ENCLOSURE 1

(20)

SAN ONOFRE NUCLEAR GENERATING STATION
UNIT 1 APR 24 1981
COMPLETELY REVISED

OPERATING INSTRUCTION # S01-3-6
REVISION 1

PLANT OPERATION WITH NATURAL CIRCULATION

SECTION PAGE

A. NATURAL CIRCULATION OPERATION

1.0 OBJECTIVE

1.1 The purpose of this procedure is to provide instruction for operation of the reactor plant at any time following events that result in the loss of forced reactor coolant flow capability, and only in the case where reactor coolant system pressure boundary integrity is maintained and heat rejection to the steam generators is possible.

2.0 REFERENCES

2.1 S01-1.1-1, "Emergency Shutdown"

2.2 S01-1.7-1, "Loss of Off-Site Power"

2.3 Westinghouse Abnormal Operating Instructions

2.3.1 A-4, "Station Blackout" instruction series

2.3.2 A-6, "Plant Operating with Natural Circulation of Reactor Coolant"

3.0 PREREQUISITES

3.1 The reactor is critical or subcritical with the plant in Modes 1-4.

3.2 Those plant systems necessary to facilitate normal plant operation with steam dump to the condenser or atmosphere are operable.

4.0 PRECAUTIONS AND LIMITATIONS

4.1 During the course of a natural circulation operation, adequate core cooling should be verified frequently by insuring the following:

4.1.1 $50^{o}F$ subcooling is maintained on the Reactor Coolant System.

4.1.2 Core Outlet Thermocouples are stable and varying with Reactor Coolant System temperature.

4.1.3 Continued indications of natural circulation and heat removal.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

4.2 Normal pressure reduction by Pressurizer spray valve actuation will not be possible with Reactor Coolant Pumps off. Pressurizer heater usage should be adjusted to maintain pressure control by equilibration of pressurizer heat losses and heater input.

4.3 When Pressurizer Auxiliary Spray is to be used to reduce system pressure, do not exceed 320^{o}F ΔT between auxiliary spray and pressurizer temperature. Maintain normal letdown to provide reheating for charging flow used for auxiliary spray. If letdown is not in service, consideration should be given to depressurizing the Reactor Coolant System by intermittently opening the pressurizer PORV's, however, auxiliary spray is preferable.

4.4 Component cooling to the Reactor Coolant Pumps must be supplied any time a Reactor Coolant Pump is operating and must not be terminated to an idle pump until the reactor cycle has been cooled to the Cold Shutdown condition (<200^{o}F)

5.0 CHECK-OFF LISTS

5.1 None

6.0 INSTRUCTIONS

6.1 Recovery and initial stabilization of the Plant following loss of forced reactor coolant flow.

NOTE: If reactor coolant forced circulation is lost and a reactor/turbine trip is initiated, refer to S01-1.1-1, "Emergency Shutdown" for inital plant stabilization. If the loss of flow is due to a station loss of power, refer to S01-1.7-1, "Loss of Off-Site Power" for inital plant stabilization

6.1.1 Manually trip the reactor, if it is critical or subcritial with control rods partly withdrawn.

.1 Verify reactor subcritical condition.

.2 Verify all control rods are fully inserted.

NOTE: If two or more control rods are known to be not fully inserted, begin an emergency boration as per S01-1.1-2 "Emergency Boration".

6.0 INSTRUCTIONS (continued)

6.1 (continued)

6.1.2 Verify or manually trip the turbine.

6.1.3 Align the plant secondary systems to maintain constant main steam pressure:

.1 Verify or set the Steam Dump Controller, PC-418A, in automatic set at ~935 psig.

.2 Verify or place the Steam Dump Pressure Control switch in the PRESSURE CONTROL-ATMOSPHERE and CONDENSER position.

.3 Observe the condenser steam dump valve position lights and PC-418A controller output indicating automatic actuation of atmospheric and/or condenser steam dump.

