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Davis-Besse Nuclear Power Station

Unit No. 1

Abnormal Procedure AB 1203.04

DEPRESSURIZATION OF THE RCS WITH ONLY SAFETY GRADE EQUIPMENT

NUCLEAR SAFETY RELATED

Record of Approval and Changes

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QA Approved N/A, Quality Assurance Director — Date

Approved By Jack Evans, Plant Manager — 3/31/77 Date

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Depressurization of the RCS with Only Safety Grade Equipment

This procedure is written strictly as a guide for the operator and is in no way intended to be detailed in actions to be taken. No real detail can be provided since the plant conditions at the time of this type of situation are in themselves unpredictable. The intent of this procedure is to remind or instruct the operator what general actions need to be taken, what problems to look for, and what detailed emergency and operating procedures will be needed to recover from this situation. This procedure assumes that the accident starts while at power since this will be the most severe condition.

This procedure depends upon safety related equipment only, but does remind the operator of other equipment which may become available. If at any time, it becomes possible to regain the use of non-safety related equipment, place the equipment into operation according to normal operating procedures.

1. INITIAL OCCURRENCE

1.1 Turbine Generator has tripped coincident with a loss of off-site power.

1.2 All RCP's trip.

1.3 Reactor trips.

1.4 The Main Feed Pumps trip due to a loss of control oil pressure.

1.5 The Diesel Generators start and energize Busses C1 and D1.

1.6 As soon as there is Essential AC power, the SFRCS signals will isolate the Steam Generators due to loss of feedwater and start
11| the AFPs to feed both SG's to 46 inches on the Startup Range, to establish natural circulation flow.

1.7 The SG safeties will be lifting.

2. PLANT STABILIZATION

2.1 The plant will be stabilized per EP 1202.01, RPS, SFAS, SFRCS Trip or SG Tube Rupture. Some bus power and additional system
11| systems will be restored by AB 1203.28, Loss of AC Bus Power Sources. Some of the systems restarted by EP 1202.01 and AB 1203.28 which will not be reconsidered by this procedure are:

1. CCW, Service Water (Get CCW to the RCP's seals as soon as possible), and makeup pumps.

2. Reenergizing C2-D2 Bus

11| 3. Essential pressurizer heaters

4. Restore Lighting

5. Emergency Instrument Air Compressor

11| 2.2 Check Emergency Plan Activation, EI 1300.01, to determine proper emergency classification and take actions accordingly.

2.3 It will be necessary to control the atmospheric vent valves ICS 11A and ICS 11B to control the RCS Tave and the

S/G steam pressure. Perform the following steps to control the Steam Generator Pressure with its atmospheric vent valve.

1. Place both Atmospheric Vent Valve Hand/Auto Stations in hand and at zero demand.

2. Press the BLOCK button for the Steam Generator's Atmospheric Vent Valve. (HIS ICS 11D for SG 1-1 or HIS ICS 11C for SG 1-2.)

3. Press Auto for the Steam Generator's Atmospheric Vent Valve (HIS ICS 11B for SG 1-1 or HIS ICS 11A for SG 1-2).

4. Control the Steam Generator's pressure to prevent lifting MS Safety Valves.

5. If condenser vacuum is broken, the Atmospheric Vent Valves Hand/Auto Station may be placed in Auto.

NOTE: If manual operation of the Atmospheric Vent Valves is required, see Attachment 1 for guidance.

2.4 What happens to RCS pressure is difficult to predict and depends upon initial reactor power, amount of RCS inventory loss through the pressurizer safeties, and overall plant response to the accident. There is no method other than the pressurizer safeties to control increasing pressure. An attempt to control decreasing RCS pressure can be made using the Pressurizer Essential Groups Heaters, but these will control only slow pressure transients. If Przr. Level is less than 40 inches, the heaters will not be available.

2.5 If normal makeup is unavailable and RCS pressure is greater than 1600 psig, line up one HPI Pump in piggyback with its complimentary LPI Pump from the BWST per Decay Heat and Low Pressure Injection Operation Procedure, SP 1104.04, Section 11. Turn off the Pressurizer Heaters, if they are being used, and allow pressure to drift down to the discharge pressure of the HPI Pumps which in this configuration should be about 1850 psig taking care to maintain RCS pressure above the 1650 psig SFAS

11 trip setpoint. Start the HPI-LPI piggyback pump combination to regain pressurizer level.

