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NINE MILE POINT NUCLEAR STATION UNIT 2

OPERATING PROCEDURE

PROCEDURE NO. N2-OP-30

# CONTROL ROD DRIVE

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NIAGARA MOHAWK POWER CORPORATION

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CONTROL ROD DRIVE

A. TECHNICAL SPECIFICATIONS

1.0 Section 3/4.1.3 Control Rods

B. SYSTEM DESCRIPTION

The Control Rod Drive System (CRD) makes changes in core reactivity by individually positioning neutron absorbing control rods within the core in response to manual control signals (RMC). The systems proper operation is monitored by the following back up systems; Rod Worth Minimizer, (RWM), Rod Block Monitor (RBM) and Rod Sequence Control Systems (RSCS).

The CRD System is also designed to insert all control rods (scram) to rapidly shut down the reactor in response to a signal from the Reactor Protective System (RPS), Redundant Reactivity Control System, (RRCS), or manually.

This procedure will cover the Control Rod Drive Hydraulics. For information on Control Rod movement and control, refer to N2-OP-96, Reactor Manual Control and Rod Position Indication.

1.0 Control Rod Drive Hydraulic

The Control Rod Drive Hydraulic System consists of two 100 percent system capacity pumps, two 100 percent system capacity suction and discharge filters, a hydraulic control unit (HCU) for each of the 185 control rods and the associated valves, and instrumentation piping required to operate each control rod.

The Control Rod Drive Hydraulic Pumps (P1A, P1B) are horizontal, ten stage, centrifugal pumps, and are controlled by their respective control switches located on control room panel P603. Each control switch is provided with START-STOP-PULL TO LOCK, AUTO positions. The CRD pumps are rated at 115 gpm @ 3,235 ft. TDH. Reactor Building Closed Loop Cooling Water provides cooling for the bearing and seal cooler.

The pump motors are three phase, 4,160-V ac motors. The motors are rated at 300 horsepower and are powered from 2NNS-SWG014 (P1A) and 2NNS-SWG015 (P1B). Each motor is equipped with an electrical heater (0.8 kw) that is energized when the motor is off. Both electrical heaters are powered from 2SCA-PNL201.

One pump is normally in operation with the other in a standby status.

When the plant is operating, condensate from the condensate demineralizers is supplied to the suction header via a self-contained pressure reducing valve (PCV140). Pressure control valve PCV140 maintains the required suction head to the RDS pumps. The condensate storage tanks supply the CRD pumps when the condensate pumps are off during shutdown. 2

The suction header for the CRD pumps has two 100 percent system capacity suction filters and provide filtration of any particles greater than 25 microns.

Differential pressure across the suction filters is sensed by a differential pressure indicating switch (PDIS104) which is located on local panel 2CES-RAK103, and provides an annunciator for high differential pressure on P603. The normal operating maximum pressure drop across a clean filter is 2 psid @ 100 gpm and the maximum pressure drop across a dirty filter is 18 psid @ 100 gpm.

From the suction filters, the CRD pumps are supplied thru their respective suction and discharge isolation valves. The CRD pumps are equipped with a seal equalization line, which pressurizes the idle pumps seal to prevent seal damage upon startup.

A pump recirculation line is attached to each pump discharge header and recirculates approximately 20 gpm during normal operations back to the condensate storage tank via a common return line for pump minimum flow protection.

The CRD pump discharge header branches into two lines, each of which contains a drive water filter, which are 100 percent system capacity filters and will remove any particles greater than 50 microns.

The differential pressure across the drive water filters is sensed by a differential pressure indicating switch (PDIS106), and annunciated on P603. The normal operating maximum pressure drop across a clean filter is 14 psid @ 73 gpm and the maximum pressure drop across a dirty filter is 125 psid.

The outlet of the drive water filters supplies approximately 3-5gpm each (normal) to the number one seal cavity of the Reactor Recirculation System Pumps (2RCS-P1A, P1B).

The drive water filters outlet header contains a flow element (FE107). Flow transmitter FT107 is located on local panel 2CES-RAK102 and supplies the following:

a. Analog computer point for system flow.

b. Flow indicator located on P603.

c. Flow indicator located on local panel 2CES-RAK102.

d. Flow controller located on control room panel P603, supplies a modulation control signal to flow control valves FV6A, 6B.

The drive water filters combined outlet header also supplies a reactor plant sample connection and the charging water header which supplies each scram accumulator (185), and has local press indication and control room annunciator and computer pt. The header supplies two flow control valves (FV6A, 6B). Normally one flow control valve is operating and the other is isolated. Flow control valves FV6A, 6B maintain Rod Drive System flow constant at about 63 gpm. |2

The drive water header supplies the stabilizing valve units and is equipped with a motor-operated pressure control valve, operated by a switch located on control room panel P603 with OPEN-NORM-CLOSE positions. Pressure control valve PV101 maintains the upstream pressure at 260 psig above primary pressure by throttling the flow. Differential pressure is sensed by a pressure differential transmitter PDT114. Pressure differential transmitter PDT114 supplies signals to a differential pressure indicator located on local panel 2CES-RAK103 and P603. Differential pressure indicator PDI114 allows the operator to monitor pressure and manually position pressure control valve PV101 to maintain pressure 260 psig above reactor pressure. There is also local and control room indication of drive water flow on P603.

The outlet header of pressure control valve PV101 is the cooling water header and is maintained at reactor press +30 psig. Pressure differential transmitter PDT117 is located on local panel 2CEC-RAK103 and provides the operator with indication of differential pressure between the reactor and the cooling water header on panel P603. Pressure differential transmitter PDT117 also supplies pressure differential indicator located on local panel 2CES-RAK103. There is also flow indication locally and on control room panel P603.

## 2.0 Stabilizing Valve Units

Two sets of stabilizing valve units are provided to maintain constant flow conditions in the system. One stabilizing valve unit is in operation while the other has its inlet block valve closed. Needle valves are provided on the outlet of each solenoid valve and regulate the flow as follows:

Drive insert solenoid (SOVX7A/B) 4 gpm

Drive withdraw solenoid (SOVY7A/B) 2 gpm

With no rod movement, 6 gpm flows through the on service stabilizing unit, 4 gpm through SOVX7A or 7B, and 2 gpm through SOVY7A or 7B.

Control rod insertion requires 4 gpm to maintain the required differential pressure (260 psig) for rod insertion. Solenoid valve SOVX7A, 7B closes, allowing only 2gpm to pass through the stabilizing unit to the cooling water header, thus providing 4 gpm additional flow to the drive water header. This maintains a constant drive water header pressure at 260 psig above reactor pressure during rod insertion. When the drive insert signal is removed, solenoid valve SOVX7A, 7B opens and the system is returned to a normal condition as stated above.

The control rod withdrawal operation is similar to insertion, except that 2 gpm is required for operation and SOVY7A, 7B operates, thus providing the 2 gpm for control rod withdrawal.

Fourteen exhaust water branch lines receive exhaust water from the 185 HCUs and combine into the exhaust water header. The exhaust water header is equipped with a local pressure indicator (PI120).

The two exhaust water headers are each equipped with a pressure equalizing valve (RV15A, 15B). The pressure equalizing valves operate at 80 psid to repressurize the exhaust header from the cooling header following a scram. Each pressure equalization valve is equipped with locked open inlet and outlet globe valves.

2.1 Instrument Air is supplied to the RDS for the operation of:

a. Flow control valve FV6A, 6B (30 psig).

b. Scram discharge volume drain and vent valves *AOV123, 124, 130 and 132 (70 - 75 psig). | 1

c. 185 scram supply and exhaust valves (AOV-126) and (AOV-127) (70 - 75 psig).

1. There are two CRD Instrument Air headers; The first header supplies two pressure control valves (PCV18A, 18B). Normally, one reducing valve is in service maintaining outlet pressure at 30 psig, while the other reducing valve is isolated with the inlet and outlet valves closed. The outlet lines of pressure control valve PCV18A, 18B, combine and supply the following with 30 psig instrument air:

Pressure indicator: PI134 located on local panel 2CES-RAK102

Control air to flow control valves 6A, 6B electro-pneumatic positioners I/P107 on 2CES-RAK 102.

Current to pressure converter I/P107 is located on local panel 2CES-RAK102. Auto/manual stations 6A, 6B are located on local panel 2CES-RAK102.

The second header supplies two pressure control valves PCV19A, 19B. Normally, one reducing valve is in service maintaining outlet pressure at 70-75 psig, while the other reducing valve is isolated with the inlet and outlet valves closed. The outlet of PCV19A, 19B supplies valve operating air to valves FV6A, 6B and to the scram air header. The scram air header consists of the following air supply lines: operating air supply to scram inlet and outlet valves via dual-solenoid operated 3-way scram pilot valves (PV-139) for each of 185 control rods; operating air supply to scram discharge volume vent & drain valves via 3-way solenoid operated valves SOV-154 for AOV-124(vent) & AOV-123 (drain) and SOV-155 for AOV-132 (vent) & AOV-130 (drain).

The scram air header is normally maintained pressurized. When a scram signal is generated by both channels of the Reactor Protection System, SOV-138 & SOV-137 (3-way solenoid operated back up scram pilot valves) energize blocking supply air to the scram air header while simultaneously venting it. At the same time, the dual-solenoid 3-way scram pilot valves for each set of scram inlet and outlet valves de-energize blocking operating air to the scram inlet and outlet valves while simultaneously venting the valve, allowing the scram inlet and outlet valves to open. SOV-154 and SOV-155 also de-energize blocking and venting operating air to the scram discharge volume vent and drain valves AOV-124, 132 and AOV-123, 130, allowing these air-operated valves to close.

Two additional 3-way solenoid operated valves SOV-162, 163 are in the scram air header in series with SOV-137, 138. These valves are associated with the alternate rod insertion function of the Redundant Reactivity Control System and perform the same function as the back-up scram valves SOV-137, 138 except they energize to function in response to a scram signal.

The Control Rod Drive scram pilot valve air header is equipped with a pressure indicator and pressure transmitter located on local panel 2CES-RAK 102. Pressure transmitter supplies input to process computer and to control room annunciator for actuation on high or low pressure condition.

3.0 Hydraulic Control Units

There are 185 hydraulic control units (HCUs), one for each control rod. One will be explained and the remaining units are similar. Each hydraulic control unit consists of the following:

a. Directional control valves:

1. Withdrawal supply: SOV122
2. Insert supply: SOV123
3. Insert return: SOV121
4. Withdrawal return and settle: SOV120

b. Scram pilot valves: PV 139

c. Scram inlet valve: AOV126

d. Scram exhaust valve: AOV127

e. Scram accumulator with

1. Local nitrogen pressure indicator: PI205

2. Pressure switch (PS206) which actuates on low pressure to energize a control room annunciator and a control room digital computer point.

3. Level switch (LDS129) which actuates to provide a control room annunciator and a digital computer point in the event of water leakage into the scram accumulator nitrogen cylinder.

f. Charging water header

g. Drive water header

h. Cooling water header

i. Exhaust water header

j. Insert riser

k. Withdraw riser

l. Scram exhaust header

m. Scram pilot valve air header.

The drive water header is equipped with a manual valve and a check valve. The drive water header connects to each HCU between the insert and withdraw supply valves. Control rod insertion is accomplished as follows: insert supply valve SOV123 opens and drive water is directed to the control rod via the insert riser at a rate of 4 gpm. Insert return valve SOV121 opens and provides a flow path for exhaust water from the withdraw riser to be discharged to the exhaust header. The exhaust header routes water returning from the drive in motion to the underside of the SOV 121 on the other 184 HCUs. Each SOV 121 is designed to relieve the pressure on the exhaust header to the reactor vessel. Control rod withdraw is accomplished as follows: withdraw supply valve SOV122 opens and drive water is directed to the control rod via the withdraw riser at a rate of 2 gpm. Withdraw return valve SOV120 opens and provides a flow path for exhaust water from the insert riser to be discharged to the exhaust header. Exhaust water is directed to the Reactor as described above. Insertion speed control (4 gpm) is accomplished by the manual adjustment of a needle valve located on the inlet side of insert supply valve SOV123. Withdraw speed control (2 gpm) is accomplished by the manual adjustment of a needle valve located on the outlet side of withdraw return valve SOV120.

The charging water header is equipped with a manual valve, a check valve and a drain connection. The charging water header branches and connects the water side of the scram accumulator to the insert riser. The charging water header maintains the accumulator pressure approximately equal to pump discharge pressure. The scram accumulator consists of a water side and a nitrogen side separated by a piston . Nitrogen is charged into a dry accumulator by a portable charging unit. The purpose of the scram accumulator is to provide a stored energy source for rapid insertion of the control rod drive on a reactor scram signal.

A ball check valve located in each control rod housing allows reactor pressure to scram the control rod when accumulator pressure equals reactor pressure. The charging water header to the insert riser is equipped with an air-operated scram inlet valve (AOV126). Scram inlet valve AOV126 when open, allows the scram accumulator to discharge into the insert riser, causing the control rod to scram. Exhaust water in the withdraw riser during a control rod scram is exhausted via the scram exhaust header which is equipped with a scram exhaust valve (AOV127), a check valve and a manual gate valve. The scram exhaust header branches from the withdraw riser and directs scram exhaust water to the scram discharge volume.

The cooling water header is equipped with a manual gate valve and a check valve. The cooling water header connects to the insert riser and supplies water to the control rod for cooling. The cooling water in the insert riser flows past the drive piston and up into the control rod at a rate of approximately 63 gpm (total for all 185) during normal conditions. The cooling water riser also connects to the exhaust header through the pressure equalizing valves.

The scram pilot valve air header provides the operating medium for the scram inlet (AOV126), and scram outlet (AOV127) valves, thru a self-contained dual solenoid pilot valve (PV139). The dual solenoids de-energize on a scram signal and cause the air to be vented from AOV 126 & 127, resulting in the control rod insertion.

Vent and drain valves AOV123, AOV124, 130 and 132 are normally open and can be opened after a reactor scram to drain the scram discharge volume. They close upon reactor scram.

An instrument volume of 50 gallons minimum provides scram discharge volume water level measurement. The instrument volume contains the following level switches:

Level switches (LS126 & LS129) which provides an annunciator, "SDV LEVEL HIGH" (window 603130) on P603.

Level switches (LS125 & LS127) which provides a rod block signal.