6.1.4 Verify or start the electric and turbine driven auxiliary feedwater pumps.

.1 Verify auxiliary feedwater flow indication to all three steam generators.

.2 Verify steam generator levels are recovering.

NOTE: Refer to Reference 2.1 or 2.2, as applicable, for operation of the emergency and/or normal auxiliary feedwater system.

6.1.5 When steam generator water level has been recovered and is at or above 26% level on the narrow range indicators:

.1 Stop all operating main feedwater pumps if running.

.2 Close MOV-20, 21, and 22, main feedwater isolation valves if open.

6.1.6 Control auxiliary feedwater flow to all steam generators to obtain and maintain ~50% level on the narrow range instruments.

NOTE: If at least one reactor coolant pump becomes available during the performance of the following actions, the pump may be restarted; in this event, revert to applicable normal or emergency operating instructions.

6.0 INSTRUCTIONS (continued)

6.2 Establishing conditions to support and enhance natural circulation.

6.2.1 Terminate any dilution operation which may have been in progress at the time of the loss of forced reactor coolant flow.

6.2.2 Establish stable pressurizer pressure between 2035 psig and 2120 psig by operation of the control and backup pressurizer heaters.

CAUTION: Normal pressure reduction by pressurizer spray valve actuation will not be possible with Reactor Coolant Pumps off. To minimize pressure transients, operate only those heaters necessary for stable control.

.1 If the termination of a plant up-pressure transient exceeding 2120 psig is necessary, utilize auxiliary spray to the pressurizer to effect the desired pressure reduction.

NOTE: Do not reduce system pressure below 2000 psig.

6.2.3 Establish and maintain pressurizer level at ~25% through use of either manual charging flow control or automatic pressurizer level control with LC-430F in the MAN-SET mode.

NOTE: Pressurizer level may vary unnecessarily if LC-430F is maintained in automatic using T avg as the reference set point due to T avg being a decreasing variable while in a constant steam decay heat removal mode of operation.

6.2.4 Confirm the continued effectiveness of the natural circulation heat removal process by observing the following:

.1 Steam release is occurring from the steam generators and is effective in maintaining essentially constant steam pressure.

.2 Core exit thermocouple readings (average) indicate a value substantially less than saturation temperature for the immediate pressurizer pressure. Trending of core coolant exit temperature (using averaged readings taken at 10-15 minute intervals) should verify that this parameter has been stabilized and begins to decrease as core decay heat output decreases.

6.0 INSTRUCTIONS (continued)

6.2 (continued)

NOTE: To provide trending information on the parameters of importance (T_H and core coolant exit temperatures) readings should be over a relatively long period (3-4 sets of readings at ∿15 minute consecutive intervals) and should agree if the reactor coolant system is in a stable free convection operating mode.

NOTE: For a printed TC map or a continuous digital readout of the termocouples, see Operating Instruction S01-4-21, "Core Monitoring System Operation".

.3 Cold leg temperature in all active loops should stabilize in a temperature band near saturation temperature for the steam pressure being maintained i.e., for ∿935 psig, cold leg temperature should be ∿535°F.

NOTE: Loop T-cold readings in active loops are quite sensitive to changes in heat transfer rates from the primary to the secondary side of the steam generator. They will follow almost exactly (in trends, not quantitatively) main steam pressure variations, with minimal time lag.

.4 With a constant steam pressure being maintained, hot leg temperatures in all active loops should slowly decrease as core decay heat decreases. The observed ΔT across each active loop should (within limits of combined loop temperature instrument error) be no greater than 45°F and should be in the 15-25°F range.

NOTE: The observed Loop temperatures and temperature differences (T_H, T_C, ΔT) can be expected to vary from loop-to-loop and may deviate at any single observation. Only the trended values of these parameters should be utilized to infer the continued existence of natural circulation flow within the Reactor Coolant System. Adequate core cooling is verified by use of the averaged reading of all available Core Coolant Exit Termocouples.