NOTE: Just to give the operator a feel for how much flow and pressure is available in this configuration, the maximum pressure obtainable with the HPI minimum recirc open and the HP2 valves throttled back, but passing flow is roughly 1850 psig yielding about 50 gpm to the RCS. This assumes normal BWST levels (32 to 38 ft.). As RCS pressure decreases, more flow is available. With the minimum recirc closed, a flow of about 30 gpm is available at 1775 psig.

11 2.6 When pressurizer level increases above 40", put pressurizer essential groups heaters back into service. When pressurizer level approaches the desired operating level, initiate RCS letdown to slow the pressurizer level increase down. Eventually, the RCS pressure will equal the HPI-LPI pump combination shutoff head and makeup will stop.

3. COOLDOWN AND DEPRESSURIZATION

3.1 Refer to PP 1102.10, Plant Shutdown and Cooldown, Section 10 which gives the steps for a cooldown on natural circulation.

3.2 Calculate Shutdown Margin at the temperature the RCS is being cooled to. Use the BWST water for contraction volume.

NOTE: If the use of Makeup Pump was regained, the normal method of boration and makeup can be employed using the BA Pumps and Primary Water Transfer Pumps through the Batch Controller all of which are essential powered. Makeup Pump suction may, however, be from the BWST if normal letdown cannot be regained.

3.3 Continue while monitoring ΔT_{RCS} (which should be 20-50°F) to assure natural circulation is still there. Refer to the Shutdown and Cooldown Procedure, PP 1102.10 Sections 5 and 6, and perform as many steps as may be possible even if they must be done manually.

1. Block SFAS Incident Level 2 at 1800 psig RCS pressure.

2. Block SFRCS at 650 psig Steam Pressure

3. Control Pressurizer level as outlined in step II-5 of this procedure.

3.4 If piggyback operation is being used, when RCS pressure is less than ~ 1400 psig, piggyback mode may be terminated, and an HPI Pump using suction direct from the BWST can be started as per SP 1104.04, Section 11.

3.5 Continue cooldown in accordance with Shutdown and Cooldown Procedure, PP 1102.10.

1. Isolate the Core Flood Tanks at 750 psig

2. Block SFAS Incident Level 3 at 600 psig

3. Go on to normal Decay Heat Removal when RCS temperature is less than 280°F

4. EQUIPMENT RECOVERY PRIORITIES AND PRECAUTIONS

4.1 The most obvious priority is to get off-site power back as soon as possible. It makes no difference which line is restored, but the more sources available, the better. Refer to AB 1203.28, Loss of AC Bus Power Sources, for specific instructions on restoring power to A bus, B bus, C2 bus and D2 bus. 11

1. If only one source is available, it is advisable to reenergize only the non-essential equipment from that source. Leave C1 and D1 on their associated EDG's so that if that off-site power source is lost for some reason, no interruption in established cooldown will results.

2. If two or more sources become available, the preference would be to reenergize A Bus, B Bus, C2 Bus and D2 Bus first. Then synchronize and parallel C2 with C1 and D2 with D1, unload the EDG's and trip them off. Then realign the EDG's for auto start as per SP 1107.11 prior to proceeding with anything else.

NOTE: Restoration of 345 KV lines and 13.8 KV busses should only be done on direction from the Load Dispatcher.

4.2 Get power to the Station Air Compressors and return them to service after reestablishing TPCW.

4.3 Restore power to and restart the Reactor Vessel Head Fans.

4.4 Restore as much ventilation as possible, but start with:

1. Control Room and Cabinet Room

2. Main Station Exhaust Fans

3. Radwaste Area Ventilation

4. Fuel Handling Area Fans

5. Non Radwaste Area Fans

6. Auxiliary Feed Pump Rooms

4.5 Get the Auxiliary Boiler on. This may be required before getting some vent fans on depending upon the outside air temperatures.

4.6 Get power to the Clean Waste Receiver Tank Transfer Pumps, Primary Water Transfer Pumps or the Demin Water Transfer Pumps.

4.7 Whether or not to start one or more RCP's depends upon the situation at the time. If seal leakage is within limits and the seals are staging or can be staged properly, then it would be best to get on one or more RCP's. If there seems to be any evidence of seal damage, however, do not start an RCP. Refer to Reactor Coolant Pump operating procedure SP 1103.06 for starting instructions.

