUTO.

5.9 **Charging Pump Isolation****NOTE**

This section provides direction for isolating individual Charging Pumps. This section should only be used when the associated work scope requires complete Charging Pump isolation. When the work scope requires that boundaries for isolation encompass more than those provided by this procedure, then the work control process should be used to complete isolation.

- ___ 5.9.1 **ENSURE** the following Technical Specifications have been evaluated, as applicable:
- ◆ 3.1.2.1
 - ◆ 3.1.2.2
 - ◆ 3.1.2.3
 - ◆ 3.1.2.4
 - ◆ 3.5.2
 - ◆ 3.5.3
- ___ 5.9.2 **ENSURE** Appendix R requirements have been evaluated, if applicable, and compensatory measures implemented IAW SH.OP-AP.ZZ-0108(Q), Operability Assessment And Equipment Control Program.
- ___ 5.9.3 **ENSURE** the Charging Pump to be isolated is out of service AND either of the following conditions exist:
- The applicable pump(s) breaker is disconnected:
- ___ ◆ 2AX1AX7X, 23 CHARGING PUMP
 - ___ ◆ 2BD1AX9D, 21 CHARGING PUMP
 - ___ ◆ 2CD1AX9D, 22 CHARGING PUMP

OR

- The applicable pump(s) 125 VDC breaker control power is open:
- ___ ◆ 2AX1AX7X#, 23 CHARGING PUMP CONTROL P
 - ___ ◆ 2BD1AX9D#, CONTROL POWER (21 Charging Pump)
 - ___ ◆ 2CD1AX9D#, CONTROL POWER (22 Charging Pump)

___ 5.9.4 IF 21 Charging Pump is to be isolated,
THEN:

___ A. **INSTALL** a collection device at 2CV356, CHG PUMP SUCT VENT.

NOTE

Due to packing design, 2CV81 AND 2CV82 have proven difficult to ensure fully closed in the past. When checking valves **CLOSED**, a valve wrench should be used to provide assurance of positive seating. The valve wrench used must be approved by the SM/CRS, and care should be taken that excessive torque is NOT used. Precautions for manual valve operations IAW SH.OP-AP.ZZ-0103(Q), Component Configuration Control, should be observed. **[70039045]**

___ B. **ENSURE** 2CV81, 21 CHG PUMP DISCH VALVE is **CLOSED**.

___ C. **CLOSE** 2CV48, 21 CHG PUMP DISCH VALVE.

___ D. **CLOSE** 2CV136, 21 CHG PUMP RECIRC STOP VALVE.

CAUTION

Step 5.9.4E will isolate the Charging Pump. The pump suction pressure gauge should be closely monitored for indication of leak-by past the discharge isolation valves.

___ E. **CLOSE** 2CV44, 21 CHG PUMP SUCT VALVE,
AND MONITOR 21 Charging Pump suction pressure at 2PI192A.

___ F. IF excessive leak-by is indicated by rising pump suction pressure,
THEN:

___ 1. **OPEN** 2CV44 to relieve the pressure.

___ 2. **NOTIFY** SM/CRS of excessive leak-by.

___ G. When it is determined that 21 Charging Pump has an adequate isolation, slowly **OPEN** 2CV356, CHG PUMP SUCT VENT.

___ 5.9.5 IF 22 Charging Pump is to be isolated,
THEN:

___ A. **INSTALL** a collection device at 2CV361, CHG PUMP SUCT VENT.

NOTE

Due to packing design, 2CV81 AND 2CV82 have proven difficult to ensure fully closed in the past. When checking valves **CLOSED**, a valve wrench should be used to provide assurance of positive seating. The valve wrench used must be approved by the SM/CRS, and care should be taken that excessive torque is NOT used. Precautions for manual valve operations IAW SH.OP-AP.ZZ-0103(Q), Component Configuration Control, should be observed. **[70039045]**

___ B. **ENSURE** 2CV82, 22 CHG PUMP DISCH VALVE is **CLOSED**.

___ C. **CLOSE** 2CV53, 22 CHG PUMP DISCH VALVE.

___ D. **CLOSE** 2CV138, 22 CHG PUMP RECIRC STOP VALVE.

CAUTION

Step 5.9.5E will isolate the Charging Pump. The pump suction pressure gauge should be closely monitored for indication of leak-by past the discharge isolation valves.

___ E. **CLOSE** 2CV49, 22 CHG PUMP SUCT VALVE,
AND MONITOR 22 Charging Pump suction pressure at 2PI192B.

___ F. IF excessive leak-by is indicated by rising pump suction pressure,
THEN:

___ 1. **OPEN** 2CV49 to relieve the pressure.

___ 2. **NOTIFY** SM/CRS of excessive leak-by.

___ G. When it is determined that 22 Charging Pump has an adequate isolation, slowly **OPEN** 2CV361, CHG PUMP SUCT VENT.

- ___ 5.9.6 IF 23 Charging Pump is to be isolated,
AND is aligned for Normal Operation IAW Section 5.1,
THEN:
- ___ A. **INSTALL** a collection device at 2CV357, CHG PUMP SUCT VENT
OR 2CV478, BORATION FOR CROSS TIE VENT VALVE.
- ___ B. **ENSURE** 2CV462, APP R CHARGING CROSS TIE MOV is CLOSED.
- ___ C. **ENSURE** 2CV467, APP R BORATION FOR CROSS TIE is CLOSED.
- ___ D. **ENSURE** 2CV468, APP R CROSS TIE RWST SUCTION ISOLATION VA
is CLOSED.
- ___ E. **UNLOCK AND CLOSE** 2CV64, 23 CHG PMP DISCH VALVE.

CAUTION

Step 5.9.6F will isolate the Charging Pump. The pump suction pressure gauge should be closely monitored for indication of leak-by past the discharge isolation valves.

- ___ F. **UNLOCK AND CLOSE** 2CV57, 23 CHG PMP SUCT VALVE.
AND MONITOR 23 Charging Pump suction pressure at 2PI192C.
- ___ G. IF excessive leak-by is indicated by rising pump suction pressure,
THEN:
 - ___ 1. **OPEN** 2CV57 to relieve the pressure.
 - ___ 2. **NOTIFY** SM/CRS of excessive leak-by.
- ___ H. When it is determined that 23 Charging Pump has an adequate isolation,
slowly **OPEN** the valve on which the collection device was installed
in Step 5.9.6A, 2CV357 OR 2CV478, as applicable.

(step continued on next page)

5.9.6 (continued)

NOTE

If excessive leakage exists from the valve opened in Step 5.9.6H, then Relief Valve 2CV141 should be evaluated as a potential source of inleakage.