6.0 INSTRUCTIONS (continued)

6.2 (continued)

.5 If core coolant exit thermocouples are observed to increase for 3 successive measurement intervals (30-45 minute time span), natural circulation flow may be insufficient to remove the total decay heat input. To obtain greater natural circulation flow:

.5.1 Reset the steam pump controller, PC-418A, to a lower pressure.

.5.2 Verify correct response of coolant temperature as noted in steps 6.2.4.1 thru 6.2.4.4.

NOTE: The decrease in temperature around the system due to a decrease in steam pressure will occur relatively slowly. It is expected that equilibrium conditions will not be reattained for 20-30 minutes following a control action of this sort.

6.2.5 Borate the reactor coolant system as necessary to maintain the required shutdown reactivity margin in accord with Operating Instruction S01-4-13, "RCS Boration and Dilution System", and S01-12.9-2, "Determination of Just Critical Rod Position and Reactor Shutdown Margin". If possible, a slower rate of boration is preferable over a rapid boration in order to enhance boron distribution and natural circulation.

6.2.6 Following the boration operation, determine the boron concertration in each location listed below by means of direct coolant sampling, in order to determine boron distribution within the reactor coolant system:

.1 All Loops with Sample Connections.

.2 Pressurizer Liquid Volume.

.3 Letdown Line.

NOTE: The Pressurizer Liquid Boron Concentration will remain at or near the Original Coolant Boron Concentratioon prior to the loss of forced flow event. The boron concentrations measured in the RCS loops and in the letdown line should approach a common value as boron missing in the active portions of the Reactor Coolant System proceeds. The average boron concentration calculated on total coolant system mass must be at least that required to provide the necessary shutdown reactivity margin. The value can be conservatively determined by multiplying the required Cold Shutdown Boron Concentration times 1.25 or more accurately by the equation; RCS C_B Final = 1.22 (Cold Shutdown C_B) - .22 (Pzr. C_B)

6.3 Await the restoration of forced reactor coolant flow capability or proceed with Section B, "Natural Circulation Cooldown" as plant conditions dictate.

6.4 The reactor plant is stable in free convection heat transfer mode when the following conditions are attained.

6.4.1 Pressurizer pressure is maintained above 2000 psig in a desired band between 2035 psig and 2120 psig.

6.4.2 Pressurizer level is maintained at ∿25% level.

6.4.3 Average core coolant exit temperature is being maintained at 600°F or below by steam dump system operation.

6.4.4 Charging flow, letdown flow and RCP seal injection flow are normal.

6.4.5 Auxiliary feedwater system is in normal operation through either the emergency or normal regulators as desired.

6.4.6 Steam generator water level is being maintained above the feedring. The desired control set point is ∿ 50%.

6.4.7 Reactor coolant boron concentration in the active portions of the system is as necessary to provide the required shutdown reactivity margin.

6.4.8 Reactor make-up control is in automatic and set to deliver at the required boron concentration.

7.0 RECORDS

7.1 Not Applicable

8.0 ATTACHMENTS

8.1 Not Applicable

B. NATURAL CIRCULATION COOLDOWN

1.0 OBJECTIVE

1.1 The purpose of this procedure is to provide instructions to cooldown and depressurize the reactor coolant system during a natural circulation condition to the point where RHR can be placed in service.

2.0 REFERENCES

2.1 S01-1.8-1, "Inadequate Core Cooling"

2.2 S01-3-5, "Plant Shutdown From Hot Standby to Cold Shutdown"

2.3 S01-4-9, "Placing The Residual Heat Removal System in Service"

2.4 Westinghouse Abnormal Operating Instructions

2.4.1 A-4, "Station Blackout" instruction series.

2.4.2 A-6, "Plant Operation with Natural Circulation of Reactor Coolant"

3.0 PREREQUISITES

3.1 The reactor is subcritical with the plant in the Hot Standby status

3.2 The following plant systems should be in service or available for service to facilitate a natural circulation cooldown with steam dump to the condenser or atmosphere.