Level switches LSX11A, LSY11A, LSX11B, LSY11B, LTX12A, LTY12A, LTX12B and LTY12B which all provide inputs to the reactor protection system for reactor scram signals in the event of high level in the scram discharge volume.

C. OPERATING REQUIREMENTS

1.0 Systems

1.1 Normal and Emergency station electrical power. N2-OP-71, 72, 73 A&B

1.2 Instrument Air System. N2-OP-19

1.3 Reactor Protection System. N2-OP-97

1.4 Condensate Storage Tanks Transfer. N2-OP-4

1.5 Condensate System. N2-OP-3

1.6 Rod Position Indication System. N2-OP-96

1.7 Reactor Building Closed Loop Cooling. N2-OP-13

D. PRECAUTIONS/LIMITATIONS

1.0 Maintain charging water pressure below 1600 psig. Excessive charging water pressure may cause drive mechanism damage during a scram.

2.0 When valving a HCU into or out of service, the order of isolation valve operation must follow the sequence specified. Failure to follow the proper valve sequence may cause drive mechanism damage due to excessive internal Δ P in the drive.

3.0 When a drive mechanism is initially installed and coupled,do not insert the drive beyond position 06 until the drive has been properly vented.

4.0 Do not attempt to cool an overheating rod drive mechanism by giving it repeated drive signals. After checking for possible outlet scram valve leakage (AOV127), a CRD with a high temperature alarm should be left "HOT". Write work request for maintenance on the affected drive.

5.0 Observe all precautions to limit radiation exposure and the spread of contamination. Water from leakage or drain/vent operations should be treated as contaminated. Whenever possible, make provisions to contain the source of the water.

6.0 Possible IGSCC corrosion may be indicated by higher than normal torque required to open the 101, 102 and 112 valves on HCUs. Maintenance should be notified. See GE Sil 419.

7.0 In Mode 5, ALL personnel on refuel floor should be out of line of sight of the reactor vessel while control rod movement is in progress from the Control Room.

8.0 Isolating RDS Suction from Condensate will effect Hotwell Level. See N2-OP-4 Precautions. TCN-30

E. START UP PROCEDURE

1.0 System Start-Up: assuming extended system outage, all piping, HCUs and drives vented and drained, otherwise perform E.4.0 of this procedure.

1.1 Perform a Normal Valve Lineup in accordance with Table IA.

1.2 Isolate all HCU's by performing the maintenance valve line-up of Table IB.

1.3 Perform a normal power supply line-up in accordance with Table II.

1.4 Place all the scram toggle switches at the HCU's to "NORM". Open Scram Pilot Air Isolation Valves 116. Verify the inlet and outlet scram valves on each accumulator are shut.

1.5 At the local flow control panel place the FCV which is in service to "AUTO" and place the out of service FCV to "MANUAL" with minimum controller output.

1.6 At panel P603 place the CRD Flow Controller in "MANUAL" at minimum output.

1.7 At panel P603 fully open the drive water pressure control valve 2RDS-PV101 by placing the hand switch to "OPEN" and holding until the green position indication light goes out then release.

1.8 Shut the CRD pump discharge valve 2RDS-V18A(B) for the pump to be started.

1.9 Vent the "A" suction filter by opening 2RDS-V4A until a steady stream of water comes from the vent then shut 2RDS-V4A.

1.10 Vent the "B" suction filter by opening 2RDS-V4B until a steady stream of water comes from the vent then shut 2RDS-V4B.

1.11 Vent the "A" CRD Pump casing by opening 2RDS-V14A until a steady stream of water comes from the vent then shut 2RDS-V14A.

1.12 Vent the "B" CRD Pump casing by opening 2RDS-V14B until a steady stream of water comes from the vent then shut 2RDS-V14B.

1.13 Verify Reactor Building Closed Loop Cooling is lined-up to both CRD pumps per N2-OP-13.

1.14 Verify the appropriate (un-isolated) set of stabilizing valves is selected at P603. (Set "A" for normal valve line-up)

1.15 Start a CRD pump by placing the appropriate control switch to "START" then release to "NORMAL".

1.16 Slowly open the pump discharge valve 2RDS-V18A(B) for the running pump.

NOTE: Increase flow slowly to prevent high P on the suction and discharge filters. Do not exceed 40 amps on the CRD pump motor.

1.17 Vent the "A" Discharge Filter by opening 2RDS-V24A until a steady stream of water comes from the vent then shut 2RDS-V24A.

1.18 Vent the "B" Discharge Filter by opening 2RDS-V24B until a steady stream of water comes from the vent then shut 2RDS-V24B.

1.19 Vent each header by opening the following valve pairs until a steady stream of water comes from the vent, then shut each pair of valves (Vent only one header at a time and route vents to floor drains.)

a. 2RDS-V30A and 2RDS-V30B
b. 2RDS-V38A and 2RDS-V38B
c. 2RDS-V81A and 2RDS-V81B
d. 2RDS-V56A and 2RDS-V56B
e. 2RDS-V67 and 2RDS-V68
f. 2RDS-V69 and 2RDS-V70
g. 2RDS-V71 and 2RDS-V72
h. 2RDS-V77 and 2RDS-V78

1.20 Establish cooling water flow to each HCU by opening the following valves in order:

a. Scram Discharge riser 112
b. Withdraw riser 102
c. Insert riser 101
d. Cooling Water riser 104
e. Exhaust Water riser 105
f. Drive water riser 103

1.21 Open the Flow Control valve using the flow controller on P603 until cooling water flow is 63 gpm, then place the controller in "AUTO".

1.22 Throttle shut the Pressure Control Valve (PV101) using the handswitch on P603 until drive water pressure is 260 psid.

1.23 Check the following local indications:

a. Suction filter d/p between 2 and 9 psid (PDIS-104 on RAK-103).

b. Discharge filter d/p between 14 and 20 psid (PDIS-106 on RAK-101)

c. Stabilizer valve flow 5.4 to 6.6 gpm (FI-119 on RAK-101)

d. Flow control valve instrument air supply approximately 30 psig (PI-134 on RAK-101).

e. Scram Pilot air pressure between 70 and 75 psig (PI-133 on RAK 102)

1.24 Check the following control room indications at P603:

a. CRD System Flow (R606) approximately 63 gpm

b. Drive Water d/p (R602) approximately 260 psid.

c. Cooling Water d/p (R603) approximately 30 psid.

d. Charging water pressure (N600) approximately 1500 psig.

1.25 Vent each Control Rod Drive in accordance with Section E.2.0 then precharge each accumulator in accordance with Section E.3.0 of this procedure.

2.0 Control Rod Drive Venting: to be used after CRD maintenance or after an extended outage following performance of section E.1.0.

2.1 Line up the HCU for the CRD to be vented by performing the following in order:

a. Shut charging water isolation valve 113
b. Shut accumulator drain valve 107
c. Open scram pilot air isolation valve 116

2.1 (Cont)

d. Open scram discharge isolation valve 112
e. Open withdraw isolation valve 102
f. Open insert isolation valve 101
g. Open cooling water isolation valve 104
h. Open exhaust water isolation valve 105
i. Open drive water isolation valve 103

NOTE: If this procedure is being used following CRD maintenance the control rod coupling integrity must be demonstrated as required by Tech. Spec. Section 4.1.3.6. In order to do this all other uncoupled control rods must have their position indication probes disconnected so the "CONTROL ROD OVERTRAVEL" annunciator will clear for the affected control rod once it has been coupled.

2.2 If the rod is uncoupled verify "CONTROL ROD OVERTRAVEL" annunciator on P603 is on.

2.3 Open HCU insert vent valve V83 for the rod to be vented (route vent to floor drain).

NOTE: Do not insert rod to position 06. Difficulty may be encountered in moving a rod out of position 06 prior to completing vent.

2.4 At P603, selected the rod to be vented then apply a continuous insert signal by depressing the "INSERT" push button and holding until a clear flow of water free of air bubbles is observed coming from the insert vent valve then release the "INSERT" push button.

2.5 Shut the HCU insert vent valve V83.

2.6 Open the HCU withdraw vent valve V1 for the rod to be vented (route vent to floor drain).

2.7 At P603 apply a continuous withdraw signal by first depressing the "CONTINUOUS WITHDRAW" push button then depressing the "WITHDRAW" push button and holding them both until a clear flow of water free of air bubbles is observed coming from the withdraw vent valve then release both push buttons.

2.8 Shut the HCU withdraw vent valve V1.

2.9 If the rod is not fully withdraw, withdraw rod fully by simultaneously depressing the "CONTINUOUS WITHDRAW" and "WITHDRAW" push buttons and holding until control rod reaches position 48.

NOTE: If "CRD" will not move, use procedure described in Section H.2.0 to get rod to move.

2.10 At P603, apply a continuous insert signal by depressing the "INSERT" push button and holding until rod reaches position "40" then release. Cycle insert vent valve V83 as necessary during rod motion to verify the insert line is vented.

2.11 At P603, apply a continuous withdraw signal by simultaneously depressing and holding the "CONTINUOUS WITHDRAW" and "WITHDRAW" push buttons until rod is fully withdrawn and stall flow (approximately one gpm drive water flow) is observed then release.

2.12 Verify CRD coupling integrity by verifying "ROD OVERTRAVEL" annunciator stays clear.

2.13 At P603 apply a continuous insert signal by depressing and holding the "INSERT" push button until the control rod reaches position "24".

2.14 At P603, insert the control rod to position "06" one notch at a time by depressing the "INSERT" push button then releasing as soon as the "INSERT" light comes on.

2.15 At P603 apply a continuous withdraw signal by simultaneously depressing and holding the "CONTINUOUS WITHDRAW" and "WITHDRAW" push buttons until the control rod is fully withdrawn.

2.16 Repeat steps 2.13 through 2.15 at least two additional time. (Actual number of repetitions is dependant on how many it takes to achieve normal rod movement).

2.17 With the control rod at position "48" apply a continuous withdraw signal at P603 by simultaneously depressing and holding the "CONTINUOUS WITHDRAW" and "WITHDRAW" pushbuttons.

2.18 Open the insert vent valve V83 until a clear flow of water free of air bubbles is observed coming from the insert vent valve then close V83 and release the "CONTINUOUS WITHDRAW" and "WITHDRAW" push buttons.

2.19 At P603 continuously insert the control rod by depressing and holding the "INSERT" push button until it reaches position "06".

2.20 At P603 insert the control rod to position "02" one notch at a time by depressing the "INSERT" push button then releasing as soon as the "INSERT" light come on.

2.21 At P603 withdraw the control rod to position "04" by depressing the "WITHDRAW" push button then releasing when rod motion starts.

2.22 At P603, insert the control rod to position "00" one notch at a time by depressing "INSERT" push button then releasing as soon as the "INSERT" light comes on.

2.23 With the control rod at position "00" apply a continuous insert signal at P603 by depressing and holding the "INSERT" push button.

2.24 Open the withdraw vent valve V1 until a clear flow of water free of air bubbles is observed coming from the withdraw vent valve then close V1 and release the "INSERT" push button.

2.25 Apply a single notch withdraw signal at P603 by depressing the "WITHDRAW" push button to withdraw the CRD to position "02". Verify no drive flow spikes and normal control rod motions during single notch withdrawal with normal drive water pressure.

2.26 If drive flow spikes occur or if normal control rod motion cannot be achieved with normal drive water pressure, withdraw the control rod to position "48" by simultaneously depressing the "WITHDRAW" and "CONTINUOUS WITHDRAW" push buttons then repeat steps 2.17 and 2.26.

2.27 When normal control rod motion is achieved, insert the control rod to position "00" using the "INSERT" push button.

2.28 Perform Section E.3 of this procedure to obtain the proper precharge pressure and to vent and charge the water side of the accumulator, if required.

2.29 Open charging water isolation valve - 113.

3.0 Precharging HCU's/Filling and Venting of Accumulators

3.1 Shut charging water isolation valve - 113.

3.2 Slowly open accumulator drain valve - 107 (route valve outlet to floor drain).

3.3 Compare the accumulator nitrogen pressure as read at the HCU to the desired pressure from figure 1 for the ambient temperature at the HCU. If no further nitrogen charging is required, proceed to step 3.12.

3.4 Shut the nitrogen cartridge valve 111. (Valve in the instrument block).

3.5 Using two wrenches, slowly loosen then remove the cap from connector P6 and connect the $N_2$ charging line to the instrument block. TCN- 25

3.6 Open nitrogen cartridge valve 111.

3.7 Line up nitrogen charging system to commence charging to the HCU. Charge until desired pressure from figure 1 for the ambient temperature at the HCU then secure charging by shutting the charging stations shutoff valve.

3.8 Shut nitrogen cartridge valve 111.

3.9 Vent the charging line at the charging station then disconnect the charging line from the instrument block. Apply thin coat of Nickel NEVER SEEZ on connector P6 adapter and reinstall the cap. Tighten the cap to 150-200 in-lbs.

3.10 Open cartridge valve 111.

NOTE: If several HCU's are to be precharged, steps 3.1 through 3.10 may be performed for all accumulators prior to proceeding to step 3.11.

3.11 Approximately 30 minutes after the accumulator has been charged compare the accumulator pressure gauge to the desired pressure from figure 1. If actual pressure is above desired pressure, shut cartridge valve 111, remove the cap from connector P6, then throttle open nitrogen cartridge valve 111 to bleed off nitrogen. Reinstall cap and tighten to 150-200 in-lbs. Open cartridge valve 111.

NOTE: Do not proceed to step 3.12 unless the CRD system is in operation with the charging water header pressurized and the HCU scram valves are shut.

3.12 Shut accumulator drain valve 107.

3.13 Slowly open accumulator charging isolation valve 113.

3.14 Crack open accumulator drain valve 107 until a steady stream of water comes out free of air bubbles then close 107 (Route drain to floor drain).

4.0 System Start-up from a Short Outage: Assuming the piping, and majority of the HCU's and drives are not vented or drained.

NOTE: If no maintenance or valve manipulations have been performed during the system shutdown, steps 4.1 to 4.3 may be omitted at the SSS's discretion.

4.1 Perform a Normal Valve Lineup in accordance with Table IA.

4.2 Lineup the HCU's for operation which do not require venting by performing the operational valve lineup of Table IB. Any HCU's which required venting are to be lined up in accordance with the maintenance valve lineup of Table IB.