- ___ I. IF leakage from the valve opened in Step 5.9.6H is excessive (as determined by the SM/CRS),
THEN:
 - ___ 1. **CLOSE** the valve opened in Step 5.9.6H.
 - ___ 2. **PERFORM** one of the following as directed by the SM/CRS:
 - ___ ◆ **INITIATE** monitoring of pump suction pressure, or
 - ___ ◆ **OPEN** 2CV57 to relieve the pressure.
 - ___ 3. **INITIATE** additional actions as directed by the SM/CRS.
- ___ 5.9.7 IF 23 Charging Pump is to be isolated,
AND is aligned for Appendix R Only (Unit 1) IAW Section 5.2,
THEN:
 - ___ A. **INSTALL** a collection device at 2CV357, CHG PUMP SUCT VENT OR 2CV478, BORATION FOR CROSS TIE VENT VALVE.
 - ___ B. **ENSURE** 2CV462, APP R CHARGING CROSS TIE MOV is CLOSED.
 - ___ C. **ENSURE** 2CV467, APP R BORATION FOR CROSS TIE is CLOSED.
 - ___ D. **ENSURE** 2CV57, 23 CHG PUMP SUCT VALVE is CLOSED.
 - ___ E. **ENSURE** 2CV64, 23 CHG PUMP DISCH VALVE is CLOSED.

(step continued on next page)

CAUTION

Step 5.9.7F will isolate the Charging Pump. The pump suction pressure gauge should be closely monitored for indication of leak-by past the discharge isolation valves.

- ___ F. **CLOSE** 2CV468, APP R CROSS TIE RWST SUCTION ISOLATION VA, **AND MONITOR** 23 Charging Pump suction pressure at 2PI192C.
- ___ G. IF excessive leak-by is indicated by rising pump suction pressure, THEN:

NOTE

Due to the in line check valve CV469, opening CV468 may NOT adequately relieve pressure.

- ___ 1. **OPEN** 2CV468
AND MONITOR 23 Charging Pump suction pressure at 2PI192C.
- ___ 2. IF 23 Charging Pump suction pressure continues to rise, THEN THROTTLE the valve on which the collection device was installed in Step 5.9.7A, 2CV357 OR 2CV478, as applicable, to control 23 Charging Pump suction pressure.
- ___ 3. **NOTIFY** SM/CRS of excessive leak-by.
- ___ H. When it is determined that 23 Charging Pump has an adequate isolation, slowly **OPEN** the valve on which the collection device was installed in Step 5.9.7A, 2CV357 OR 2CV478, as applicable.
- ___ 5.9.8 **UPDATE** WCM for component positions.
- ___ 5.9.9 IF the isolated Charging Pump is drained, THEN EVALUATE performing a Reactor Coolant System (RCS) leakrate IAW S2.OP-ST.RC-0008(Q), Reactor Coolant System Water Inventory Balance, to identify potential leakage issues.

5.10 **Restoration of 23 Charging Pump After Mechanical Maintenance**

- ___ 5.10.1 **IF** maintenance has been performed which could have affected the Suction Stabilizer or Discharge Pulsation Dampener charge, **THEN ENSURE** 23 Charging Pump Suction Stabilizer and Discharge Pulsation Dampener Checks are complete IAW Section 5.12.
- ___ 5.10.2 **PREPARE** 23 Charging Pump for Fill & Vent as follows:
- ___ A. **PLACE** 2AX1AX7X#, 125VDC CONTROL POWER for 23 Charging Pump, in OFF position.
- ___ B. **ENSURE** the following valves are CLOSED:
- ___ ◆ 2CV57, 23 CHG PUMP SUCT VALVE
- ___ ◆ 2CV64, 23 CHG PUMP DISCH VALVE
- ___ ◆ 2CV480, 2CV462 CHG CROSS-TIE MOV LO PT DRN VLV
- ___ ◆ 2CV481, 2CV462 CHG CROSS-TIE MOV LO PT DRN VLV
- ___ ◆ 2CV482, CHARGING CROSS-TIE VENT VALVE
- ___ ◆ 2CV483, CHARGING CROSS-TIE VENT VALVE
- ___ ◆ 2CV466, BORATION FOR CROSS-TIE
- ___ ◆ 2CV467, BORATION FOR CROSS-TIE
- ___ ◆ 2CV478, BORATION FOR CROSS-TIE VENT
- ___ ◆ 2CV479, CROSS-TIE RWST SUCTION LEAK TEST VALVE
- ___ ◆ 2CV487, PDP RECIRC TEST LINE ISO VALVE LEAK TEST
- ___ ◆ 2CV488, PDP RECIRC TEST LINE ISO VALVE LEAK TEST
- ___ C. **CLOSE** 2CV464, CHARGING CROSS-TIE ISOLATION VALVE (located in Unit 1 Charging Valve Alley).
- ___ D. **OPEN** 2CV462, CHARGING CROSS-TIE MOV.

- ___ 5.10.3 Slowly OPEN 2CV468, CROSS-TIE RWST SUCTION ISOLATION VALVE.
- ___ 5.10.4 **UNLOCK AND OPEN** 2CV485, PDP RECIRC TEST LINE ISOLATION VALVE
- ___ 5.10.5 **OPEN** 2CV486, PDP RECIRC TEST LINE ISOLATION VALVE
- ___ 5.10.6 **FILL AND VENT** 23 Charging Pump suction header path as follows:
 - ___ A. **CONNECT** a hose to 2CV436, STABILIZER VENT VALVE.
 - ___ B. Slowly **THROTTLE** 2CV436.
 - ___ C. When a minimum of 10 minutes has elapsed **AND** a steady stream of water issues from vent, **CLOSE** 2CV436.
 - ___ D. **REMOVE** hose from 2CV436.
 - ___ E. **CONNECT** a hose to 2CV357, CHG PUMP SUCT VENT.
 - ___ F. Slowly **THROTTLE** 2CV357.
 - ___ G. When a minimum of 10 minutes has elapsed **AND** a steady stream of water issues from vent, **CLOSE** 2CV357.
 - ___ H. **REMOVE** hose from 2CV357.
 - ___ I. **CONNECT** a hose to 2CV478, BORATION FOR CROSS-TIE VENT.
 - ___ J. Slowly **THROTTLE** 2CV478.
 - ___ K. When a minimum of 10 minutes has elapsed **AND** a steady stream of water issues from vent, **CLOSE** 2CV478.
 - ___ L. **REMOVE** hose from 2CV478.

___ 5.10.7 **FILL AND VENT** 23 Charging Pump discharge header path as follows:

NOTE

The following steps allow venting the discharge piping through the pump discharge pressure gauge instrument line while maintaining the gauge filled with water.