NOTE: Starting RCP 2-2 will provide pressurizer spray.

NOTE: If more than one pump is to be started, it is preferable to start at least one pump in each loop to promote the best heat transfer in the steam generators.

11 4.8 If the one or more RCP's get started, it may be possible to return to main feed system operation and the Auxiliary Feed Pumps shutdown. Refer to Station Shutdown and Cooldown Procedure, PP 1102.10.

OPERATION OF ATMOSPHERIC VENT VALVES

I. NORMAL OPERATION (ICS)

1. Instrument air is supplied through IA supply valve through both SA1 and SA2. This air positions V1 and V2 open (air ported from boosters to actuator) and V3 closed. V2 and V3 are two-way valve (open/closed). V1 is a three-way valve which ports from booster to actuator or actuator to vent.

2. Modulation is achieved by the transducer which receives the ICS signal. The transducer (I/P) supplies a control air signal to the positioner which in turn supplies a control signal (increased or decreased modulation) to the two boosters.

II. SAFETY FEATURES ACTUATION/STEAM FEEDWATER RUPTURE CONTROL SYSTEM

1. An SFAS or SFRCS signal de-energizes SA1 and SA2 - V1 repositions to vent the actuator while V2 closes. V3 opens and 100# air positions the actuator down through V3.

2. The transducer, positioner, and boosters have no control since V2 is closed and V1 is positioned to vent.

3. To re-establish ICS control, the SFAS/SFRCS actuation must be cleared or blocked. Ensure the H/A station is at 0%. Then press HIS ICS 11A/B AUTO. This energizes SA1 and SA2 and allows either ICS auto control or H/A station manual control.

III. EMERGENCY OPERATION USING THE REMOTE VALVE OPERATORS

A. Operation with SA1 and SA2 energized. This would be the condition with SFAS AND SFRCS NOT tripped.

OR

SFAS OR SFRCS tripped AND trip blocked AND valve control returned to auto.

In this condition, V3 is closed, and it is NOT possible to vent the air off the valve actuator using only valves A and B.

1. IF access to Control Room switches HIS ICS 11A and B is available,

   THEN, press CLOSE on the switches and proceed per Section B.

2. IF access to the Control Room is NOT available,

   THEN close the instrument air supply to Main Steam Atmsopheric

Vent Valve IA450, located on Turbine Building 585' level next to the emergency isntrument air compressor receiver and proceed as follows:

NOTE: Closing IA450 isolates instrument air to the following valves:

ICS11A	ICS11B
MS375	MS394
MS100A	MS101A

a. Valve A (see drawing) must remain open.

b. Open Valve B (vent valve) to vent supply piping, allowing V3 to open so actuator will also vent.

c. Check the handwheel counter at zero. Then open the handwheel (CCW) to the desired position.

0 turns = closed
253 turns = open

NOTE: Valve does not start to open until approximately 13 turns.

d. If partial closing is desired, simply rotate the manual handwheel in the clockwise direction since the valve is spring assisted in the close direction.

e. If positive shutoff is desired, close the manual handwheel until it reaches the full closed position (zero counts on counter).

f. Close B valve.

CAUTION: Do NOT open IA450 unless BOTH valve's remote manual operator counters are at zero counts as damage can occur to the lifting fork on the valve stem.

g. Open IA450 to restore closing air to BOTH actuators.

B. Operation with SA1 and SA2 de-energized. This would be the condition with SFAS or SFRCS tripped,

AND

The trip signal has NOT been blocked,

AND

The valve has NOT been returned to auto.

1. Manual control of the atmospheric vent valves is necessary to maintain hot standby conditions.

2. In the radwaste ventilation area outside the Control Room (elevation 623') is located a manual handwheel and two valves for each atmospheric vent valve. Instructions are posted near each handwheel as follows:

   a. Close Valve A (see drawing) which isolates air from Valve V3.

   b. Open Valve B (vent valve) which vents actuator air through V3.

   c. Check the handwheel counter at zero. Then open the handwheel (CCW) to the desired position.

      0 turns = closed
      253 turns = open

      NOTE: Valve does not start to open until approximately 13 turns.