4.3 Perform a normal power supply lineup in accordance with Table II.

4.4 Compare the HCU accumulator nitrogen pressure as read at each HCU to the desired pressure from figure 1 for the ambient temperature at the HCU. If required, charge the accumulators which do not require the associated CRD to be vented in accordance with Section E.3 of this procedure. (HCU's which require venting will be charged following completion of HCU vent procedure).

4.5 Verify that all reactor scram signals are reset and all HCU scram valves are closed. (Verification may be done at P603 by ensuring all SCRAM lights are out on the full core display.)

4.6 At the local flow control panel place the FCV which is in service to "AUTO" and place the out of service FCV to "MAN" with minimum controller output.

4.7 At panel P603, place the CRD Flow Controller in manual at minimum output.

4.8 At panel P603, fully open the drive water pressure control valve PV101 by placing the handswitch to "OPEN" and holding until the green position indication light goes out then release.

4.9 Shut the CRD pump discharge valve 2RDS-V18A(B) for the pump to be started.

4.10 Vent the pump casing for the pump to be started by opening 2RDS-V14A(B) until a steady stream of water comes from the vent then shut V14A(B).

4.11 Verify Reactor Building closed loop cooling is lined up to both CRD pumps per N2-OP-13.

4.12 Verify the appropriate (un-isolated) set of stabilizing valves is selected at P603. (Set "A" for normal valve lineup).

4.13 Start a CRD pump by placing the appropriate control switch to "START" then release to "NORMAL".

4.14 Slowly open the pump discharge valve 2RDS-V18A(B) for the running pump.

NOTE: Increase flow slowly to prevent high d/p on the suction and discharge filters. Do not exceed 40 amps on the CRD pump motor.

4.15 Open the Flow Control Valve using the flow controller on P603 until cooling water flow is 63 gpm., then place the controller in "AUTO".

4.16 Throttle shut the Pressure Control Valve (PV101) using the handswitch on P603 until drive water pressure is 260 psid.

4.17 Check the following local indications:

a. Suction filter d/p between 2 and 9 psid (PDIS-104 on RAK-103).

b. Discharge filter d/p between 14 and 20 psid (PDIS-106 on RAK-101).

c. Stabilizer valve flow 5.4 to 6.6 gpm (FI-119 on RAK-101).

d. Flow control valve instrument air supply approximately 30 psig (PI-134 on RAK-102).

e. Scram Pilot air pressure between 70 and 75 psig (PI-133 on RAK-102).

4.18 Check the following control room indications at P603:

a. CRD System Flow (R606) approximately 63 gpm.

b. Drive Water d/p (R602) approximately 260 psid.

c. Cooling Water d/p (R603) approximately 30 psid.

d. Cooling Water Flow (R605) approximately 63 gpm.

e. Charging Water pressure (N600) approximately 1500 psig.

4.19 Vent any CRD's which require venting in accordance with Section E.2 of this procedure.

F. NORMAL OPERATION

1.0 Suction Filter Changeover: The in service suction filter should be isolated and replaced whenever the d/p is greater than 9.0 psid as read at the local gauge.

1.1 Verify the standby suction filter inlet valve 2RDS-V2A(B) is open.

1.2 Vent the standby suction filter by opening the filter vent valve 2RDS-V4A(B) until a steady stream of water comes from the vent then shut V4A(B). | TCN-17

1.3 Open the Standby suction filter outlet valve 2RDS-V3A(B).

1.4 Shut the In-service filter outlet valve 2RDS-V3B(A) to remove it from service.

NOTE: If filter elements are not going to be changed, do not proceed to Step 1.5. The filter which was in service is now in the standby condition.

1.5 Isolate and drain the filter which was in service by shutting the inlet isolation valve 2RDS-V2B(A) then opening the vent valve 2RDS-V4B(A) and drain valves 2RDS-V5B(A) and 2RDS-V6B(A).

1.6 Maintenance may now replace the filter elements.

1.7 Once the filters have been replaced and the filter vessel is reassembled, shut the filter drain valves 2RDS-V5B(A) and 2RDS-V6B(A).

1.8 Shut the filter vent valve 2RDS-V4B(A) then throttle it open approximately one turn.

1.9 Slowly open filter inlet valve 2RDS-V2B(A).

1.10 When solid stream of water free of air bubbles appears coming from the vent valve, shut vent valve 2RDS-V4B(A).

2.0 CRD pump changeover: To be used for a normal (non-emergency) rotation of running CRD pumps.

2.1 Start the standby CRD pump by placing the appropriate hand switch to "START" then releasing to "NORMAL".

2.2 Stop the CRD pump to be secured by taking the appropriate handswitch to "STOP" then releasing to "NORMAL".

3.0 Pump Discharge Filter Changeover: The in service discharge filter should be isolated, removed, and replaced with a clean filter whenever the d/p is greater than 20 psid as read at the local gauge.

3.1 Verify the standby discharge filter inlet valve 2RDS-V23A()B) is fully open.

3.2 Vent the standby discharge filter by opening the filter vent valve 2RDS-V24A(B) until a steady stream of water comes out then shut 2RDS-V24A(B). TCN-17

3.3 Slowly open the standby discharge filter outlet valve 2RDS-V26A(B).

3.4 Slowly shut the in-service discharge filter outlet valve 2RDS-V26B(A) to remove it from service.

NOTE: If the filter is not going to be replace with a clean filter do not proceed to step 3.5. The filter which was in service is now in the standby condition.

3.5 Isolate and drain the filter which was in service by shutting the inlet isolation valve 2RDS-V23B(A) then opening the vent valve 2RDS-V24B(A) and drain valve 2RDS-V25B(A).

3.6 Maintenance may now replace the filter with a clear filter is installed and the filter vessel reassembled, shut the filter drain valve 2RDS-V25B(A).

3.7 Once a clean filter is installed and the filter vessel is reassembled, shut the filter drain valve 2RDS-V25B(A).

3.8 Shut the filter vent valve 2RDS-V24B(A) then throttle it open approximately one turn.

3.9 Slowly open filter inlet valve 2RDS-V23B(A).

3.10 When a solid stream of water free of air bubbles appears coming from the vent valve, shut vent valve 2RDS-V24B(A).

4.0 Flow Control Valve Changeover: To be used to place the standby flow control valve in service in Automatic.

4.1 Verify the discharge isolation valve 2RDS-V34A(B) is shut and the inlet isolation valve 2RDS-V33A(B) is open for the flow control valve to be placed in service.

4.2 At the local flow control panel verify the in service flow control valve is in "AUTO".

4.3 Place the standby flow control valve in "AUTO" at the local flow control panel.

4.4 Slowly open the discharge isolation valve 2RDS-V34A(B) for the standby flow control valve.

4.5 Slowly shut the discharge block valve for the flow control valve that is to be taken out of service.

4.6 At the local flow control panel place the flow control valve taken out of service in manual and lower output to minimum.

5.0 Stabilizing Valve Changeover: To be used to place the standby set of stabilizing valves in service.

5.1 Un-isolate the stabilizing valve to be placed in service by opening the appropriate isolation valves 2RDS-V49B(A) and 2RDS-V52B(A).

5.2 At P603, select the stabilizing valve to be placed in service by depressing the selector switch.

5.3 Isolate the stabilizing valves taken out of service by shutting the appropriate isolation valves 2RDS-V49A(B) and 2RDS-V52A(B).

5.4 Verify local indication of stabilizing flow is 5.4 to 6.6 gpm at 2RDS-FI119 on RAK-101.

G. SHUTDOWN PROCEDURE

NOTE: During periods of reactor shutdown the CRD hydraulic system is normally left in service to maintain the system free of air and minimize corrosion.

1.0 Shutdown to Standby Readiness

1.1 Balance the deviation meter on the CRD flow controller (R-600) on P603 then transfer to manual and reduce flow to minimum.

1.2 Secure the running pump by placing the handswitch to "STOP" then releasing.

2.0 CRD Lay up - Steps are listed in order of desirability for CRD lay up during an extended outage (greater than 28 days).

2.1 Continue the normal cooling water flow and stroke each rod a full stroke once per week.

2.2 If CRD must be shutdown, start up the system in accordance with Section E.4 once per week to establish cooling water flow for four hours and cycle each drive a minimum of one notch in and out.

2.3 If CRD must be shutdown and rod movement is not possible, start up the system in accordance with section E.4 once per week to establish cooling water flow for four hours.

H. OFF NORMAL PROCEDURE

1.0 Loss of CRD Pump during plant operation

1.1 Shift CRD flow controller to manual and shut FCV to minimum position from P603.

1.2 If pump trip was not caused by a low suction pressure condition, start the standby pump by placing the pump handswitch in "START" then releasing to "NORMAL".

1.2.1 If pump trip was caused by low suction pressure, then refer to I.2.0 and I.7.0 of this procedure. TCN-23

1.3 If standby pump cannot be immediately started, or if standby pump also trips, perform the following:

a. Lower reactor power by reducing recirculation flow per N2-OP-101D Section H.1.0.

b. Continue attempts to start CRD pump.

c. If more than one accumulator fault alarm is received while no CRD pump is running, place the Reactor Mode Switch to SHUTDOWN.

1.4 Once a CRD pump is operating normally, throttle open the FCV by using the flow controller on P603 until a CRD system flow of 63 gpm is obtained. Adjust controller thumbwheel until needle is in the green band then shift controller to "AUTO".

2.0 Stuck Rod: To be used when the selected rod does not move with normal drive pressure.

2.1 Verify the HCU valve lineup is in accordance with the operational valve lineup of Table IB.

2.2 While attempting to move the control rod observe drive water flow.

a. If drive water flow spikes then returns to stall flow (approximately 1 gpm) and stays, proceed to step 2.3.

b. If drive water flow does not increase at all or if it increases then returns to zero gpm, it is an indication of a directional control valve failure.

c. If drive water flow is exceedingly high (Pegs meter or is in excess of 4 gpm constantly) it is an indication of either a stuck open directional control valve or a stuck open cooling water check valve.

2.3 If attempting to withdraw the control rod at position 00, simultaneously depress "CONTINUOUS INSERT" and "WITHDRAW" push buttons on the P603 until indication of inward control rod motion is received (Position indication changes from an even number to two dashed lines) then release "CONTINUOUS INSERT". If the first attempt fails, increase the drive water pressure by throttling shut the pressure control valve 2RDS-PV101 in 50 psi increments up to 350 psid and continue to attempt to withdraw using this method.

NOTE: If a drive requires higher than normal pressure to move, proper collet latching should be verified by either withdrawing the drive at least two notches and observing proper motion at the intermediate point or inserting a fully withdrawn drive to position 46 to verify motion then returning to position 48. These checks should be done with normal drive water pressure.

2.4 If attempting to insert the control rod, install d/p instrumentation between the insert and withdraw vent valves and verify that hydraulic pressures being applied to the CRD are normal (250 to 265 psid). If pressures are normal and rod will not move, drive water pressure may be increased in 50 psi increments up to 350 psid. If the control rod still wont move, it should be declared inoperable. Refer to Tech Specs.

2.5 If a rod cannot be moved refer to Tech. Spec. 3.1.3.1 for appropriate action.

3.0 Accumulator Trouble: To be used to determine the cause of the accumulator status light on the Rod Status Display and correct the problem.

3.1 Check the local accumulator pressure indicator at the HCU. If the pressure is less than 940 psig, refer to Technical Specification 3.1.3.5. TCN-23

3.1.1 If pressure is less than 1025 psig, it could be assumed that low nitrogen pressure is the cause. Perform the following steps for nitrogen charge:

NOTE: To prevent accumulator over charge, the following steps are for the accumulator pressure is greater than 940 psig, otherwise perform Section E.3 for accumulator nitrogen charge.

a. Shut the nitrogen valve 111 on the accumulator instrument block.

3.1.1 (Cont'd)

b. Using two wrenches, slowly loosen, then remove the cap from connector P6.

c. Verify charging station contains sufficient pressure for charging.

d. Connect the N2 charging line to the instrument block.

e. Open nitrogen cartridge valve 111.

f. Line up nitrogen charging system and slowly charge the accumulator to about 1100 psig on the pressure indicator.

g. Shut nitrogen cartridge valve 111.

h. Vent the charging line at the charging station then disconnect the charging line from the instrument block.

i. Apply thin coat of Nickel NEVER SEEZ on connector P6 adapter, reinstall the cap and torque to 150-200 in-lbs.

j. Open nitrogen cartridge valve 111.

k. Check the accumulator pressure indicates about 1100 psig.

3.2 If accumulator pressure is above 1025 psig, perform the following steps to check for water leakage:

a. Shut the accumulator nitrogen valve 111 on the accumulator instrument block.

b. Slowly loosen, using two wrenches, then remove the cap from connector P6. TCN-27

c. Blow water out of the instrument block by cracking open valve 111 then shut.

d. Apply thin coat of Nickel NEVER SEEZ on connection P6 adapter, replace the cap and torque the cap to 150-200 in-lbs.

e. Open valve 111.

f. Verify accumulator fault alarm clears. (If alarm does not clear, check local pressure gauge to ensure it did not drop below 1025 psig. If it did perform Steps 3.1 above.)

g. If water was found, note date on HCU record when accumulator block was drained for determination of seal problem (if alarm persists due to water leakage, perform Section H.4 of this procedure).

3.3 If alarm is not traced to low gas pressure or water in the block the instrument block instrument setpoints should be checked and adjusted as required.

4.0 Accumulator Piston Seal Leakage: To be used to stop seal leakage if it persists after performing Section H.3 (should be performed just prior to this section to remove all water accumulation.)

4.1 Isolate the HCU by closing the following isolation valve in order:

a. Insert riser 101

b. Withdraw riser 102

c. Charging water isolation 113

d. Cooling water riser 104

e. Drive water riser 103

f. Exhaust water riser 105

g. Scram discharge riser 112

4.2 Depressurize water side of accumulator by slowly opening valve 107 (Route drains to floor drain.)

4.3 Shut accumulator drain valve 107 and recharge accumulator by slowly opening charging water isolation valve 113.

4.4 Shut charging water isolation valve 113.

4.5 Repeat steps 4.2 to 4.4 three additional times. (This exercises the accumulator piston and should cause it to seal.)

4.6 Return the HCU to service by slowly opening the following isolation valves in order:

a. Scram discharge riser 112

b. Charging water isolation 113

c. Withdraw riser 102

d. Insert riser 101

e. Cooling water riser 104

f. Exhaust water riser 105

g. Drive water riser 103

NOTE: If seal leakage continues, accumulator maintenance will be required.