- ___ A. **ENSURE** 2CV326, CHG PUMP DISCH PRESS TAP ROOT VALVE is OPEN (Charging Valve Alley).
- ___ B. **CLOSE** the instrument inlet valve for 2PI-142F, 23 Charging Pump Discharge Pressure Gauge.
- ___ C. **INSTALL** a tygon tube on instrument blowdown line between the instrument inlet valve AND 2CV326.
- ___ D. Slowly **THROTTLE** the instrument blowdown valve.
- ___ E. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from the instrument line, **CLOSE** the instrument blowdown valve.
- ___ F. **REMOVE** tygon tube from instrument blowdown line.
- ___ G. **OPEN** the instrument inlet valve for 2PI-142F.
- ___ H. **PROCEED** to the Unit **1** Charging Valve Alley AND **PERFORM** the following:
 - ___ 1. **CONNECT** a hose to 2CV471, CHARGING CROSS-TIE LEAKAGE TEST VALVE.
 - ___ 2. **OPEN** 2CV471.
 - ___ 3. Slowly **THROTTLE** 2CV470, CHARGING CROSS-TIE LEAKAGE TEST VALVE.
 - ___ 4. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from vent:
 - ___ a. **CLOSE** 2CV470.
 - ___ b. **CLOSE** 2CV471.
 - ___ 5. **REMOVE** hose from 2CV471.
 - ___ 6. **RETURN** to the Unit **2** Charging Valve Alley.

(step continued on next page)

5.10.7 (continued)

- ___ I. **CONNECT** a hose to 2CV483, CHARGING CROSS-TIE VENT VALVE.
- ___ J. **OPEN** 2CV483.
- ___ K. Slowly **THROTTLE** 2CV482, CHARGING CROSS-TIE VENT VALVE.
- ___ L. When a minimum of 10 minutes has elapsed
AND a steady stream of water issues from vent:
 - ___ 1. **CLOSE** 2CV482.
 - ___ 2. **CLOSE** 2CV483.
- ___ M. **REMOVE** hose from 2CV483.

___ 5.10.8 **FILL AND VENT** 23 Charging Pump recirculation header path as follows:

- ___ A. **CONNECT** a hose to 2CV488,
PDP RECIRC TEST LINE ISO VALVE LEAK TEST.
- ___ B. **OPEN** 2CV488.
- ___ C. Slowly **THROTTLE** 2CV487, PDP RECIRC TEST LINE
ISO VALVE LEAK TEST
- ___ D. When a minimum of 10 minutes has elapsed
AND a steady stream of water issues from vent:
 - ___ 1. **CLOSE** 2CV487.
 - ___ 2. **CLOSE** 2CV488.
- ___ E. **REMOVE** hose from 2CV488.

___ 5.10.9 Notify Outage Services is to **PERFORM** Ultrasonic Testing (UT) of affected pump piping to ensure proper fill and vent with no air voids.

___ 5.10.10 IF UT examinations indicate the presents of air voids in any piping associated with 23 Charging Pump,
THEN PERFORM the applicable section(s) of Attachment 4, Fill And Vent of 23 Charging Pump Piping Following Ultrasonic Testing (UT), to eliminate air voids.

___ 5.10.11 **ENSURE** Charging Pump oil level is >1/4.

___ 5.10.12 **PRIME** 23 Charging Pump fluid drive:

NOTE

Pipe plugs are located on either side of input shaft.

___ A. **REMOVE** pipe plugs from both sides of Speed Increaser.

___ B. **ADD** oil through either hole until level rises in other hole and remains there.

___ C. **REPLACE** pipe plugs.

___ 5.10.13 **IF** Seal Tank water level is low,
THEN FILL Seal Tank using 2CV59, SEAL WATER TANK M/U VLV.

___ 5.10.14 **PLACE** 2AX1AX7X#, 125VDC CONTROL POWER
for 23 Charging Pump, in ON position.

___ 5.10.15 **DIRECT** a second operator to perform an Independent Verification
IAW Attachment 2, Section 6.0.

___ 5.10.16 **EVALUATE** the need to place 23 Charging Pump in operation as follows:

NOTE

There are two high points in the pump discharge piping that physically cannot be vented. When air voids are identified by UT examinations, the pump is to be placed in recirc to the RWST for at least 2 hours at the highest possible flowrate to sweep the air into the RWST.

___ ◆ **DETERMINE** whether UT examinations indicate the presents of air voids in the two sections of pump discharge piping that physically cannot be vented.

___ ◆ **DETERMINE** whether 23 Charging Pump “packing break-in” is required.

___ ◆ **CONSULT** with Engineering to determine whether 23 Charging Pump is required to be placed in operation based on the maintenance activity performed.

___ 5.10.17 IF 23 Charging Pump is required to be placed in operation,
THEN:

- ___ A. **ESTABLISH** communication between Control Room and 23 Charging Pump.
- ___ B. **ENSURE** the linkage of 23 Charging Pump is in the low pressure position.
- ___ C. **SET** 23 Charging Pump SPEED DEMAND to 10-12%.
- ___ D. Simultaneously **PERFORM** the following:
 - ___ ◆ **MONITOR** 23 Charging Pump Output Fluid Drive speed using the hand held tachometer.
 - ___ ◆ **START** 23 Charging Pump AND immediately **INCREASE** speed demand to couple pump.

NOTE

12-13% speed demand on 23 Charging Pump is \approx 1500 rpm when aligned for RWST recirc following pump coupling.

CAUTION

Do NOT exceed Output Fluid Drive Speed of 1700 rpm as indicated on the on hand held tachometer.

- ___ E. **ADJUST** output end of 23 Charging Pump Fluid Drive to 1500 (1475-1525) rpm as indicated on the hand held tachometer.
- ___ F. IF 23 Charging Pump “packing break-in” is required,
THEN:
 - ___ 1. **ENSURE** Maintenance has installed a test gauge at 2PL3610 IAW Attachment 1, Test Equipment Data.
 - ___ 2. **MAINTAIN** 23 Charging Pump at 1500 (1475-1525) rpm for 30 minutes as indicated on the hand held tachometer.

(step continued on next page)

5.10.17 (continued)

CAUTION

- ◆ **Closely monitor test gauge at 2PL3610 while throttling 2CV485 and 2CV486 to ensure pressure does NOT exceed 2000 psig.**
- ◆ **Excessive throttling of 2CV485 AND 2CV486 has the potential to lift 2CV141 to the VCT. This can result in a reactivity excursion during power operation. 23 Charging Pump is to be stopped immediately and 2CV485 AND CV486 are to be closed should there be any indication of 2CV141 lifting (unexpected VCT level rise or flow noise).**

- ___ 3. When 30 minutes have elapsed, slowly **THROTTLE** 2CV486, PDP RECIRC TEST LINE ISOL VLV, until 23 Charging Pump discharge pressure is \approx 100 psig on test gauge installed at 2PL3610.
- ___ 4. **ADJUST** output end of 23 Charging Pump Fluid Drive to 1500 (1475-1525) rpm as indicated on the hand held tachometer.
- ___ 5. Slowly **THROTTLE** 2CV486 in 100 psig increments, until pressure is \approx 750 psig on test gauge installed at 2PL3610, while **ADJUSTING** output end of 23 Charging Pump Fluid Drive to maintain 1500 (1475-1525) rpm, as indicated on the hand held tachometer.
- ___ 6. Slowly **THROTTLE** 2CV485 in 100 psig increments, until pressure is \approx 1000 psig on test gauge installed at 2PL3610, while **ADJUSTING** output end of 23 Charging Pump Fluid Drive to maintain 1500 (1475-1525) rpm, as indicated on the hand held tachometer.
- ___ 7. **MAINTAIN** 23 Charging Pump at 1000 psig and 1500 (1475-1525) rpm for 60 minutes as indicated on the hand held tachometer.
- ___ 8. When 60 minutes have elapsed, slowly **THROTTLE** 2CV485 to a pressure value as recommended by System Engineering, as indicated on the test gauge installed at 2PL3610, while **ADJUSTING** output end of 23 Charging Pump Fluid Drive to maintain 1500 (1475-1525) rpm, as indicated on the hand held tachometer.
- ___ 9. **MAINTAIN** 23 Charging Pump at 1500 psig and 1500 (1475-1525) rpm for 60 minutes as indicated on the hand held tachometer.