3.2.1 Instrument air system

3.2.2 Steam dump control system.

3.2.3 Component cooling water system.

3.2.4 Salt water cooling system.

3.2.5 Charging and letdown system.

3.2.6 Pressurizer heaters.

3.2.7 Boric acid transfer system.

3.2.8 Reactor coolant make up system.

3.2.9 Circulating water system

3.0 PREREQUISITES (continued)

3.2 (continued)

3.2.10 Condenser air removal system.

3.2.11 Hotwell make-up and drawoff system.

3.2.12 Auxiliary feedwater system.

3.2.13 Primary sampling system.

3.2.14 Control Rod Drive Mechanism cooling units, A-8, A-8S, A-8SS

3.2.15 Power supplies to the above equipment and system components.

CAUTION: This list must not be interpreted as an exclusive equipment requirement for the loss of forced reactor coolant flow condition with condenser or atmospheric steam dump. Normal operation of plant control, protection, safeguards, and surveillance systems, and of any supporting systems necessary to prevent damage to the plant or failure of the listed equipment should be assured.

NOTE: With the above systems less than fully operational the natural circulation cooldown may continue; however, the procedure and cooldown rate should be adjusted accordingly.

3.3 The secondary plant is aligned to maintain constant main steam pressure as follows:

3.3.1 Steam Dump Controller in Automatic, set for ~ 930 psig.

3.3.2 Steam Dump Control Mode Selector Switch is in the PRESSURE CONTROL - ATMOSPHERE and CONDENSER control position.

3.3.3 The Main or Auxiliary Feedwater System is being used to maintain Steam Generator levels at ~ 50% level as indicated on the Narrow Range Recorders.

3.4 The Reactor Plant is stable in a Natural Circulation Mode with the following conditions obtained:

3.0 PREREQUISITES (continued)

3.4 (continued)

3.4.1 Pressurizer Pressure is being maintained above 2000 psig by operation of the Control and Backup Pressurizer Heaters. The desired Control Band for Reactor Coolant System Pressure is between 2035 psig and 2120 psig.

CAUTION: Normal pressure reduction by Pressurizer Spray Valve actuation will not be possible with Reactor Coolant Pumps off. Pressurizer Heater usage should be adjusted to maintain pressure control by equilibration of Pressurizer, heat losses and Heater input.

3.4.2 Pressurizer level is being maintained above 15% with Charging Flow, Letdown Flow and Reactor Coolant Pump Seal Injection Flow established.

3.4.3 Loop ΔT indication should be greater than 0 but less than the full load ΔT. Immediately following a reactor trip the ΔT should drop to apporoximately 15-25^{o}F.

3.4.4 Core Exit Thermocouples constant or decreasing. For a printed TC map or a continuous digital readout of the Termocouples, see Operating Instruction S01-4-21 "Core Monitoring Systems Operating."

3.4.5 Secondary Side Steam Pressure corresponds approximately to the saturation pressure associated with the Reactor Coolant System T cold.

4.0 PRECAUTIONS AND LIMITATIONS

4.1 During the course of a natural circulation cooldown, adequate core cooling should be verified frequently by insuring the following:

4.1.1 At least 50^{o}F subcooling is maintained on the Reactor Coolant System, except as noted in Precaution 4.4 below.

4.1.2 Core Outlet Thermocouples are stable and decreasing as Reactor Coolant System temperature decreases.

4.1.3 Continued indications of natural circulation and heat removal.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

4.2 The maximum rate of cooldown for the Reactor Coolant System while in the Natural Circulation Mode is 25°F/hr.

4.3 During a natural circulation cooldown the possibility of steam void formation in Reactor Vessel Head exists. This is due to reduced cooling flows in the Reactor Head area which may allow the Vessel Head area temperature reduction to lag with respect to the bulk coolant temperature. The possibility of this void formation can be recognized by uncontrolled and unwarranted pressurizer level variations. This condition can occur even when a high subcooling margin exists in the Reactor Coolant Loops.