5.0 Control Rod Drift and Freeing a Stuck Collet Piston TCN-14

5.1 If control rod is still drifting, attempt to stop by driving the control rod one notch in the opposite direction.

5.2 If control rod drifting stops when drive signal is applied, return control rod to its proper position and keep rod under observation.

5.3 If rod is drifting in and continues drifting when the withdrawal signal is removed perform the following:

a. Consult with the reactor analyst for implementation of N2-RAP-3.

b. Verify outlet scram valve (AOV127) is not leaking (can be checked by determining if piping is hot).

c. Verify inlet scram valve (AOV126) is not leaking.

d. Check for proper operation of the directional control valves.

NOTE: The following step could cause the control rod to cycle between full out and full in several times, ensure plant conditions support this potential rod movement per reactor analyst instruction.

5.4 If rod is drifting out and continuous drifting, perform the following:

a. Continuously drive the rod in and keep it full in by depressing and holding the "INSERT" push button at P603.

b. Shut the insert riser isolation valve - 101 at the HCU.

c. Shut the withdraw riser isolation valve-102 at the HCU.

d. Release the "INSERT" push button at P603.

5.5 If rod drifts out with the 101 and 102 valves closed, or the control rod can not be reinserted, perform the following:

a. Immediately reduce power to less than 75% per N2-OP-101D Section H.1.0 to preclude inadvertent overpower of fuel caused by the unplanned rod movement. *

b. Notify the reactor analyst.

c. Refer to Technical Specification 3.1.3.1 for Limiting Condition of Operation.

NOTE: The following steps (5.6 - 5.8) could cause the control rod to cycle between full out and full in several times. Ensure plant conditions support this potential rod movement per reactor analyst instruction.

5.6 Determine the cause of rod drift out:

a. If rod drifts out with the 101 and 102 valves closed, then the problem is a stuck collet assembly. Proceed with Step 5.7.1 or 5.7.2 depending on plant conditions.

5.6 (Cont'd)

b. If rod does not drift out with the 101 and 102 valves closed, check for proper operation of the directional control valve SOV122 per Step 5.8. 2

5.7 If cause of drift is stuck collet, perform the following if plant conditions permit.

5.7.1 If reactor is at an elevated pressure:

a. Open 102 valve then open 101 valve.

b. Verify or withdraw rod to position 48.

c. Individual scram the rod by placing both test switches on the HCU to "TEST".

d. Once rod is full in, place both test switches to "NORM".

e. Repeat steps above if scram does not release collet fingers.

5.7.2 If reactor is at low or ambient pressure:

a. Open 102 valve then open 101 valve.

b. Verify or withdraw rod to position 48.

c. Raise drive water pressure to 350 psid by throttling shut PV101 on P603.

d. Apply a continuous withdrawal signal by simultaneously depressing "CONTINUOUS WITHDRAW" and "WITHDRAW" push buttons and hold for approximately one to two minutes.

e. Repeat Step d above approximately 20 to 30 times.

f. Drive rod in one notch by momentarily depressing "INSERT" pushbutton.

g. If rod drifts back out, repeat steps a to f until collet fingers latch.

h. Return drive water pressure to approximately 260 psid by throttling open PV101.

5.8 If cause of drift is faulty directional valve SOV122, perform the following if plant condition permits.

a. Open 102 valve then open 101 valve.

b. Apply a withdraw signal by momentarily depressing "WITHDRAW" pushbutton.

c. If rod continues to drift out, remove the clip on SOV122 and remove the solenoid coil assembly.

d. If rod drift stops, then the problem is faulty electrical system.

e. If rod drift continues with SOV122 solenoid removed, shut drive water isolation valve V103 and verify rod drift stops.

f. Reinstall SOV122 solenoid coil.

g. After trouble shoot, fully insert the control rod until maintenance replaces the faulty SOV122 solenoid or valve assembly.

6.0 Isolating HCU

NOTE: Isolating HCU should only be performed when reactor is at cold shutdown condition.

6.1 Isolating HCU for maintenance

a. Shut insert isolation valve 101

b. Shut withdraw isolation valve 102

c. Shut charging water isolation valve 113

d. Slowly open accumulator drain valve to relieve accumulator pressure (Route accumulator drain to floor drain.) 107

e. Shut the cooling water isolation valve. 104

f. Shut the drive water isolation valve. 103

g. Shut the exhaust water isolation valve. 105

h. Shut the scram discharge isolation valve. 112

i. Close scram pilot air isolation valve. 116

j. At the electrical box place both NORM-TEST-SRI toggle switches to TEST.

TCN-29

6.2 Isolation of the HCU with cooling water flow:

a. Shut the insert isolation valve. 101

b. Shut the withdraw isolation valve. 102

c. Shut the charging water isolation valve. 113

d. Slowly open the accumulator drain valve. 107 to relieve the accumulator pressure (Route accumulator drain to floor drain).

e. Shut the drive water isolation valve. 103

f. Open the insert isolation valve. 101

6.3 After HCU Maintenance is completed, perform Table 1B "Operational Valve Line-Up" and perform venting per E.2.0 as required.

7.0 Raising CRD System Flow To The RPV After Shutdown During Emergency TCN-18

NOTE: Performance of this procedure may be required by the EOPs. Changes to this section of the procedure (including renumbering) are required to be reviewed by the EOP Coordinator. TCN-18

CAUTION:

Do not exceed 40 amps on the CRD pump motor. Reduce system flow immediately to prevent motor overload trip.

7.1 Verify one of the CRD pumps is operating.

7.2 Trip or verify that the reactor protection system is tripped.

CAUTION:

a. If "CRD PUMPS SUCTION FLTR DIFF PRESSURE HIGH" alarm (window 603318) received, immediately open the standby suction filter isolation valves 2RDS-V2B(A), 2RDS-V3B(A) and filter bypass 2RDS-V8 and RDS-V9.

b. If "CRD DRV WTR FLTR DIFF PRESSURE HIGH" alarm (window 603317) received, open the standby discharge filter isolation valves 2RDS-V23B(A) and 2RDS-V26B(A).

7.5 If desired, start the second CRD pump at P603.

CAUTION:

If one pump should trip, reduce the system flow immediately to prevent motor overload trip.

7.6 Monitor the CRD flow and pump motor current during RPV depressurization. Adjust the flow control valve 2RDS-FV6A(B) and open pressure control valve 2RDS-PV101 as required to achieve maximum attainable flow.

8.0 CRD Speed Adjustment

NOTE: CRD speed adjustment below is for reactor cold shutdown condition, timing specified should be followed to ensure the speed of 40 to 60 seconds when the reactor is at rated pressure.

NOTE: When reactor mode switch is in REFUEL, only one rod withdrawal is permitted. Observe the rod out block is not in effect prior to preceding the rod timing.

8.1 If necessary, vent the drive to be tested per E.2.0 of this procedure.

8.2 Select the CRD to be timed at P603.

8.3 Continuously withdraw the CRD from position 00 to position 48 and monitor rod position on four rod display. *

a. Start stopwatch when position 00 light extinguishes.

b. Stop stopwatch when position 48 light illuminates.

8.4 If the withdraw time is beyond 46 to 60 seconds, adjust the time as follows:

a. Remove the cap on direction control valve SOV120 needle valve at HCU.

b. Loosen the locknut on the needle valve.

NOTE: Approximately 12 seconds per one turn needle valve adjustment.

c. If timing is too fast, thread in the needle valve.

d. If timing is too slow, thread out the needle valve.

e. Tighten the locknut on the needle valve.

f. Reinstall the cap on directional control valve SOV120.

8.5 Continuously insert the CRD from position 48 to position 00 and monitor rod position on four rod display. *

a. Start stopwatch when position 48 light extinguishes.

b. Stop stopwatch when position 00 light illuminates.

8.6 If the insert time is not between 40 to 56 seconds, adjust the time as follows:

a. Remove the cap on the direction control valve SOV123 needle valve at HCU.

b. Loosen the locknut on the needle valve.

NOTE: Approximately 12 seconds per one turn needle valve adjustment.

c. If timing is too fast, thread in the needle valve.

d. If timing is too slow, thread out the needle valve.

e. Tighten the locknut on the needle valve.

f. Reinstall the cap on direction control valve SOV123.

8.7 Repeat the timing as required per steps 8.2 to 8.5

8.8 If rod speed cannot be adjusted, or if there is a substantial variation in speed over the stroke of the rod, replace the filter 135 (withdraw) or 136 (insert) or CRD friction test should be performed.

9.0 CRD HOUSING FLANGE LEAKAGE

2

NOTE: The following guideline delineates the corrective actions for CRD flange joint leakage on a newly installed CRD during reactor pressure vessel leak rate test.

9.1 If any spray type leakage is observed from the flange joint, maintenance on the drive should be performed.

9.2 All drip type leakage which exhibit a decreasing leak rate after pressurization greater than 1000 psig for a period of 4 hours do not need any corrective action.

9.3 If drip type leakage at pressures greater than 1000 psig for a period of 4 hours is constant or increasing, then perform the following:

a. Ensure that the rod to be scrammed is fully inserted.

b. Shut the charging water isolation valve V113.

c. Locally scram the control rod at HCU by placing scram toggle switches to "TEST".

d. Reset the scram toggle switches to "NORM".

e. Open charging water isolation valve V113.

f. If the flange leakage does not improve, then repeat Steps 9.3 a-e as directed.

10.0 Flushing of CRD Mechanisms

NOTE: This procedure provides corrective actions for excessive drive temperatures during reactor operation and/or sluggish withdraw motion following a scram.

NOTE: This procedure is to be used only when the reactor is in the cold shutdown condition and CRD Hydraulic System is operating with normal flows and differential pressures established.

10.1 Valve out HCU by closing the following isolation valves in order:

| | | |
|---|---|---|
| a. | Insert riser | 101 |
| b. | Withdraw riser | 102 |
| c. | Charging Water isolation | 113 |
| d. | Cooling water riser | 104 |
| e. | Drive water riser | 103 |
| f. | Exhaust water riser | 105 |
| g. | Scram discharge riser | 112 |

10.2 Depressurize water side of accumulator by slowly opening valve 107 (Route drain to floor drain)

10.3 Connect vent tubing to vent valve blocks V1 and V83, route flow to floor drain. Open V1 and V83 to commence static flush of both insert and withdraw header for minimum of 45 minutes. Reclose V1 and V83, remove vent tubing.

10.4 Contact maintenance to remove and inspect filters 134 and 136. Replace the filters as necessary. Use new O-ring gasket for the filter plugs. Install the plugs into the manifold and tighten to 350 to 450 in-lb. TCN-12

10.5 Remove filter 135 and install a substitute P3 plug to accept a tygon tubing drain to floor drain.

10.6 Crack open insert riser isolation valve 101 and flush through P3 connection for approximately 5 minutes.

10.7 Shut valve 101 and crack open cooling water riser isolation valve 104. Flush through P3 connection for approximately 5 minutes.

10.8 Shut valve 104 and reinstall plug P3 with new filter 135. Use new O-ring gasket for P3. Install the plug into the manifold and tighten to 350 to 450 in-lb. TCN-12

10.9 Shut accumulator drain 107, remove hose.

10.10 Return the HCU to normal by opening following isolation valves in order:

| | | |
|---|---|---|
| a. | Scram discharge riser | 112 |
| b. | Charging water isolation | 113 |
| c. | Withdraw riser | 102 |
| d. | Insert riser | 101 |
| e. | Cooling water riser | 104 |
| f. | Exhaust water riser | 105 |
| g. | Drive water riser | 103 |

10.11 Functional check CRD by stroking and timing rod. Adjust CRD speed per H.8.0 as required.

10.12 Monitor drive temperature upon return to hot operation condition. If drive continues to run hot, a plugged cooling water orifice may be indicated, removal of the CRD for maintenance should be considered at the next outage.

11.0 Flushing HCU Charging Water Inlet Check Valves (V115)

NOTE: This procedure will be performed when it is determined by Surveillance Testing (i.e. N2-OSP-RDS-R002) that the Charging Water Check Valves are not seating to prevent reverse flow and as directed by the SSS.

11.1 Attach drain line to HCU drain, V107, for the HCU to be flushed and route to floor/equipment drain.

CAUTION:

Water in CRD Charging Water Lines is at ~1400 PSIG. Ensure vent line to floor/equipment drains is secure so as not to lose control of the vent line.

11.2 Slowly open V107 on the HCU to be flushed.

11.3 After approximately 1 minute, close V107.

11.4 Remove drain line attached in Step 11.1.

11.5 Log the HCU that this flush was performed on in the CSO Log.

12.0 Adjusting 2RDS-PCV140, Condensate Supply to CRD Pump. TCN 26

12.1 Verify that Condenser water level is between 8" to 16" as indicated on 2CNS-LI102 at P851.

12.2 Record Condensate Draw Off Flow as indicated on computer point 2CNSFA02.

12.3 Clear yellow holdout on 2RDS-PCV140.

12.4 Contact I&C to assist placing 2RDS-PCV140 in manual mode operation.

12.5 Throttle 2RDS-PCV140 using pressure controller in manual to establish Condensate Draw Off Flow of about 100 gpm.

12.6 Contact Chemistry to verify that water supply dissolved oxygen concentration to CRD is less than 50 ppb on Reactor Water Sample Panel or by analysis.

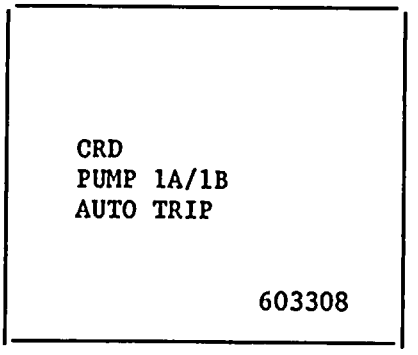
12.7 Throttle 2RDS-PCV140 open as required to establish CRD water supply dissolved oxygen concentration to less than 50 ppb. Record Condensate Draw Off Flow.