(step continued on next page)

5.10.17 (continued)

- ___ 10. When 60 minutes have elapsed **PERFORM** the following:
 - ___ a. Slowly **OPEN** 2CV485, PDP RECIRC TEST LINE ISOLATION VALVE.
 - ___ b. Slowly **OPEN** 2CV486, PDP RECIRC TEST LINE ISOLATION VALVE.
- ___ 11. Direct Maintenance to **REMOVE** test gauge installed at 2PL3610 IAW Attachment 1, Test Equipment Data.
- ___ G. IF 23 Charging Pump does NOT require packing break-in THEN **MAINTAIN** 23 Charging Pump at 1500 (1475-1525) rpm for 30 minutes as indicated on the hand held tachometer.

NOTE

There are two high points in the pump discharge piping that physically cannot be vented. When air voids are identified by UT examinations, the pump is to be placed in recirc to the RWST for at least 2 hours at the highest possible flowrate to sweep the air into the RWST.

- ___ H. IF UT examinations indicate the presents of air voids in the two sections of pump discharge piping that physically cannot be vented, THEN:
 - ___ 1. Slowly **INCREASE** 23 Charging Pump speed demand to obtain the highest possible flowrate.
 - ___ 2. **MAINTAIN** 23 Charging Pump at the highest possible flowrate for at least two hours to sweep the air from the discharge piping.

___ 5.10.18 When 23 Charging Pump is no longer required to be in operation (refer to Steps 5.10.17G AND 5.10.17H):

___ A. **ADJUST** 23 Charging Pump speed demand to 10-12%.

CAUTION

Due to potential back leakage through the 2CV63 and 2CV64 valves, 23 Charging Pump suction piping is susceptible to overpressurization anytime 2CV57 is closed with the pump stopped. The Operator should closely monitor pump suction pressure (2PI192C) to ensure suction pressure is maintained within its normal operating range until suction pressure has stabilized at <100 psig (2PI192C). An Engineering Evaluation is required anytime pump suction pressure is suspected of exceeding 225 psig.

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___ B. **STOP** 23 Charging Pump.

___ C. Closely **MONITOR** 23 Charging Pump suction pressure, until suction pressure has stabilized at <100 psig.

___ D. IF 23 Charging Pump suction pressure is rising after pump is stopped, THEN:

___ 1. **CONNECT** a hose to 2CV357.

___ 2. Slowly **THROTTLE** 2CV357 to maintain suction pressure <100 psig.

___ 3. **NOTIFY** the SM/CRS.

___ 4. When pump suction pressure has stabilized at <100 psig, **CLOSE** 2CV357.

___ 5. **REMOVE** hose from 2CV357.

___ 6. **DIRECT** a second operator to perform an Independent Verification of 2CV357 valve position IAW Attachment 2, Section 6.0.

___ 5.10.19 **CLOSE** 2CV462, CHARGING CROSS-TIE MOV.

NOTE

23 Charging Pump AND 2CV64 have the potential to exceed the leakage limits specified in SC.RA-AP.ZZ-0051(Q), Leakage Monitoring And Reduction Program. 23 Charging Pump should NOT be aligned for NORMAL Operation with known leakage.

- ___ 5.10.20 IF 23 Charging Pump is to be used for NORMAL Operation,
THEN:
- ___ A. **ALIGN** 23 Charging Pump for Normal Operation IAW Section 5.1.
- ___ B. **PERFORM** S2.OP-ST.CVC-0005(Q), IST - 23 Charging Pump.
- ___ 5.10.21 IF 23 Charging Pump is to be used for Appendix R Only (Unit 1),
THEN:
- ___ A. **CLOSE AND LOCK** 2CV485,
PDP RECIRC TEST LINE ISOLATION VALVE.
- ___ B. **CLOSE** 2CV486, PDP RECIRC TEST LINE ISOLATION VALVE.
- ___ C. **OPEN** 2CV464, CHARGING CROSS-TIE ISOLATION VALVE
(located in Unit 1 Charging Valve Alley).
- ___ D. **ALIGN** 23 Charging Pump for Appendix R Only (Unit 1) IAW Section 5.2.
- ___ E. **PERFORM** S2.OP-PT.CVC-0003(Q), Appendix R Testing
- 23 Charging Pump.

5.11 **Manual Operation Of The Master Flow Controller****NOTE**

Master Flow Controller controls 23 Charging Pump Speed Controller and 2CV55, when either is selected to AUTO.

CAUTION

When the Master Flow Controller is in MANUAL, the Charging Pumps will NOT respond to changes in Pressurizer level. Close monitoring of actual and programmed Pressurizer level is required.

- ___ 5.11.1 **SELECT MANUAL** on Master Flow Controller.
- ___ 5.11.2 **IF** Pressurizer level is lower than desired,
THEN SELECT INCREASE FLOW on Master Flow Controller
until CHARGING FLOW (FI128B) is at desired value.
- ___ 5.11.3 **IF** Pressurizer level is higher than desired,
THEN SELECT DECREASE FLOW on Master Flow Controller
until CHARGING FLOW (FI128B) is at desired value.
- ___ 5.11.4 When returning the Master Flow Controller to AUTOMATIC:
 - ___ A. **ENSURE** Pressurizer level is $\pm 5\%$ of programmed value.
 - ___ B. **SELECT AUTO** on MASTER FLOW CONTROLLER.