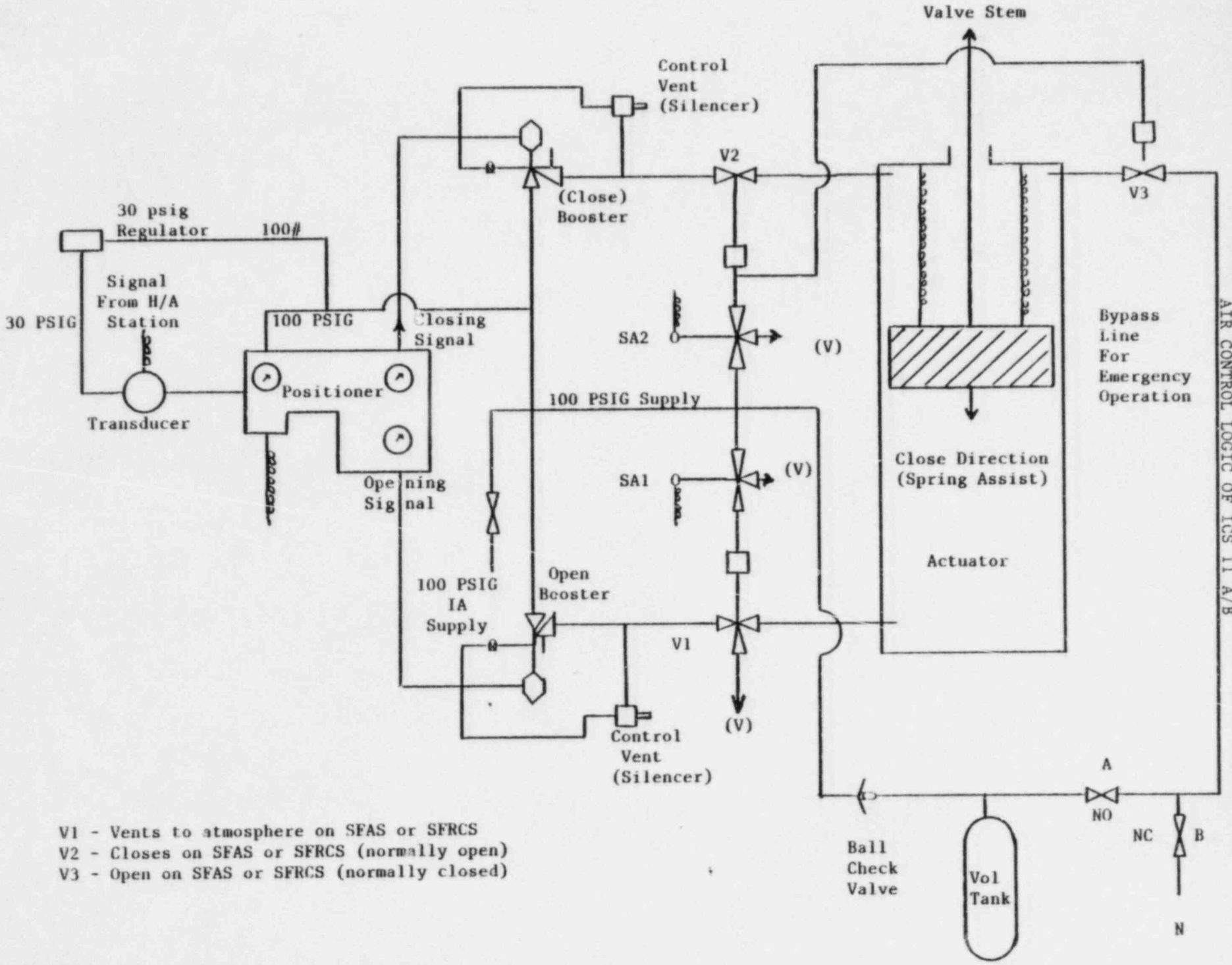
   d. If partial closing is desired, simply rotate the manual handwheel in the clockwise direction since the valve is spring assisted in the close direction.

   e. If positive shutoff is desired, close the manual handwheel until it reaches the full closed positoin (zero counts on counter).

   f. Close B valve.

      CAUTION: Do NOT open A valve unless remote manual operator counter is at zero counts as damage can occur to the lifting fork on the valve stem.

   g. Open A valve to restore closing air to the actuator.



V1 - Vents to atmosphere on SFAS or SFRCS
V2 - Closes on SFAS or SFRCS (normally open)
V3 - Open on SFAS or SFRCS (normally closed)

END

AIR CONTROL LOGIC OF ICS 11 A/B

9

AB 1203.04.8

Attachment 1
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