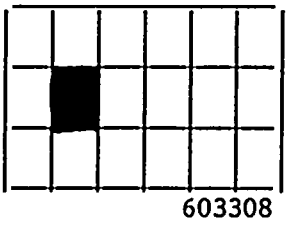
## I. PROCEDURE FOR CORRECTING ALARM CONDITIONS

1.0 603308 Control Rod Drive Pump P1A or P1B Auto Trip

Reflash: Yes

TCN-20




| 1.1 | Computer Point | Computer Printout | Source |
|---|---|---|---|
| | RDSUC01 | CRD PMP 1A AUTO TRIP | Alarm when "A" pump breaker opens while hand switch is in after START. |
| | RDSUC02 | CRD PMP 1B AUTO TRIP | Alarms when "B" pump breaker opens while hand switch is in after START. |

1.2 Automatic Response

NONE

1.3 Corrective Action

a. Verify pump has actually tripped by checking pump indication and charging water pressure.

b. Refer to section H.1 of this procedure.

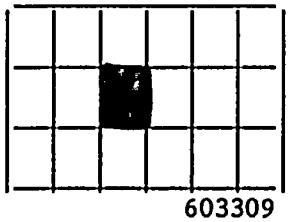
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

2.0 603309 Control Rod Drive Pump P1A Suction Pressure Low

Reflash: No

CRD
PUMP 1A
SUCTION PRESS
LOW

603309



603309

2.1

| Computer Point | Computer Printout | Source |
|---|---|---|
| RDSPC02 | CRD PUMP P1A SUCT. PRESS. | 2RDS-PS2A (25" Hg. Abs.) |

2.2 Automatic Response

CRD pump P1A trips.

2.3 Corrective Action

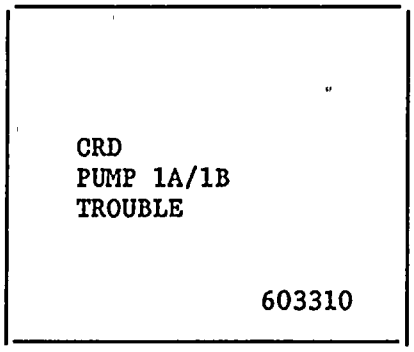
a. Verify CRD pump P1A has tripped.

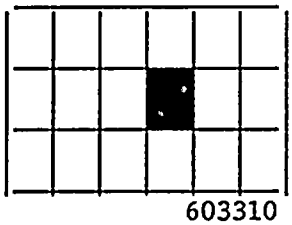
b. Determine and correct the cause of the low suction pressure condition. TCN-23

I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

3.0 603310 Control Rod Drive Pump P1A or P1B Trouble

Reflash: No




3.1

| Computer Point | Computer Printout | Source | |
|---|---|---|---|
| RDSBC16 | CRD PMP 1A/1B | Loss of CRD pump P1A or P1B control power | * 1 |

3.2 Automatic Response

NONE

3.3 Corrective Action

a. Determine which pump breaker has lost control power by checking for loss of pump indication.

b. If pump which has lost control power is running, and CRD operation is required, start the standby pump by placing the appropriate hand switch to "START" then release.

c. Trip the pump which has lost control power by opening the pump breaker locally.

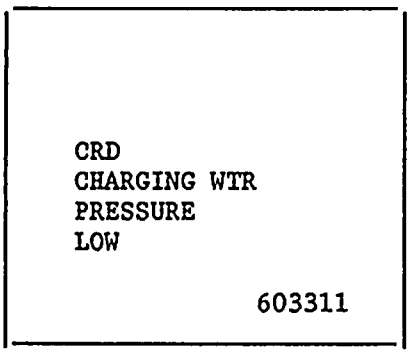
NOTE: A pump which has lost control power may continue to be run, however, all protective trips are lost and pump or motor damage may occur during a fault condition.

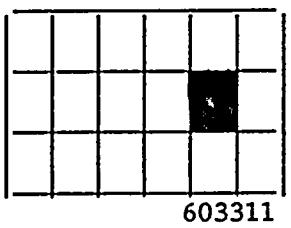
d. Trouble shoot the breaker which has lost control power and repair. Likely cause of failure is either control power fuses or power supply.

I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

4.0 603311 Control Rod Drive Charging Water Pressure Low

Reflash: No




| 4.1 | Computer Point | Computer Printout | Source |
|---|---|---|---|
| | RDSPC01 | CRD CHARGING WTR PRESS | 2RDS-PIS108 (1300 psig) |

* 1

4.2 Automatic Response

NONE

4.3 Corrective Action

a. If running CRD pump has tripped refer to section H.1 of this procedure for loss of CRD pump.

b. Verify the CRD Flow Control Valve is controlling flow at approximately 63 gpm

c. Check charging water header integrity and ensure there are no line breaks or valves out of position.

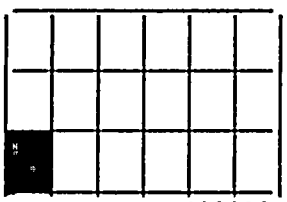
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

5.0 603313 Control Rod Drive Pump P1A or P1B Motor Electrical Fault

Reflash: Yes

CRD
PUMP 1A/1B
MOTOR
ELEC FAULT

603313



603313

| 5.1 | Computer Point | Computer Printout | Source | |
|---|---|---|---|---|
| | RDSUC03 | CRD PMP 1A MOT ELEC | "A" Pump motor ground overcurrent | *1 |
| | RDSUC04 | CRD PMP 1B MOT ELEC | "B" pump motor ground overcurrent | *1 |

5.2 Automatic Response

Affected CRD pump trips

5.3 Corrective Action

a. Verify affected CRD pump has tripped.

b. Refer to section H.1 of this procedure for loss of CRD pump.

c. Trouble shoot and repair ground overcurrent condition.

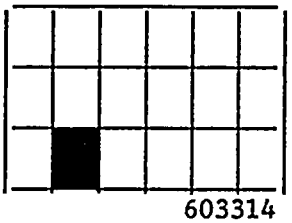
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

6.0 603314 Control Rod Drive Pump P1A or P1B Motor Overload

Reflash: Yes

CRD
PUMP 1A/1B
MOTOR
OVERLOAD

603314



603314

| 6.1 | Computer Point | Computer Printout | Source | |
|---|---|---|---|---|
| | RDSTC01 | CRD PMP 1A MOTOR | "A" Motor phase overcurrent | *1 |
| | RDSTC02 | CRD PMP 1B MOTOR | "B" Motor phase overcurrent | *1 |

6.2 Automatic Response

Affected CRD pump trips

6.3 Corrective Action

a. Verify affected CRD pump has tripped.

b. Refer to section H.1 of this procedure for loss of CRD pump.

c. Trouble shoot and repair ground overcurrent condition.

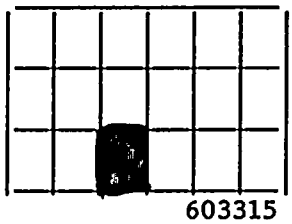
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

7.0 603315 Control Rod Drive Pump P1B Suction Pressure Low

Reflash: No

CRD
PUMP 1B
SUCTION PRESS
LOW

603315



603315

7.1

| Computer Point | Computer Printout | Source |
|---|---|---|
| RDSPC03 | CRD PMP P1B SUCT PRESS | 2RDS-PS2B (25" Hg Abs.) |

7.2 Automatic Response

CRD pump P1B trips

7.3 Corrective Action

a. Verify CRD pump P1B has tripped.

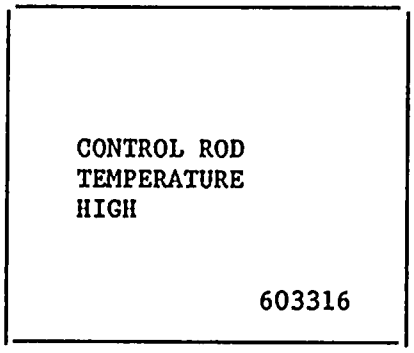
b. Determine and correct the cause of the low suction pressure condition. TCN-23

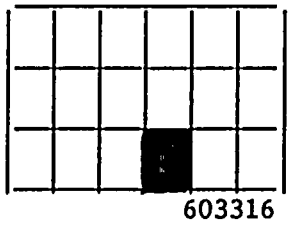
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

8.0 603316 Control Rod Temperature High

Reflash: No

TCN-20




8.1

| Computer Point | Computer Printout | Source |
|---|---|---|
| RDSTC05 | CONTROL ROD TEMPERATURE | C12-TR-R018 (250° F) |

8.2 Automatic Response

NONE

8.3 Corrective Action

a. Check Temperature Recorder C12-TR-R018 to find out which rod is alarming. Also check to see if the temperatures of all other rods are rising.

b. Verify cooling water flow is 63 gpm.

c. Check to determine if the scram discharge valve for the alarming CRD is leaking as indicated by elevated ambient pipe temperature at the HCU withdraw isolation valve (102).

NOTE: If scram discharge valve is determined to be at fault it must be isolated to repair. This may be done after reactor is shutdown, or one valve isolation can be obtained by fully inserting the rod and performing section H.6 of this procedure.

d. Check to ensure the CRD thermocouple circuit is operating properly.

e. If the rod is fully withdrawn insert the high temperature rod one notch and observe the drive temperature decreases then return to position 48.

f. If alarm persists after adjusting cooling water flow and the scram discharge valve nor thermocouple circuit are at fault then flushing should be performed after reactor is placed in a cold shutdown condition per H.10.0 of this procedure. 2

g. The high temperature annunciator for the drive may be patched - out provided the temperature is checked at least weekly.

NOTE: Operation may continue with CRD temperature above 250° F. Do not attempt to cool drive by applying repeated drive signals as this will cause undesirable thermal cycles. The drive may be moved if required.

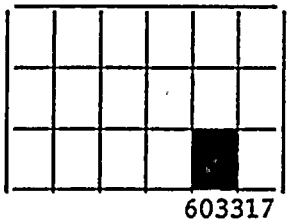
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

9.0 603317 Control Rod Drive Drive Water Filter Differential Pressure High

Reflash: No

CRD
DRV WATR FLTR
DIFF PRESSURE
HIGH

603317



603317

| 9.1 | Computer Point | Computer Printout | Source | |
|---|---|---|---|---|
| | RDSPC04 | CRD DRIVE WTR FLTR D/P | 2RDS-PSIS106 (20 psid) | *1 |

9.2 Automatic Response

NONE

9.3 Corrective Action

a. Locally check filter d/p to ensure alarm is valid.

b. Change to standby filter in accordance with section F.3 of this procedure.

c. Have maintenance remove, clean, and reinstall the filter element.

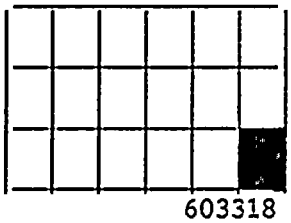
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

10.0 603318 Control Rod Drive Pumps Suction Filter Differential Pressure High

Reflash: No

CRD PUMPS
SUCTION FLTR
DIFF PRESSURE
HIGH

603318



603318

10.1

| Computer Point | Computer Printout | Source |
|---|---|---|
| RDSPC06 | CRD PMPS SUCT FLTR D/P | 2RDS-PDIS104 (9 psid) |

*1

10.2 Automatic Response

NONE

10.3 Corrective Action

a. Locally check filter d/p to ensure alarm is valid.

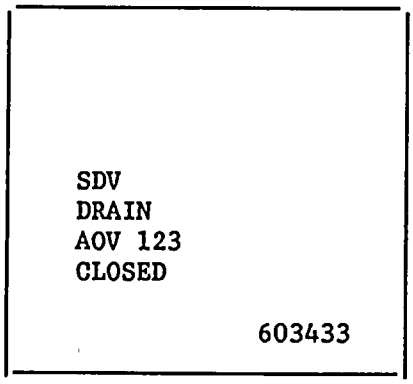
b. Change to standby filter in accordance with section F.1 of this procedure.

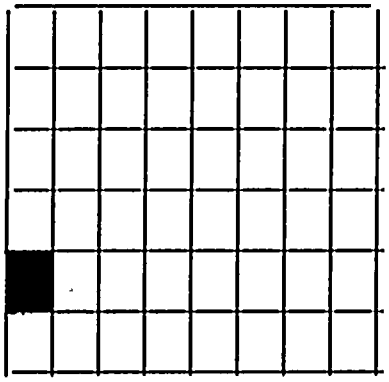
c. Have maintenance replace the filter element with new cartridge.

I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

11.0 603433 Scram Discharge Volume Drain AOV 123 Closed

Reflash: No



603433

11.1

| Computer Point | Computer Printout | Source | |
|---|---|---|---|
| RDSZC03 | SDV DRN VLV AOV123 | Alarms when valve is not fully open (from Valve Position Switch) | *T |

NOTE: When 2RDS*AOV123 is fully closed a Sequence of Events (SOE) Computer Point, RDSZC107 SDV DRN AOV123, should be actuated. This computer point comes directly from the valve position switch and is independent of this annunciator. This SOE computer point will be used to verify valve closure time during a scram (Reference: MOD PN2Y87MX092). *T

11.2 Automatic Response

NONE

11.3 Corrective Action

NOTE: Information alarm, this alarm will be activated during scram.

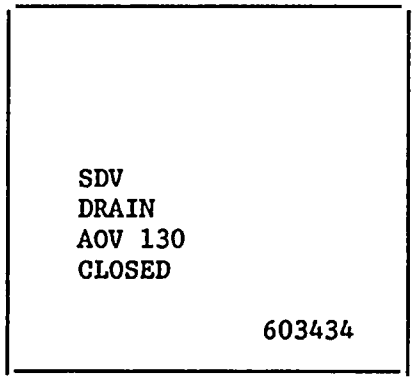
a. If SDV vent valve AOV-124 has also closed check air supply piping to ensure no loss of air to the valves and verify power has not been lost to 2RDS*SOV154.

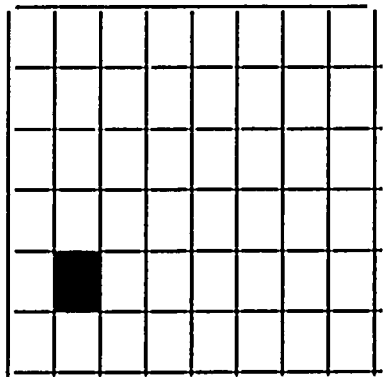
b. Locally check valve to ensure valve position indication is not faulty and that the valve has not been closed with the manual operator.