5.12 **Aligning 23 Charging Pump for Suction Stabilizer and Discharge Pulsation Dampener Check**

- ___ 5.12.1 C/T 2AX1AX7X, 23 CHARGING PUMP.
- ___ 5.12.2 **IF** 23 Charging Pump is aligned for Normal Operation,
THEN:
- ___ A. **ENSURE** 2CV462, CHARGING CROSS TIE MOV is CLOSED.
- ___ B. **ENSURE** 2CV466 **AND** 2CV467, BORATION FOR CROSS TIE is CLOSED.
- ___ C. **ENSURE** 2CV468, CROSS-TIE RWST SUCTION ISOLATION VALVE is CLOSED.
- ___ D. **UNLOCK AND CLOSE** 2CV64, 23 CHG PMP DISCH VALVE.
- ___ E. **UNLOCK AND CLOSE** 2CV57, 23 CHG PMP SUCT VALVE.
- ___ 5.12.3 **IF** 23 Charging Pump is aligned for Appendix R Only (Unit 1),
THEN:
- ___ A. **ENSURE** 2CV462, CHARGING CROSS TIE MOV is CLOSED.
- ___ B. **ENSURE** 2CV64, 23 CHG PMP DISCH VALVE is CLOSED.
- ___ C. **ENSURE** 2CV57, 23 CHG PMP SUCT VALVE is CLOSED.
- ___ D. **ENSURE** 2CV466 **AND** 2CV467, BORATION FOR CROSS TIE are CLOSED.
- ___ E. **CLOSE** 2CV468, CROSS-TIE RWST SUCTION ISOLATION VALVE.
- ___ 5.12.4 **DRAIN** 23 Charging Pump as follows:
- ___ A. **OPEN** 2CV435, 23 CHG PMP SUCT STABILIZER DRN.
- ___ B. **OPEN** 2CV437, 23 CHARGING PUMP PULSATION DAMPENER DRAIN VLV.
- ___ C. **OPEN** 2CV436, 23 CHG PMP SUCT STABILIZER VENT.
- ___ D. **OPEN** 2CV357, CHG PMP SUCT VENT.

- ___ 5.12.5 **DIRECT** Maintenance to perform Suction Stabilizer and Discharge Pulsation Dampener checks IAW SC.MD-CM.CVC-0005(Q), 13 And 23 Charging Pump: Bearing Inspection; Power Frame Disassembly, Inspection, Repair, and Reassembly; Fluid Cylinder Replacement; and Suction Stabilizer/Pulsation Dampener Charging.
- ___ 5.12.6 When Maintenance has completed Suction Stabilizer and Discharge Pulsation Dampener checks IAW SC.MD-CM.CVC-0005(Q), **CLOSE** the following valves:
 - ___ ◆ 2CV435, 23 CHG PMP SUCT STABILIZER DRN
 - ___ ◆ 2CV437, 23 CHARGING PUMP PULSATION DAMPENER DRAIN VLV
 - ___ ◆ 2CV436, 23 CHG PMP SUCT STABILIZER VENT
 - ___ ◆ 2CV357, CHG PMP SUCT VENT

NOTE

Section 5.10, Restoration of 23 Charging Pump After Mechanical Maintenance should be used to fill and vent 23 Charging Pump following Mechanical Maintenance.

- ___ 5.12.7 IF Section 5.10, Restoration of 23 Charging Pump After Mechanical Maintenance was NOT performed, THEN FILL AND VENT 23 Charging Pump as follows:
 - ___ A. IF 23 Charging Pump is to be aligned for Normal Operation, THEN:
 - ___ 1. **ENSURE** 2CV64, 23 CHG PUMP DISCH VALVE is CLOSED.
 - ___ 2. Slowly **OPEN AND LOCK** 2CV57, 23 CHG PMP SUCT VALVE.
 - ___ 3. **CONNECT** a hose to 2CV436, STABILIZER VENT VALVE.
 - ___ 4. Slowly **THROTTLE** 2CV436.
 - ___ 5. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from vent, **CLOSE** 2CV436.
 - ___ 6. **REMOVE** hose from 2CV436.

(step continued on next page)

5.12.7 (continued)

- ___ 7. **CONNECT** a hose to
2CV478, BORATION FOR CROSS TIE VENT VALVE.
- ___ 8. Slowly **THROTTLE** 2CV478.
- ___ 9. When a minimum of 10 minutes has elapsed
AND a steady stream of water issues from vent,
CLOSE 2CV478.
- ___ 10. **REMOVE** hose from 2CV478.

NOTE

The following steps allow venting the discharge piping through pump discharge pressure gauge instrument line while maintaining gauge filled with water.

- ___ 11. **ENSURE** 2CV326, 23 CHG PUMP DISCH PRESS TAP is OPEN.
- ___ 12. **CLOSE** the instrument inlet valve for 2PI142F,
23 Charging Pump Discharge Pressure Gauge.
- ___ 13. **DIRECT** discharge waste of instrument block blowdown valve to a
suitable container (e.g. poly bottle).
- ___ 14. Slowly **THROTTLE** the instrument block blowdown valve.
- ___ 15. When a minimum of 10 minutes has elapsed
AND a steady stream of water issues from
instrument block blowdown line,
CLOSE the instrument block blowdown valve.
- ___ 16. **OPEN** the instrument inlet valve for 2PI142F.
- ___ 17. **OPEN AND LOCK** 2CV64, 23 CHG PMP DISCH VALVE.
- ___ 18. **DIRECT** a second Operator to complete Attachment 2,
Section 7.0.
- ___ B. IF 23 Charging Pump is to be aligned for Appendix R Only (Unit 1),
THEN:
 - ___ 1. **ENSURE** 2CV64, 23 CHG PUMP DISCH VALVE is CLOSED.
 - ___ 2. Slowly **OPEN** 2CV468, CROSS-TIE RWST SUCTION
ISOLATION VALVE.

(step continued on next page)

5.12.7 (continued)

- ___ 3. **CONNECT** a hose to 2CV436, STABILIZER VENT VALVE.
- ___ 4. Slowly **THROTTLE** 2CV436.
- ___ 5. When a minimum of 10 minutes has elapsed
AND a steady stream of water issues from vent,
CLOSE 2CV436.
- ___ 6. **REMOVE** hose from 2CV436.
- ___ 7. **CONNECT** a hose to
2CV478, BORATION FOR CROSS TIE VENT VALVE.
- ___ 8. Slowly **THROTTLE** 2CV478.
- ___ 9. When a minimum of 10 minutes has elapsed
AND a steady stream of water issues from vent,
CLOSE 2CV478.
- ___ 10. **REMOVE** hose from 2CV478.

NOTE

The following steps allow venting the discharge piping through pump discharge pressure gauge instrument line while maintaining gauge filled with water.

- ___ 11. **ENSURE** 2CV326, 23 CHG PUMP DISCH PRESS TAP is OPEN.
- ___ 12. **CLOSE** the instrument inlet valve for 2PI142F,
23 Charging Pump Discharge Pressure Gauge.
- ___ 13. **DIRECT** discharge waste of instrument block blowdown valve
to a suitable container (e.g. poly bottle).
- ___ 14. Slowly **THROTTLE** the instrument block blowdown valve.
- ___ 15. When a minimum of 10 minutes has elapsed
AND a steady stream of water issues from the
instrument block blowdown line,
CLOSE the instrument block blowdown valve.
- ___ 16. **OPEN** the instrument inlet valve for 2PI142F.
- ___ 17. **DIRECT** a second Operator to complete Attachment 2,
Section 8.0.

- ___ 5.12.8 IF all maintenance is complete on 23 Charging Pump (with the exception of Ultrasonic Testing to identify potential air voids) THEN RELEASE tag on 2AX1AX7X, 23 CHARGING PUMP.
- ___ 5.12.9 Notify Outage Services to **PERFORM** Ultrasonic Testing (UT) of affected pump suction and discharge piping to ensure proper fill and vent with no air voids.
- ___ 5.12.10 IF UT examinations indicate the presents of air voids in any piping associated with 23 Charging Pump, THEN PERFORM the applicable section(s) of Attachment 4, Fill And Vent of 23 Charging Pump Piping Following Ultrasonic Testing (UT), to eliminate air voids.