4.4 To prevent possible void formation in the upper head the following minimum subcooling should be maintained:

4.4.1 If all Control Rod Drive Mechanism cooling units are in operation, maintain at least 50°F subcooling on the Reactor Coolant System.

4.4.2 If all Control Rod Drive Mechanism cooling units are not in operation:

.1 Maintain RCS pressure at ~2085 psig until RCS temperature is cooled down to 450°F,

.2 Continue the cooldown and initiate a depressuration of the RCS while maintaining a minimum of 200°F indicated subcooling (or the Technical Specification limit for the pressure-temperature relationship if it is more restrictive) until RCS pressure is 1200 pisg,

.3 Cool down the RCS to below 350°F while maintaining 1200 psig. Then wait for approximately 20 hours to allow the upper head to cool off to a temperature less than saturation for 400 psig before continuing with the depressurization.

4.5 Normal pressure reduction by Pressurizer Spray Valve actuation will not be possible with Reactor Coolant Pumps off. Pressurizer Heater usage should be adjusted to maintain pressure control by equilibration of Pressurizer heat losses and heater input.

4.6 When Pressurizer Auxiliary Spray is to be used to reduce system pressure, do not exceed 320°F ΔT between auxiliary spray and pressurizer temperature. Maintain normal letdown to provide reheating for charging flow used for Auxiliary Spray. If letdown is not in service, consideration should be given to depressurizing the Reactor Coolant System by intermittently opening the pressurizer PORV's.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

4.7 The Pressurizer Liquid Boron Concentration will remain at or near the original Coolant Boron Concentration prior to the loss of forced flow. The Boron Concentration required in the RCS for Cold Shutdown must take the lack of mixing with the Pressurizer into account. The averaged boron concentration calculated on total coolant system mass must be at least that required to provide the necessary shutdown reactivity margin. This value can be conservatively determined by multiplying the required Cold Shutdown Boron Concentration times 1.25 or more accurately by the equation; RCS C_B Final = 1.22 (Cold Shutdown C_B) - .22 (Pzr. C_B).

4.8 One shutdown group of Control Rods must be 320 steps withdrawn whenever positive reactivity is being inserted by boron dilution, xenon decay or cooldown. The following two exceptions to this rule may be applied.

1. The Reactor Coolant System has been borated to at least the hot, xenon free, boron concentration and is being maintained at hot standby conditions.

2. The Reactor Coolant System has been borated to the Cold Shutdown Boron Concentration.

4.9 Component cooling to the Reactor Coolant Pumps must be supplied any time a Reactor Coolant Pump is operating and must not be terminated to an idle pump until the reactor coolant has been cooled to the Cold Shutdown condition (<200°F).

4.10 Do not maintain the pressurizer level above 80% unless required for system cooldown or startup operations.

4.11 The Containment Spray System, the Refueling Water Storage Tank, their associated valves and interlocks shall remain operable per Technical Specification 3.3 while above 200°F in the Reactor Coolant System.

4.12 To limit the consequences of a steam line break, establish 4% $\Delta K/K$ shutdown, hot, xenon free, all rods in, prior to removing the safety injection system from service.

5.0 CHECKOFF LISTS

5.1 None

6.0 PROCEDURE

NOTE: If at least one Reactor Coolant Pump becomes available during the performance of the following actions, the pump may be restarted per S01-4-4, "Reactor Coolant Pump Startup". In this event, revert to the normal cooldown operating procedure, S01-3-5, "Plant Shutdown from Hot Standby to Cold Shutdown".

6.1 If the Reactor Coolant System is to be opened for repair or refueling, initiate degassing of the reactor coolant in accordance with Operating Instruction S01-4-8 "Degassing The Reactor Coolant System," while proceding with the remaining steps of this procedure.