I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

12.0 603434 Scram Discharge Volume Drain AOV 130 Closed

Reflash: No



603434

12.1

| Computer Point | Computer Printout | Source | |
|---|---|---|---|
| RDSZC04 | SDV DRN VLV AOV130 | Alarms when valve is not fully open (from Valve Position Switch) | *1 |

NOTE: When 2RDS*AOV130 is fully closed a Sequence of Events (SOE) Computer Point, RDSZC108 SDV DRN AOV130, should be actuated. This computer point comes directly from the valve position switch and is independent of this annunciator. This SOE computer point will be used to verify valve closure time during a scram (Reference: MOD PN2Y87MX092). *1

12.2 Automatic Response

NONE

12.3 Corrective Action

NOTE: Information alarm, this alarm will be activated during scram.

a. If SDV vent valve AOV-124 has also closed check air supply piping to ensure no loss of air to the valves and verify power has not been lost to 2RDS*SOV155.

b. Locally check valve to ensure valve position indication is not faulty and that the valve has not been closed with the manual operator.

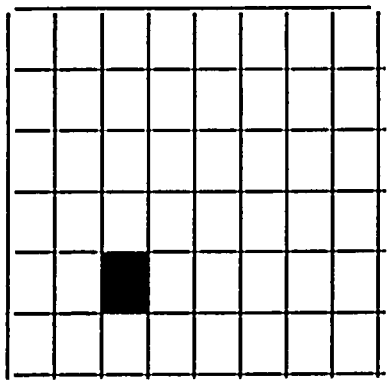
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

13.0 603435 Scram Discharge Volume Vent AOV 124 Closed

Reflash: No

SDV
VENT
AOV 124
CLOSED

603435



603435

13.1

| Computer Point | Computer Printout | Source | |
|---|---|---|---|
| RDSZC01 | SDV VENT AOV124 | Alarms when valve is not fully open (from Valve Position Switch) | *1 |

NOTE: When 2RDS*AOV124 is fully closed a Sequence of Events (SOE) Computer Point, RDSZC105 SDV VENT AOV124, should be actuated. This computer point comes directly from the valve position switch and is independent of this annunciator. This SOE computer point will be used to verify valve closure time during a scram (Reference: MOD PN2Y87MX092). *1

13.2 Automatic Response

NONE

13.3 Corrective Action

NOTE: Information alarm, this alarm will be activated during scram.

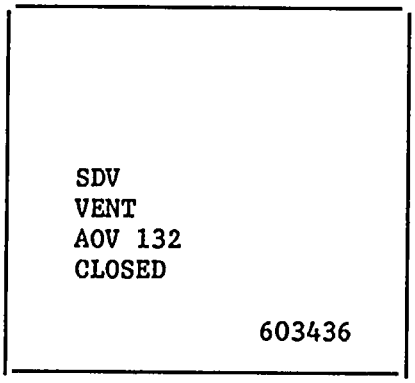
a. If SDV drain valve AOV-123 has also closed check air supply piping to ensure no loss of air to the valves and verify power has not been lost to 2RDS*SOV154.

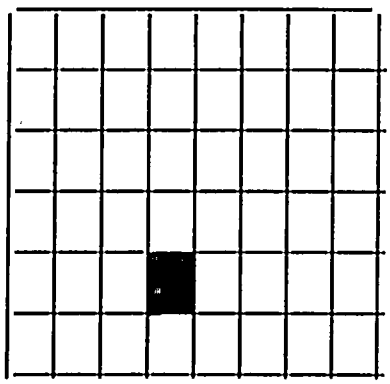
b. Locally check valve to ensure valve position indication is not faulty and that the valve has not been closed with the manual operator.

I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

14.0 603436 Scram Discharge Volume Vent AOV 132 Closed

Reflash: No



603436

| 14.1 | Computer Point | Computer Printout | Source | |
|---|---|---|---|---|
| | RDSZC02 | SDV VENT AOV132 | Alarms when valve is not fully open (from Valve Position Switch) | *1 |
| | NOTE: | When 2RDS*AOV132 is fully closed a Sequence of Events (SOE) Computer Point, RDSZC106 SDV VENT AOV132, should be actuated. This computer point comes directly from the valve position switch and is independent of this annunciator. This SOE computer point will be used to verify valve closure time during a scram (Reference: MOD PN2Y87MX092). | | *1 |

14.2 Automatic Response

NONE

14.3 Corrective Action

NOTE: Information alarm, this alarm will be activated during scram.

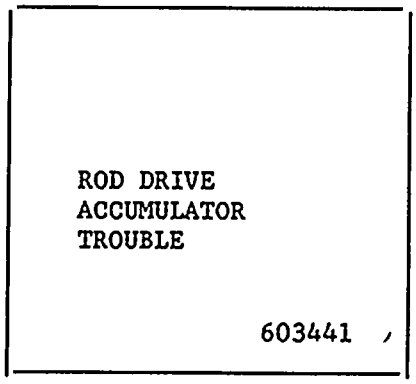
a. If SDV drain valve AOV-130 has also closed check air supply piping to ensure no loss of air to the valves and verify power has not been lost to 2RDS*SOV155.

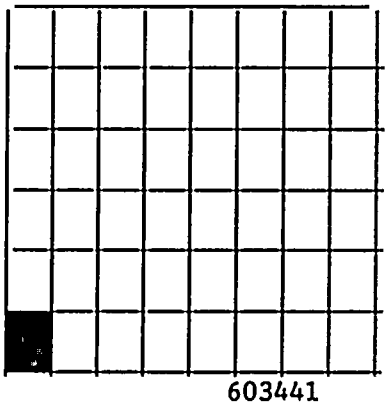
b. Locally check valve to ensure valve position indication is not faulty and that the valve has not been closed with the manual operator.

I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

15.0 603441 Rod Drive Accumulator Trouble

Reflash: No




| 15.1 | Computer Point | Computer Printout | Source | |
|---|---|---|---|---|
| | RDSBC11 | ROD DRIVE ACC TROUBLE | PS206 (1025 psig) or LDS 129 | *1 |

15.2 Automatic Response

NONE

15.3 Corrective Action

a. Determine which accumulator is causing the alarm by checking the Rod Status Display at P603

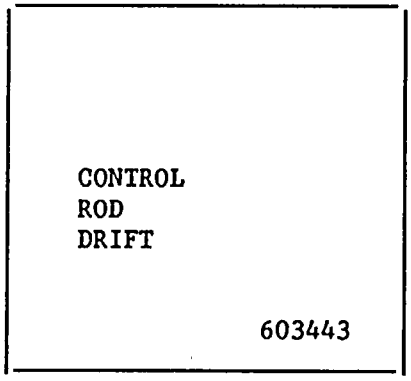
b. Refer to Section H.3.0 of this procedure for action to take for Accumulator Trouble.

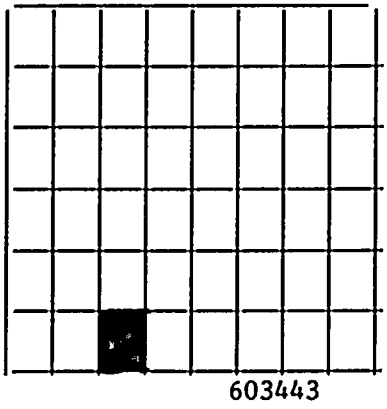
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

16.0 603443 Control Rod Drift

Reflash: No

TCN 20




| 16.1 | Computer Point | Computer Printout | Source |
|---|---|---|---|
| | RDSBC09 | CONTROL ROD DRIFT | Odd position indication reed switch closes without rod drive command |

16.2 Automatic Response

NONE

16.3 Corrective Action

a. Determine which control rod is drifting by checking the Rod Status Display and control rod position.

b. If more than one rod drifts inward because of abnormal scram pilot valve air header pressure (Annunciator Window 603306), manual scram the reactor and follow N2-OP-101C for scram recovery (SER 14-89).

c. Refer to section H.5 of this procedure for action to take for a single Control Rod Drift.

d. Refer to N2-OP-96 Section H.1.0 to recover mispositioned control rod.

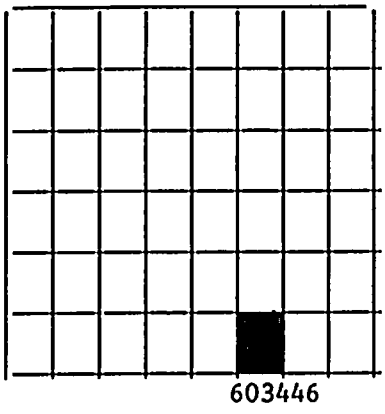
I. PROCEDURE FOR CORRECTING ALARM CONDITIONS (Cont.)

17.0 603446 Control Rod Drive Pump Discharge Header Pressure Low

Reflash: No

CRD PUMP
DISCH HEADER
PRESSURE
LOW

603446



603446

17.1

| Computer Point | Computer Printout | Source |
|---|---|---|
| RDSPC12 | CRD PMP DISCH HDR PR | 2RDS-PS14A/B (500 psig) |

*1

17.2 Automatic Response

NONE

17.3 Corrective Action

a. If low discharge is a result of loss of CRD pump refer to section H.1 of this procedure.

b. Check CRD flow. If flow is pegged high it is an indication of a valve out of position or a line break.

c. If flow is normal and pump has not tripped, trip the running CRD pump by taking hand switch to "STOP" then refer to section H.1 of this procedure for loss of CRD pump.

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V170 | Cond. Storage Supply to CRD Vent- (Turbine Bldg.-El. 261') | Shut and Capped | | | 2 |
| 2RDS-V84 | RDS Supply Header PCV-140 isol.-El. 215' | Open | | | |
| 2RDS-V86 | RDS Supply Header PCV-140 Bypass-El. 215' | Shut | | | |
| 2RDS-V87 | RDS Supply Header PCV-140 Drain-El. 215' | Shut and Capped | | | |
| 2RDS-V88 | PCV-140 Pressure Sensing Isol. El. 215' | Open | | | |
| 2RDS-V85 | RDS Supply Header PCV-140 Isolation-El. 215' | Open | | | |
| 2RDS-V156 | PDIS-104 Inst. Root Isolation-El. 215' | Open | | | |
| 2RDS-V2A | Suction Filter-1A Inlet Isol.-El. 215' | Open | | | |
| 2RDS-V4A | Suction Filter-1A Vent-El. 215' | Shut | | | |
| 2RDS-V5A | Suction Filter-1A Drain-El. 215' | Shut | | | |
| 2RDS-PCV140 | RDS Supply Header Pressure Controller | Auto | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V6A | Suction Filter-1A Drain-El. 215' | Shut | | | |
| 2RDS-V3A | Suction Filter-1A Outlet Isol.-El. 215' | Open | | | |
| 2RDS-V2B | Suction Filter-1B Inlet Isol.-El. 215' | Open | | | |
| 2RDS-V4B | Suction Filter-1B Vent-El. 215' | Shut | | | |
| 2RDS-V5B | Suction Filter-1B Drain-El. 215' | Shut | | | |
| 2RDS-6B | Suction Filter-1B Drain-El. 215' | Shut | | | |
| 2RDS-V3B | Suction Filter-1B Outlet Isol.-El. 215' | Shut | | | |
| 2RDS-V8 | Flt.-Bypass-Line Suction Strainer Isol.-El. 215' | Shut | | | |
| 2RDS-V9 (F116) | Flt.-Bypass Line Suction Strainer Isol. | Shut | | | |
| 2RDS-V157 | PDIS-104 Inst. Root Isolation | Open | | | |
| 2RDS-V7A (F013A) | RDS Pump 1A Suction Isol. | Open | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V10A | PS-2A and PI-2A Inst. Root Isol.-El. 215' | Open | | | |
| 2RDS-V12A | RDS Pump 1A Suction Strainer Inlet Test Conn.-El. 215' | Shut and Capped | | | |
| 2RDS-V13A | RDS Pump 1A Suction Strainer Outlet Test Conn.-El. 215' | Shut and Capped | | | |
| 2RDS-V7B | RDS pump 1B Suction Isol.-El. 215' | Open | | | |
| 2RDS-V10B | PI-2B PS2B Inst. Root Isolation-El. 215' | Open | | | |
| 2RDS-V12B | Test Conn.-El. 215' | Shut and Capped | | | |
| 2RDS-V13B | Test Conn.El. 215' | Shut and Capped | | | |
| 2RDS-V14A | RDS Pump 1A Casing Vent-El. 215' | Shut | | | |
| 2RDS-V16A | PS-14A Inst. Root Isol.-El. 215' | Open | | | |
| 2RDS-V21A | RDS Pump 1A Recirc. Line Stop Check Vlv.-El. 215' | Open | | | |
| 2RDS-V19A | RDS Pump 1A Recirc Line Isol.-El. 215' | Open | | | |
| 2RDS-V17A | RDS Pump 1A Disch. Check - El. 215' | Installed | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V18A | RDS Pump 1A Disch. Isol.-El. 215' | Open | | | |
| 2RDS-V11 | RDS Pump Seal Equalize Line Isol.-El. 215' | Open | | | |
| 2RDS-V14B | RDS Pump 1B Casing Vent-El. 215' | Shut | | | |
| 2RDS-16B | PS-14B Inst. Root Isolation-El. 215' | Open | | | |
| 2RDS-V21B | RDS Pump 1B Recirc Line Stop Check-El. 215' | Open | | | |
| 2RDS-V19B | RDS Pump 1B Recirc Line Isol.-El. 215' | Open | | | |
| 2RDS-V17B | RDS Pump 1B Disch. Check-El. 215' | Installed | | | |
| 2RDS-V18B | RDS Pump 1B Disch. Isolation-El. 215' | Open | | | |
| 2RDS-V20 | PI-105 Inst. Root Isol.-El. 215' | Open | | | |
| 2RDS-V154 | PDIS-106 Inst. Root Isol.-El. 261' | Open | | | |
| 2RDS-V23A | Disch. Flt. 2A Inlet Isol.-El. 261' | Open | | | NOTE: Valve is shut with FLT2B in Service |