NOTE

There are two high points in the pump discharge piping that physically cannot be vented. When air voids are identified by UT examinations, the pump is to be placed in recirc to the RWST for at least 2 hours at the highest possible flowrate to sweep the air into the RWST.

- ___ 5.12.11 IF UT examinations indicate the presents of air voids in the two sections of pump discharge piping that physically cannot be vented, THEN PLACE 23 Charging Pump in recirc IAW Section 5.4, Placing 23 Charging Pump On Recirc To RWST.

5.13 **Completion And Review**

- ___ 5.13.1 **IF** 23 Charging Pump Packing break-in was performed IAW Section 5.10, **THEN ENSURE** Maintenance has removed test gauge installed at 2PL3610 IAW Attachment 1, Test Equipment Data.

- ___ 5.13.2 **COMPLETE** Attachment 5, Section 1.0 and 2.0, **AND FORWARD** this procedure to SM/CRS for review and approval.

- ___ 5.13.3 SM/CRS **PERFORM** the following:
 - ___ A. **REVIEW** this procedure with Attachment 1-5 for completeness and accuracy.

 - ___ B. **COMPLETE** Attachment 5, Section 3.0.

 - ___ C. **FORWARD** this completed procedure to the Operations Staff.

END OF PROCEDURE SECTION

6.0 RECORDS

- 6.1 Retain following IAW RM-AA-101, Records Management Program:
 Attachments 1-4
 Attachment 5, as applicable

7.0 REFERENCES

7.1 Updated Final Safety Analysis Report

- 7.1.1 Section 5.5.7.3.4, Compliance with Branch Technical Position RSB 5-1.
 7.1.2 Section 9.3.4, Chemical and Volume Control System.
 7.1.3 Section 9.3.4.2.5, Charging Pump Control.
 7.1.4 Section 7.7.2.5, Pressurizer Level Control.
 7.1.5 Table 5.2-28, Reactor Coolant Water Chemistry Specification.
 7.1.6 Table 6.3-12, Recirculation Loop Leakage.
 7.1.7 Table 9.2-3, Component Cooling System Flow Requirements.

7.2 Technical Specifications - Unit 2

- 7.2.1 3.1.2.1, Boration System Flowpaths - Shutdown.
 7.2.2 3.1.2.2, Boration System Flowpaths - Operating.
 7.2.3 3.1.2.3, Charging Pumps - Shutdown.
 7.2.4 3.1.2.4, Charging Pumps - Operating.
 7.2.5 3.5.3, ECCS Subsystems - $T_{AVG} < 350^{\circ}F$.

7.3 Drawings

- 7.3.1 205328, No. 2 Unit Chemical and Volume Control System Operation-P&ID
 7.3.2 218861, #2 Unit--#21 Charging Pump Schematic
 7.3.3 218863, #2 Unit--#22 Charging Pump Schematic
 7.3.4 220403, CVCS Chg Pps TC & Aux Oil Press, Chg Flow, Press
 & Line Press Cont, VCT Press & Level Functional Diagram
 7.3.5 220441, RCS Pressurizer Level Control & Protection Functional Diagram.
 7.3.6 220943, No.11, 12, 21, 22 Chg. Pump Lube Oil Cooler Inlet Control Valves.
 7.3.7 221060, Reactor Protection System Pressurizer Pressure
 & Level Control Logic Diagram
 7.3.8 224416, CVCS 13 & 23 Charging Pumps Logic Diagram
 7.3.9 224417, 1CV55 & 2CV55 Charging Flow, 1CV71 & 2CV71
 Charging Pressure Valves & Charging Flow Demand Logic Diagram

7.4 PSBPs

- 7.4.1 304209, Salem Units 1 and 2 Precautions, Limitations, and Setpoints.
 7.4.2 301119, GYROL Fluid Drive.
 7.4.3 301337, Pacific Pumps Types ZJ and IJ with Mechanical Seal Shaft Seals.

7.5 Others

- 7.5.1 DE-CB.CC-0023(Q), Heat Load and Flow Requirements for CC System
- 7.5.2 DE-CB.CVC-0037(Q), Chemical and Volume Control Systems Baseline Document.
- 7.5.3 PSE-94-776, NLR-N94216, Seal Injection Flow limitations
- 7.5.4 Tech Spec Amendment 151, Boration Flow Paths
- 7.5.5 S2.OP-AR.ZZ-0018(Q), Auxiliary Annunciator
- 7.5.6 DCP 2EE-0147, Control Valve 2CV55 Replacement.
- 7.5.7 PIR960802082, Centrifugal Charging Pump - Auxiliary Oil Pump operation
- 7.5.8 PIR970123224, ECCS Pumps Operation with RCS $\leq 312^{\circ}\text{F}$
- 7.5.9 80029150, Design Analysis of CVCS Cross-Tie
- 7.5.10 DCP 80065299, Restoration of PDP as the Normal Charging Pump
- 7.5.11 20245421, Potential CVC Pp Backleakage
- 7.5.12 70052001, Non-Condensable Gas Discovered In Unit 1 CVC Suction/Discharge Piping

7.6 Cross-References

- 7.6.1 RM-AA-101, Records Management Program
- 7.6.2 NC.NA-AP.ZZ-0024(Q), Radiological Safety Program
- 7.6.3 SC.MD-CM.CVC-0005(Q), 13 and 23 Charging Pump: Bearing Inspection; Power Frame Disassembly, Inspection, Repair, and Reassembly; Fluid Cylinder Replacement; and Suction Stabilizer/Pulsation Dampener Charging
- 7.6.4 OP-SA-108-106-1001, Large Motor Starting Criteria and Protective Circuit/Breaker Reset and Reclosure Policy
- 7.6.5 SH.OP-AP.ZZ-0108(Q), Operability Assessment and Equipment Control Program
- 7.6.6 S2.OP-SO.CC-0001(Q), Component Cooling System Operation
- 7.6.7 S2.OP-SO.CVC-0006(Q), Boron Concentration Control
- 7.6.8 S2.OP-ST.CVC-0005(Q), IST - 23 Charging Pump

**ATTACHMENT 1
(Page 1 of 1)**

TEST EQUIPMENT DATA

Temporary Test Equipment	ID Number	Installation Point	Installation		Removal	
	Cal. Due Date		Initials	Date	Initials	Date
(1) Pressure Gauge Range: 0-3000 psig Accuracy: ±2% of Full Scale, or better	#	Instrument Block for 2PL3610, 23 Charging Pump Disch Press. Gauge				
	Date:					

(1) Required for 23 Charging Pump “packing break-in” only (Section 5.10).

**ATTACHMENT 2
(Page 1 of 4)**

INDEPENDENT VERIFICATION

1.0 Aligning 23 Charging Pump For Normal Operation

Component	Description	Required Position	Restoration IV Position / Initials	Date
2CV468	CROSS TIE RWST SUCTION IV	X	/	
2CV64	23 CHG PUMP DISCH VALVE	LO	/	
2CV57	23 CHG PUMP SUCT VALVE	LO	/	
2CV464	CHARGING CROSS TIE ISOL V	O	/	
2CV485	PDP RECIRC TEST LINE ISOL V	LX	/	
2CV486	PDP RECIRC TEST LINE ISOL V	X	/	
2CV462	CHARGING CROSS-TIE MOV	X	/	

2.0 Aligning 23 Charging Pump For Appendix R Only (Unit 1)

Component	Description	Required Position	Restoration IV Position / Initials	Date
2CV468	CROSS TIE RWST SUCTION IV	O	/	
2CV64	23 CHG PUMP DISCH VALVE	X	/	
2CV57	23 CHG PUMP SUCT VALVE	X	/	
2CV464	CHARGING CROSS TIE ISOL V	O	/	
2CV485	PDP RECIRC TEST LINE ISOL V	LX	/	
2CV486	PDP RECIRC TEST LINE ISOL V	X	/	
2CV462	CHARGING CROSS-TIE MOV	X	/	

**ATTACHMENT 2
(Page 2 of 4)**

INDEPENDENT VERIFICATION

3.0 Placing 23 Charging Pump On Recirc To RWST

Component	Description	Required Position	Restoration IV Position / Initials	Date
2CV462	CHARGING CROSS-TIE MOV	X	/	
2CV464	CHARGING CROSS-TIE ISOL VLV	O	/	
2CV485	PDP RECIRC TEST LINE ISOL VLV	LX	/	
2CV486	PDP RECIRC TEST LINE ISOL VLV	X	/	

4.0 Start A Centrifugal Charging Pump

Component	Description	As Found Position / Initials	Restoration IV Position / Initials	Date
2CA2015	CONTROL AIR SUPPLY TO CV55 BYPASS VALVE	/	/	

5.0 Transfer From 23 Charging Pump to A Centrifugal Charging Pump

Component	Description	As Found Position / Initials	Restoration IV Position / Initials	Date
2CA2015	CONTROL AIR SUPPLY TO CV55 BYPASS VALVE	/	/	

**ATTACHMENT 2
(Page 3 of 4)**

INDEPENDENT VERIFICATION

6.0 Restoration of 23 Charging Pump After Mechanical Maintenance

Component	Description	Required Position	Restoration IV Position / Initials	Date
N/A	Instrument Blowdown Line Valve for 2PI-142F, 23 Charging Pump Discharge Pressure Gauge	X	/	
	Instrument Inlet Valve for 2PI-142F, 23 Charging Pump Discharge Pressure Gauge	O	/	
2CV64	23 CHG PUMP DISCH VALVE	X	/	
2CV357	CHG PUMP SUCT VENT	X	/	
		X	/ (1)	
2CV57	23 CHG PUMP SUCT VALVE	X	/	
2CV436	23 CHG PUMP SUCT STABILIZER	X	/	
2CV462	CHARGING CROSS TIE MOV	O	/	
2CV464	CHARGING CROSS-TIE IV (located in Unit 1 Charging Valve Alley)	X	/	
2CV468	CROSS TIE RWST SUCTION IV	O	/	
2CV485	PDP RECIRC TEST LINE ISOLATION VLV	O	/	
2CV486	PDP RECIRC TEST LINE ISOLATION VLV	O	/	
2CV478	BORATION FOR CROSS-TIE VENT	X	/	
2CV470/471	CHARGING CROSS-TIE LEAKAGE TEST VLV	X	/	
2CV482/483	CHARGING CROSS-TIE VENT VALVE	X	/	
2CV487/488	PDP RECIRC TEST LINE ISO VLV LEAK TEST	X	/	
2CV59	23 CHARGING PUMP SEAL TNK M/U	X	/	
2AX1AX7X#	125VDC CONTROL POWER (23 Charging Pump)	ON	/	

- (1) The second IV of 2CV357 is to be completed when directed by Step 5.10.18D only. 2CV357 may have been used to maintain 23 Charging Pump suction pressure <100 psig due to back leakage through the 2CV63 and 2CV64 valves when the pump is stopped.

**ATTACHMENT 2
(Page 4 of 4)**

INDEPENDENT VERIFICATION

**7.0 23 Charging Pump Alignment For Normal Operation
Following Suction Stabilizer/Discharge Pulsation Dampener Checks**

Component	Description	Required Position	Restoration IV Position / Initials	Date
2CV468	CROSS-TIE RWST SUCTION ISOLATION VALVE	X	/	
2CV57	23 CHG PMP SUCT V	LO	/	
2CV64	23 CHG PMP DISCH V	LO	/	
2CV435	23 CHG PMP SUCT STABILIZER DRAIN	X	/	
2CV436	23 CHG PMP SUCT STABILIZER VENT	X	/	
2CV437	23 CHG PMP PULSATION DAMP DRAIN	X	/	
2CV357	CHG PMP SUCTION VENT	X	/	
2CV478	BORATION FOR CROSS TIE VENT VALVE	X	/	
2PI142F	INSTRUMENT INLET VALVE	O	/	

**8.0 23 Charging Pump Alignment For Appendix R Only (Unit 1)
Following Suction Stabilizer/Discharge Pulsation Dampener Checks**

Component	Description	Required Position	Restoration IV Position / Initials	Date
2CV468	CROSS-TIE RWST SUCTION ISOLATION VLV	O	/	
2CV57	23 CHG PMP SUCT V	X	/	
2CV64	23 CHG PMP DISCH V	X	/	
2CV435	23 CHG PMP SUCT STABILIZER DRAIN	X	/	
2CV436	23 CHG PMP SUCT STABILIZER VENT	X	/	
2CV437	23 CHG PMP PULSATION DAMP DRAIN	X	/	
2CV357	CHG PMP SUCTION VENT	X	/	
2CV478	BORATION FOR CROSS TIE VENT VALVE	X	/	
2PI142F	INSTRUMENT INLET VALVE	O	/	

ATTACHMENT 3
(Page 1 of 1)

QUANTIFICATION OF 2CV47/52 BACKLEAKAGE

1.0 **2CV47/52 Backleakage Data:**

Discharge Flowrate (F0128A)		Value	Requirement
Initial Flow	A	gpm	N/A
Final Flow	B	gpm	
Total Backleakage	C (1)	gpm	<5.0 gpm (3)
(2) Independent Verification of Calculation Performed By:			[C0284]

- (1) **CALCULATE** Total Backleakage (**B - A = C**).
- (2) **DIRECT** a second operator to perform an Independent Verification of Calculation Performed.
- (3) IF __ Total Backleakage is ≥ 5.0 gpm,
THEN:
 - ___ **◆** **INITIATE** a NOTF to System Engineering documenting backleakage and to initiate corrective actions, as required.