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TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V24A | Disch. Flt. 2A Vent El. 261' | Shut | | | |
| 2RDS-V25A | Disch. Flt. 2A Drain El. 261' | Shut | | | |
| 2RDS-V26A | Disch. FLT. 2A Outlet Isol.-El. 261' | Open | | | Note: Valve is shut with FLT2B in Service |
| 2RDS-V23B | Disch. Flt. 2B Inlet Isol.-El. 261' | Shut | | | Note: Valve is open with FLT2B in Service |
| 2RDS-V24B | Disch. Flt. 2B Vent El. 261' | Shut | | | |
| 2RDS-V25B | Disch. Flt. 2B Drain El. 261' | Shut | | | |
| 2RDS-V26B | Disch. Flt. 2B Outlet Isol.-El. 261' | Shut | | | Note: Valve is open with FLT2B in Service |
| 2RDS-V155 | PDIS-106 Inst. Root Isol. -El. 261' | Open | | | |
| 2RDS-V29 | FT-107 Inst. Root Isol. -El. 261' | Open | | | |
| 2RDS-V73 | FT-107 Inst. Root Isol.-El. 261' | Open | | | |
| 2RDS-V93 | Rx Plant Sample Station Isol. El. 261' | Open | | | |

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TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V31A | Instrument Flush Conn. El. 261' | Shut | | | |
| 2RDS-V31B | Instrument Flush Conn. -El. 261' | Shut and Capped | | | |
| 2RDS-V32 | Pt-108 Inst. Root Isolation-El. 261' | Open | | | |
| 2RDS-V28 | Charging Water Header Isol.-El. 261' | Open | | | |
| 2RDS-V27 | PI-111 Inst. Root Isolation-El. 261' | Open | | | |
| 2RDS-V33A | FV-6A Inlet Isolation -El. 261' | Open | | | |
| 2RDS-V136A | FV-6A Line Drain-El. 261' | Shut | | | |
| 2RDS-V136C | FV-6A Line Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V34A | FV-6A Outlet Isol. El. 261' | Open | | | |
| 2RDS-V33B | FV-6B Inlet Isol. El. 261' | Shut | | | |
| 2RDS-V136B | FV-6B Line Drain-El. 261' | Shut | | | |
| 2RDS-V136D | FV-6B Line Drain El. 261' | Shut and Capped | | | |
| 2RDS-V34B | FV-6B Outlet Isol. El. 261' | Shut | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-FV6A | RDS Supply Header Flow Controller | Auto | | | |
| 2RDS-FV6B | RDS Supply Header Flow Controller | Man. | | | |
| 2RDS-V74 | FT-112 Inst. Root Isolation-El. 261' | Open | | | |
| 2RDS-V36 | FT-112 Inst. Root Isolation-El. 261' | Open | | | |
| 2RDS-V37 | PI-113 Inst. Root Isolation-El. 261' | Open | | | |
| 2RDS-V39A | Instrument Flush Conn.-El. 261' | Shut | | | |
| 2RDS-V39B | Instrument Flush Conn.-El. 261' | Shut and Capped | | | |
| 2RDS-V35 | PDT-114,117 Inst. Root Isol.-El. 261' | Open | | | |
| 2RDS-V49A | Stabilizing Vlv. A Inlet Isolation-El. 261' | Open | | | |
| 2RDS-V50A | Stabilizing Vlv. A Drain-El. 261' | Shut | | | |
| 2RDS-V50C | Stabilizing Vlv. A Line Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V51A | Stabilizing Vlv. A Line Drain-El. 261' | Shut | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V51C | Stabilizing Vlv. A Line Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V52A | Stabilizing Vlv. A Outlet Isol.-El. 261' | Open | | | |
| 2RDS-V49B | Stabilizing Vlv. B Line Inlet Isol.-El. 261' | Shut | | | |
| 2RDS-V50B | Stabilizing Vlv. B Line Drain-El. 261' | Shut | | | |
| 2RDS-V50D | Stabilizing Vlv. B Line Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V51B | Stabilizing Vlv. B Line Drain-El. 261' | Shut | | | |
| 2RDS-V51D | Stabilizing Vlv. B Line Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V52B | Stabilizing Vlv. B Line Outlet Isol.-El. 261' | Shut | | | |
| 2RDS-V76 | FI-119 Inst. Root Isolation-El. 261' | Open | | | |
| 2RDS-V53 | FI-119 Inst. Root Isolation-El. 261' | Open | | | |
| 2RDS-V137 | Stabilizing Vlv. To Cooling Water Hdr. Isol.-El. 261' | Open | | | |
| 2RDS-V40 | PV-101 Line Inlet Isol. El. 261' | Open | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V65A | PV-101 Line Drain-El. 261' | Shut | | | |
| 2RDS-V65B | PV-101 Line Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V41 | PV-101 Outlet Isol. El. 261' | Open | | | |
| 2RDS-V42 | PV-101 Bypass Line Isol. El. 261' | Shut | | | |
| 2RDS-V66 | PDT-114,117 Inst. Root Isol.-El. 261' | Open | | | |
| 2RDS-V75 | FI-115 Inst. Root Isolation -El. 261' | Open | | | |
| 2RDS-V46 | FI-115 Inst. Root Isolation -El. 261' | Open | | | |
| 2RDS-V48 | PI-116 Inst. Root Isolation -El. 261' | Open | | | |
| 2RDS-V55 | PI-120 Inst. Root Isolation-El. 278' | Open | | | |
| 2RDS-V56A | Exhaust Water Header Vent El. 278' | Shut | | | |
| 2RDS-V56B | Exhaust Water Header Vent El. 278' | Shut and Capped | | | |
| 2RDS-V81A | Cooling Water Header Vent El. 278' | Shut | | | |
| 2RDS-V81B | Cooling Water Header Vent El. 278' | Shut and Capped | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V38A | Drive Water Header Vent El. 278' | Shut | | | |
| 2RDS-V38B | Drive Water Header Vent-El. 278' | Shut and Capped | | | |
| 2RDS-V30A | Charging Water Header Vent-El. 278' | Shut | | | |
| 2RDS-V30B | Charging Water Header Vent-El. 278' | Shut and Capped | | | |
| 2RDS-V60 | Exhaust Water Header Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V59 | Cooling Water Header Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V58 | Drive Water Header Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V57 | Charging Water Header Drain-El. 261' | Shut and Capped | | | |
| 2RDS-V89 | Exh. Water Equal RV 15A Isol.-El. 261' | Locked Open | | | |
| 2RDS-V90 | Exh. Water Equal RV 15A Isol.-El. 261' | Locked Open | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V91 | Exh. Water Equal RV 15B Isol.-El. 261' | Locked Open | | | |
| 2RDS-V92 | Exh. Water Equal RV 15B Isol.-El. 261' | Locked Open | | | |
| 2RDS-V77 | Exhaust Water Header Vent El. 261' | Shut and Capped | | | |
| 2RDS-V78 | Exhaust Water Header Vent El. 261' | Shut | | | |
| 2RDS-V71 | Cooling Water Header Vent El. 261' | Shut and Capped | | | |
| 2RDS-V72 | Cooling Water Header Vent El. 261' | Shut | | | |
| 2RDS-V68 | Charging Water Header Vent El. 261' | Shut | | | |
| 2RDS-V67 | Charging Water Header Vent El. 261' | Shut and Capped | | | |
| 2RDS-V70 | Drive Water Header Vent El. 261' | Shut | | | |
| 2RDS-V69 | Drive Water Header Vent El. 261' | Shut and Capped | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS*V129A | Scram Disch. Volume<br>LSY-11A Root Isol | Locked<br>Open | | | |
| 2RDS*V130A | Scram Disch. Volume<br>LSY-11A Inst. Test Conn. | Locked<br>Shut<br>and Capped | | | |
| 2RDS*V131A | Scram Disch. Volume<br>LSY-11A Inst. Test Conn. | Locked<br>Shut<br>and Capped | | | |
| 2RDS*V132A | Scram Disch. Volume<br>LSY-11A Inst. Root Isol. | Locked<br>Open | | | |
| 2RDS*V129B | Scram Disch. Volume<br>LSX-11A Inst. Root Isol. | Locked<br>Open | | | |
| 2RDS*V130B | Scram Disch. Volume<br>LSX-11A Inst. Test Conn. | Locked<br>Shut<br>and Capped | | | |
| 2RDS*V131B | Scram Disch. Volume<br>LSX-11A Inst. Test Conn. | Locked<br>Shut<br>and Capped | | | |
| 2RDS*V132B | Scram Disch. Volume<br>LSX-11A Inst. Root Isol. | Locked<br>Open | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS*V129C | Scram Disch. Volume LSY-11B Inst. Root Isol. | Locked Open | | | |
| 2RDS*V130C | Scram Disch. Volume LSY-11B Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V131C | Scram Disch. Volume LSY-11B Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V132C | Scram Disch. Volume LSY-11B Inst. Root Isol. | Locked Open | | | |
| 2RDS*V129D | Scram Disch. Volume LSX-11B Inst. Root Isol. | Locked Open | | | |
| 2RDS*V130D | Scram Disch. Volume LSX-11B Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V131D | Scram Disch. Volume LSX-11B Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V132D | Scram Disch. Volume LSX-11B Inst. Root Isol. | Locked Open | | | |
| 2RDS*V133A | Scram Disch. Volume LS125 Inst. Root Isol. | Locked Open | | | |
| 2RDS*V134A | Scram Disch. Volume LS 125 Inst. Test Conn. | Locked Shut and Capped | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS*V135A | Scram Disch. Volume LS126 Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V70A | Scram Disch. Volume LS126 Inst. Root Isol. | Locked Open | | | |
| 2RDS*V138B | Scram Disch. Volume LTX-12B Inst. Root Isol. | Locked Open | | | |
| 2RDS*V139B | Scram Disch. Volume LTX-12B Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V140B | Scram Disch. Volume LTX-12B Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V141B | Scram Disch. Volume LTX-12B Inst. Root Isol. | Locked Open | | | |
| 2RDS*V138A | Scram Disch. Volume LTY-12B Inst. Root Isol. | Locked Open | | | |
| 2RDS*V139A | Scram Disch. Volume LTY-12B Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V140A | Scram Disch. Volume LTY-12B Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V141A | Scram Disch. Volume LTY-12B Inst. Root Isol. | Locked Open | | | |
| 2RDS*V133B | Scram Disch. Volume LS-127 Inst. Root Isol. | Locked Open | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS*V134B | Scram Disch. Volume LS-127 Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V70B | Scram Disch. Volume LS-129 Inst. Root Isol. | Locked Open | | | |
| 2RDS*V135B | Scram Disch. Volume LS-129 Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V138C | Scram Disch. Volume LTY-12A Inst. Root Isol. | Locked Open | | | |
| 2RDS*V139C | Scram Disch. Volume LTY-12A Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V140C | Scram Disch. Volume LTY-12A Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V141C | Scram Disch. Volume LTY-12A Inst. Root Isol. | Locked Open | | | |
| 2RDS*V138D | Scram Disch. Volume LTX-12A Inst. Root Isol. | Locked Open | | | |
| 2RDS*V139D | Scram Disch. Volume LTX-12A Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V140D | Scram Disch. Volume LTX-12A Inst. Test Conn. | Locked Shut and Capped | | | |
| 2RDS*V141D | Scram Disch. Volume LTX-12A Inst. Root Isol. | Locked Open | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V2002 | Supply Hdr. Isol. To PCV-18 A/B | Open | | | |
| 2RDS-V2005 | PCV-18A Inlet Isol. | Open | | | |
| 2RDS-V2007 | PCV-18B Inlet Isol. | Shut | | | |
| 2RDS-V2006 | PCV-18A Outlet Isol. | Open | | | |
| 2RDS-V2008 | PCV-18B Outlet Isol. | Shut | | | |
| 2RDS-V539 | PI-107 Inst. Root Isol | Open | | | |
| 2RDS-V2009 | PI-134 Inst. Root Isol. | Open | | | |
| 2RDS-V538 | FV-6 Local Controller Isol. | Open | | | 2 |
| 2RDS-V2001 | Supply Hdr. Isol. to PCV- 19 A/B | Open | | | |
| 2RDS-V2011 | PCV-19A Inlet Isol. | Open | | | |
| 2RDS-V2013 | PCV-19B Inlet Isol. | Shut | | | |
| 2RDS-V2012 | PCV-19A Outlet Isol. | Open | | | |
| 2RDS-V2014 | PCV-19B Outlet Isol. | Shut | | | |
| 2RDS-V595 | Scram Pilot Air Header Isol. | Locked Open | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V511 | Bypass Line Check SOV 138 | Installed | | | |
| 2RDS-V561A | Bypass Line Check SOV 162 | Installed | | | |
| 2RDS-V561B | Bypass Line Check SOV 163 | Installed | | | |
| 2RDS-V594 | Scram Disch. Volume Vent/Drain S.O.V. Air Isol. | Locked<br>Open | | | |
| 2RDS-V589A | Scram Disch. Volume Vent/ Drain SOV Air Isol. | Locked<br>Open | | | |
| 2RDS-V589B | Scram Disch Volume Vent /Drain SOV Isol. | Locked<br>Open | | | |
| 2RDS-V588 | PI-133 Inst. Root Isol. | Open | | | |
| 2RDS*AOV 124 | Scram Disch. Volume Vent | Open and Locked Not Overridden* | | | TCN-11 |
| 2RDS*AOV 123 | Scram Disch. Volume Drain | Open and Locked Not Overridden* | | | TCN-11 |
| 2RDS*SOV 137 | Backup Scram Pilot Valve | Installed | | | |
| 2RDS*AOV 130 | Scram Disch. Volume Drain | Open/ Manual Operator Locked in Neutral | | | |
| 2RDS*AOV 132 | Scram Disch. Volume Vent | Open/ Manual Operator Locked in Neutral | | | |