NOTE

Leakage through 2CV81, 2CV82, 2CV52 or 2CV47 discharge check valve(s) has the potential for invalidating T/S Operability Criteria (TSSR 4.5.2.h.2 and 4.5.3.1) established in S2.OP-ST.SJ-0016(Q), High Head Cold Leg Throttling Valve Flow Balance Verification.

- ___ **◆** **EVALUATE** T/S Surveillance Requirements 4.5.2.h.2 and 4.5.3.1 for applicability.

**ATTACHMENT 4
(Page 1 of 4)**

**FILL AND VENT OF 23 CHARGING PUMP PIPING
FOLLOWING ULTRASONIC TESTING (UT)**

NOTE

Sections of this attachment are to be completed when the results of any UT examination indicate the presents of air voids in the CVCS piping associated with 23 Charging Pump. Only the applicable section(s) need be performed, as directed by the SM/CRS.

1.0 23 Charging Pump Suction Header Path:

___ 1.1 **FILL AND VENT** 23 Charging Pump suction header path as follows:

___ 1.1.1 **VENT** piping using 2CV436, STABILIZER VENT VALVE as follows:

- ___ A. **CONNECT** a hose to 2CV436.
- ___ B. Slowly **THROTTLE** 2CV436.
- ___ C. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from vent, **CLOSE** 2CV436.
- ___ D. **REMOVE** hose from 2CV436.

___ 1.1.2 **VENT** piping using 2CV357, CHG PUMP SUCT VENT as follows:

- ___ A. **CONNECT** a hose to 2CV357.
- ___ B. Slowly **THROTTLE** 2CV357.
- ___ C. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from vent, **CLOSE** 2CV357.
- ___ D. **REMOVE** hose from 2CV357.

___ 1.1.3 **VENT** piping using 2CV478, BORATION FOR CROSS-TIE VENT as follows:

- ___ A. **CONNECT** a hose to 2CV478.
- ___ B. Slowly **THROTTLE** 2CV478.
- ___ C. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from vent, **CLOSE** 2CV478.
- ___ D. **REMOVE** hose from 2CV478.

ATTACHMENT 4
(Page 2 of 4)

**FILL AND VENT OF 23 CHARGING PUMP PIPING
FOLLOWING ULTRASONIC TESTING (UT)**

2.0 23 Charging Pump Discharge Header Path:

___ 2.1 **FILL AND VENT** 23 Charging Pump discharge header path as follows:

NOTE

The following steps allow venting the discharge piping through the pump discharge pressure gauge instrument line while maintaining the gauge filled with water.

- ___ 2.1.1 **VENT** piping using 2PI-142F, Instrument Blowdown Line as follows:
- ___ A. **ENSURE** 2CV326, CHG PUMP DISCH PRESS TAP ROOT VALVE is OPEN (Charging Valve Alley).
 - ___ B. **CLOSE** the instrument inlet valve for 2PI-142F, 23 Charging Pump Discharge Pressure Gauge.
 - ___ C. **INSTALL** a tygon tube on instrument blowdown line between the instrument inlet valve AND 2CV326.
 - ___ D. Slowly **THROTTLE** the instrument blowdown valve.
 - ___ E. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from the instrument line, **CLOSE** the instrument blowdown valve.
 - ___ F. **REMOVE** tygon tube from instrument blowdown line.
 - ___ G. **OPEN** the instrument inlet valve for 2PI-142F.

(step continued on next page)

ATTACHMENT 4
(Page 3 of 4)

FILL AND VENT OF 23 CHARGING PUMP PIPING
FOLLOWING ULTRASONIC TESTING (UT)

2.0 **23 Charging Pump Discharge Header Path:** (continued)

- ___ 2.1.2 **VENT** piping using 2CV471, CHARGING CROSS-TIE LEAKAGE TEST VALVE as follows:
- ___ A. **PROCEED** to the Unit **1** Charging Valve Alley.
- ___ B. **CONNECT** a hose to 2CV471.
- ___ C. **OPEN** 2CV471.
- ___ D. Slowly **THROTTLE** 2CV470, CHARGING CROSS-TIE LEAKAGE TEST VALVE.
- ___ E. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from vent
- ___ 1. **CLOSE** 2CV470.
- ___ 2. **CLOSE** 2CV471.
- ___ F. **REMOVE** hose from 2CV471.
- ___ G. **RETURN** to the Unit **2** Charging Valve Alley.
- ___ 2.1.3 **VENT** piping using 2CV483, CHARGING CROSS-TIE VENT VALVE as follows:
- ___ A. **CONNECT** a hose to 2CV483.
- ___ B. **OPEN** 2CV483.
- ___ C. Slowly **THROTTLE** 2CV482, CHARGING CROSS-TIE VENT VALVE.
- ___ D. When a minimum of 10 minutes has elapsed AND a steady stream of water issues from vent:
- ___ 1. **CLOSE** 2CV482.
- ___ 2. **CLOSE** 2CV483.
- ___ E. **REMOVE** hose from 2CV483.

ATTACHMENT 4
(Page 4 of 4)

**FILL AND VENT OF 23 CHARGING PUMP PIPING
FOLLOWING ULTRASONIC TESTING (UT)**

3.0 23 Charging Pump Recirculation Header Path:

- ___ 3.1 **FILL AND VENT** 23 Charging Pump recirculation header path as follows:
- ___ 3.1.1 **VENT** piping using 2CV488, PDP RECIRC TEST LINE ISO VALVE LEAK TEST as follows:
- ___ A. **CONNECT** a hose to 2CV488.
- ___ B. **OPEN** 2CV488.
- ___ C. Slowly **THROTTLE** 2CV487,
PDP RECIRC TEST LINE ISO VALVE LEAK TEST
- ___ D. When a minimum of 10 minutes has elapsed
AND a steady stream of water issues from vent:
- ___ 1. **CLOSE** 2CV487.
- ___ 2. **CLOSE** 2CV488.
- ___ E. **REMOVE** hose from 2CV488.

4.0 Ultrasonic Testing (UT) Performance:

NOTE

There are two high points in the pump discharge piping that physically cannot be vented. The pump is to be placed in recirc to the RWST for at least 2 hours at the highest possible flowrate to sweep the air into the RWST when directed by either Section 5.10 OR 5.12 of this procedure.

- ___ 4.1 Notify Outage Services to **PERFORM** Ultrasonic Testing (UT) of affected pump piping, as applicable, to ensure proper fill and vent with no air voids.
- ___ 4.2 **REPEAT** Sections 1.0 through 3.0, as necessary, until the results of Ultrasonic Testing (UT) indicate proper fill and vent of 23 Charging Pump piping with no air voids.

ATTACHMENT 5
(Page 2 of 2)

COMPLETION SIGN-OFF SHEET

2.0 SIGNATURES

Print	Initials	Signature	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

INDEPENDENT VERIFICATION

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3.0 SM/CRS FINAL REVIEW AND APPROVAL

This procedure with Attachments 1-5 is reviewed for completeness and accuracy.
All deficiencies, including corrective actions, are clearly recorded in COMMENTS Section.

Signature: _____ Date: _____
SM/CRS