*Fully clockwise on the valve handwheel



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TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS*SOV 138 | Backup Scram Pilot Valve | Installed | | | |
| 2RDS*SOV 154 | Scram Disch. Volume Vent//Drain SOV | Installed | | | |
| 2RDS*SOV 163 | RRCS (ARI) Backup Scram Pilot Valve | Installed | | | |
| 2RDS*SOV 162 | RRCS (ARI) Backup Scram Pilot Valve | Installed | | | |
| 2RDS*SOV 155 | Scram Disch. Volume Vent/ Drain SOV | Installed | | | |
| 2RDS*SOV 161 | RRCS Scram Disch. Volume Vent/Drain SOV | Installed | | | |
| 2RDS*SOV 156 | RRCS (ARI) Scram Air Header SOV | Installed | | | |
| 2RDS*SOV 160 | RRCS Scram Disch. Volume Vent/Drain SOV | Installed | | | |
| 2RDS*SOV 157 | RRCS (ARI) Scram Air Header SOV | Installed | | | |
| 2RDS*SOV 158 | RRCS (ARI) Scram Air Header SOV | Installed | | | |
| 2RDS*SOV 159 | RRCS (ARI) Scram Air Header SOV | Installed | | | |
| 2RDS-PCV 18A | Air Pressure Controller to FV6A/B | Installed | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-PCV 18B | Air Pressure Controller to FV6A/B | Installed | | | |
| 2RDS-PCV 19A | Air Pressure Controller to AOV123, 124, 130, 134 | Installed | | | |
| 2RDS-PCV 19B | Air Pressure Controller to AOV123, 124, 130, 134 | Installed | | | |
| 2RDS-V43 | Scram Air Header Drain | Shut | | | |
| 2RDS-V559B | SOV155 Bleed Off | Locked Throttled | | | |
| 2RDS-V559A | SOV154 Air Supply | Locked Throttled | | | |
| 2RDS-RV1A | RDS Pump 1A Suction Relief | Not Gagged | | | |
| 2RDS-RV1B | RDS Pump 1B Suction Relief | Not Gagged | | | |
| 2RDS-RV15A | Exhaust Header Equalizing Relief | Installed | | | |
| 2RDS-RV15B | Exhaust Header Equalizing Relief | Installed | | | |
| 2RDS-RV102 | Scram Disch. Volume Vent Line Relief | Not Gagged | | | 2 |
| 2RDS-V171 | Condensate Supply to RDS Pump Drain | Shut and Capped | | | |
| 2RDS-V2000 | Instrument Air Supply Isol. | Open | | | |

TABLE IA

VALVE LINEUP

| VALVE NO. | DESCRIPTION | REQUIRED POSITION | ACTUAL POSITION | INITIALS & DATE | REMARKS |
|---|---|---|---|---|---|
| 2RDS-V2003 | Instrument Air Supply Header Drain | Shut and Capped | | | |
| 2RDS-V2004 | Instrument Air Supply Header Drain | Shut and Capped | | | |
| 2RDS-V2016 | Instrument Air Supply Isol to FV6A | Open | | | |
| 2RDS-V2017 | Instrument Air Supply Isol to FV6B | Open | | | |
| 2RDS-V2015 | Instrument Air Supply Drain | Shut and Plugged | | | |
| 2RDS-V2018 | PT139 Inst. Root Isol. | Open | | | |
| 2RDS-V2019 | PCV140 Press Sensing Line Vent | Shut and Capped | | | 2 |

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TABLE IB

HCU VALVE LINEUP

A. OPERATIONAL VALVE LINE-UP (Initial for each HCU placed in this line-up under column A. Position Valves in the order listed.

| VALVE NO. | DESCRIPTION | POSITION | |
|---|---|---|---|
| | Scram Toggle Switches | Norm. | |
| 116 | Scram Pilot Air Isolation | Open | |
| 112 | Scram Discharge Isolation | Open | |
| 107 | Accumulator Drain | Shut | |
| 113 | Charging Water Isolation | Open | |
| 102 | Withdraw Isolation | Open | |
| 101 | Insert Isolation | Open | |
| 104 | Cooling Water Isolation | Open | |
| 105 | Exhaust Water Isolation | Open | |
| 103 | Drive Water Isolation | Open | |
| 111 | Gas Accumulator Charging Valve | Open | |
| 83 | Insert Line Vent Valve | Shut | |
| 1 | Withdraw Line Vent Valve | Shut | TCN-14 |

B. MAINTENANCE VALVE LINE-UP (Initial for each HCU placed in this line-up under column B. Position Valves in the order listed.

| VALVE NO. | DESCRIPTION | POSITION | |
|---|---|---|---|
| 101 | Insert Isolation | Shut | |
| 102 | Withdraw Isolation | Shut | |
| 113 | Charging Water Isolation | Shut | |
| 107 | Accumulator Drain | Open | |
| 111 | Gas Accumulator Charging Valve | Open | |
| 116 | Scram Pilot Air Isolation | Shut | |
| | Scram Toggle Switches | Test | |
| 104 | Cooling Water Isolation | Shut | |
| 103 | Drive Water Isolation | Shut | |
| 105 | Exhaust Water Isolation | Shut | |
| 112 | Scram Discharge Isolation | Shut | |
| 83 | Insert Line Vent Valve | Shut | |
| 1 | Withdraw Line Vent Valve | Shut | TCN-14 |

TABLE IB (Cont.)

NORTH SIDE

| HCU | Initial Operational (A) | Initial Maintenance (B) | HCU | Initial Operational (A) | Initial Maintenance (B) | HCU | Initial Operational (A) | Initial Maintenance (B) |
|---|---|---|---|---|---|---|---|---|
| 42-59 | | | 42-39 | | | 54-23 | | |
| 38-59 | | | 46-39 | | | 58-23 | | |
| 34-59 | | | 50-39 | | | 58-19 | | |
| 30-59 | | | 54-39 | | | 54-19 | | |
| 30-55 | | | 58-39 | | | 50-19 | | |
| 34-55 | | | 58-35 | | | 46-19 | | |
| 38-55 | | | 54-35 | | | 42-19 | | |
| 42-55 | | | 50-35 | | | 38-19 | | |
| 46-55 | | | 46-35 | | | 34-19 | | |
| 50-51 | | | 42-35 | | | 34-15 | | |
| 46-51 | | | 38-35 | | | 38-15 | | |
| 42-51 | | | 34-35 | | | 42-15 | | |
| 38-51 | | | 30-35 | | | 46-15 | | |
| 34-51 | | | 30-31 | | | 50-15 | | |
| 30-51 | | | 34-31 | | | 54-15 | | |
| 30-47 | | | 38-31 | | | 46-07 | | |
| 34-47 | | | 42-31 | | | 50-11 | | |
| 38-47 | | | 46-31 | | | 46-11 | | |
| 42-47 | | | 50-31 | | | 42-11 | | |
| 46-47 | | | 54-31 | | | 38-11 | | |
| 50-47 | | | 58-31 | | | 34-11 | | |
| 54-47 | | | 58-27 | | | 34-03 | | |
| 58-43 | | | 54-27 | | | 38-03 | | |
| 54-43 | | | 50-27 | | | 42-03 | | |
| 50-43 | | | 46-27 | | | 34-07 | | |
| 46-43 | | | 42-27 | | | 38-07 | | |
| 42-43 | | | 38-27 | | | 42-07 | | |
| 38-43 | | | 34-27 | | | | | |
| 34-43 | | | 34-23 | | | | | |
| 30-43 | | | 38-23 | | | | | |
| 30-39 | | | 42-23 | | | | | |
| 34-39 | | | 46-23 | | | | | |
| 38-39 | | | 50-23 | | | | | |

TABLE IB (Cont.)

SOUTH SIDE

| HCU | Initial Operational (A) | Initial Maintenance (B) | HCU | Initial Operational (A) | Initial Maintenance (B) | HCU | Initial Operational (A) | Initial Maintenance (B) |
|---|---|---|---|---|---|---|---|---|
| 18-55 | | | 22-35 | | | 14-19 | | |
| 22-55 | | | 18-35 | | | 10-19 | | |
| 26-55 | | | 14-35 | | | 06-19 | | |
| 18-59 | | | 10-35 | | | 02-19 | | |
| 22-59 | | | 06-35 | | | 06-15 | | |
| 26-59 | | | 02-35 | | | 10-15 | | |
| 26-51 | | | 02-31 | | | 14-15 | | |
| 22-51 | | | 06-31 | | | 18-15 | | |
| 18-51 | | | 10-31 | | | 22-15 | | |
| 14-51 | | | 14-31 | | | 26-15 | | |
| 10-51 | | | 18-31 | | | 30-15 | | |
| 14-55 | | | 22-31 | | | 30-11 | | |
| 06-47 | | | 26-31 | | | 26-11 | | |
| 10-47 | | | 30-27 | | | 22-11 | | |
| 14-47 | | | 26-27 | | | 18-11 | | |
| 18-47 | | | 22-27 | | | 14-11 | | |
| 22-47 | | | 18-27 | | | 10-11 | | |
| 26-47 | | | 14-27 | | | 14-07 | | |
| 26-43 | | | 10-27 | | | 18-07 | | |
| 22-43 | | | 06-27 | | | 22-07 | | |
| 18-43 | | | 02-27 | | | 26-07 | | |
| 14-43 | | | 02-23 | | | 30-07 | | |
| 10-43 | | | 06-23 | | | 30-03 | | |
| 06-43 | | | 10-23 | | | 26-03 | | |
| 02-43 | | | 14-23 | | | 22-03 | | |
| 02-39 | | | 18-23 | | | 18-03 | | |
| 06-39 | | | 22-23 | | | | | |
| 10-39 | | | 26-23 | | | | | |
| 14-39 | | | 30-23 | | | | | |
| 18-39 | | | 30-19 | | | | | |
| 22-39 | | | 26-19 | | | | | |
| 26-39 | | | 22-19 | | | | | |
| 26-35 | | | 18-19 | | | | | |

TABLE II

SYSTEM POWER SUPPLY LINEUP

| Component Numbers | Component Description | Power Supply Bus Number | Cubical/ Breaker | Normal Position | Actual Position | Initials & Date | Remarks | |
|---|---|---|---|---|---|---|---|---|
| 2RDS-P1A | Control Rod Drive Feed Pump 1A | 2NNS-SWG014 | 7 | RACKED IN | | | | 2 |
| 2RDS-P1B | Control Rod Drive Feed Pump 1B | 2NNS-SWG015 | 2 | RACKED IN | | | | 2 |
| 2RDS-H1A | Control Rod Drive Feed Pump 1A Heater | 2SCA-PNL201 | 3 | ON | | | | 2 |
| 2RDS-H1B | Control Rod Drive Feed Pump 1B Heater | 2SCA-PNL201 | 14 | ON | | | | 2 |
| 2RDS-PV101 | CRD WTR PRESS THROT Cont MOV | 2NHS-MCC008 | 6A | ON | | | | 2 |
| | CRD INST. POWER | 2VBS-PNLA102 | 1 | ON | | | | 2 |
| | FCV IND. POWER | 2VBS-PNLA101 | 11 | ON | | | | 2 |
| 2RDSN07 | CRD Temperature Recorder | 2VBS-PNLA101 | 12 | ON | | | | |

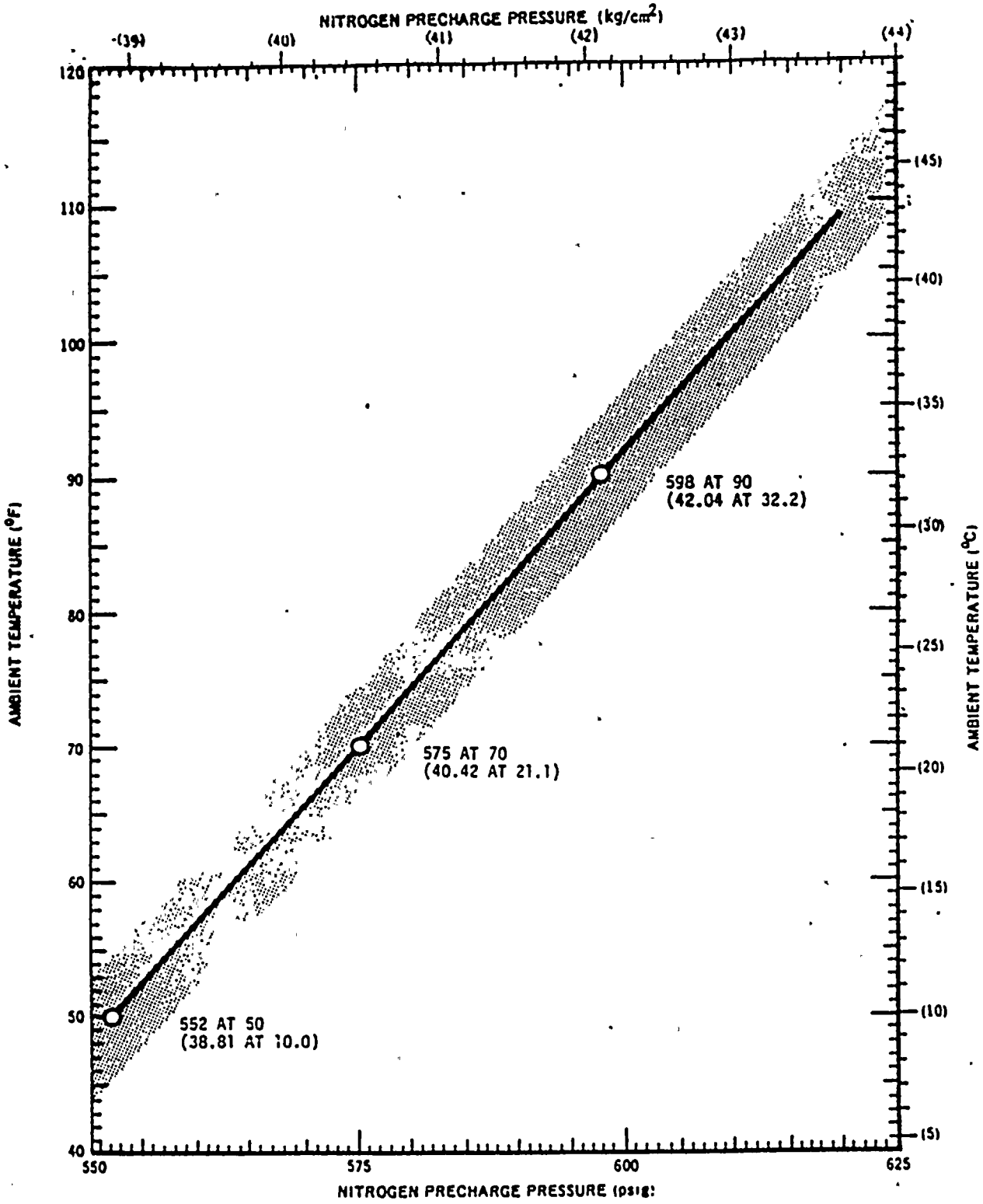


Figure 1 Accumulator Precharge Nitrogen Pressure Versus Ambient Temperature