6.2 Initiate a Reactor Coolant System Boration to the Cold Shutdown Concentration in accordance with Operating Instructions S01-4-13 and S01-12.9-2. If possible, a slower steady rate of boration is prefered over a rapid boration in order to enhance boron distribution and natural circulation.

6.3 Following the boration operation, determine the boron concentration in each location listed below by means of direct coolant sampling, in order to determine boron distribution within the reactor coolant system:

6.3.1 All Loops with Sample Connections.

6.3.2 Pressurizer Liquid Volume.

6.3.3 Letdown Line.

NOTE: The Pressurizer Liquid Boron Concentration will remain at or near the Original Coolant Boron Concentration prior to the loss of forced flow event. The boron concentrations measured in the RCS loops and in the letdown line should approach a common value as boron mixing in the active portions of the Reactor Coolant System proceeds. The averaged boron concentration calculated on total coolant system mass must be at least that required to provide the necessary shutdown reactivity margin. This value can be conservatively determined by multiplying the required Cold Shutdown Boron Concentration times 1.25 or more accurately by the equation; RCS C_B Final = 1.22 (Cold Shutdown C_B) - .22 (Pzr. C_B).

6.0 PROCEDURE (continued)

6.4 Prepare additional batches of boric acid as required to maintain required Concentrated Boric Acid Inventory in the Boric Acid Storage Tank.

6.5 Maintain the Makeup System in automatic control set for the Cold Shutdown Boron Concentration required in the RCS when considering total coolant system mass. Have boron concentration at blend device verified.

Verify that a normal level in the Volume Control Tank is maintained during the Cooldown, except as required for degassing operations.

6.6 Periodically resample the points in Step 6.3 above to confirm that the intended boron concentration is at the desired value.

6.7 Turn off all Pressurizer Heaters. If TR-430 Presssurizer Temperature Recorder is not in service, log pressurizer liquid and RCS liquid temperatures and pressure every 30 minutes on the page provided in Reference 2.2, until Cold Shutdown Condition is reached.

6.8 During the natural circulation phase of the cooldown note Reactor Head temperature displayed behind the Control Boards every 15 minutes, and verify it is decreasing as the Reactor Coolant System temperatures decrease. If it is noted that the Reactor Head temperature stops decreasing over a period of three readings, reduce the RCS cooldown rate to allow the Reactor Head area additional time to cool down with the system.

6.9 Begin cooldown of the Reactor Coolant System. The maximum rate is 25°F per hour. Adjust Steam Dump Controller 418A to slowly establish and increase the dumping rate. Periodically reset Steam Dump Control to continue the cooldown rate.

CAUTION: Maintain >50°F Subcooling during all phases of the Natural Circulation Cooldown, except as noted in Precaution 4.4.

CAUTION: Do not exceed a cooldown rate or the pressure temperature limit as shown on the pressure temperature curve provided in Reference 2.2.

6.0 PROCEDURE (continued)

6.10 To prevent possible void formation in the upper head the following minimum subcooling should be maintained:

6.10.1 If all Control Rod Drive Mechanism cooling units are in operation, maintain at least 50°F subcooling on the Reactor System.

6.10.2 If all Control Rod Drive Mechanism cooling units are not in operation:

.1 Maintain RCS pressure at ∿2085 psig until RCS temperature is cooled down to 450°F.

.2 Continue the cooldown and initiate a depressurization of the RCS while maintaining a minimum of 200°F indicated subcooling (or the Technical Specification limit from the pressure-temperature relationship if it is more restrictive) until RCS pressure is 1200 psig.

.3 Cooldown the RCS to below 350°F while maintaining 1200 psig. Then wait for approximately 20 hours to allow the upper head to cool off to a temperature less than saturation for 400 psig before continuing with the depressurization.

6.11 During the natural circulation phase of the Cooldown, monitor plant status for signs of the possibility of steam void formation in the Reactor Vessel Head. If it is suspected that a void has formed take the following action.

6.11.1 Terminate RCS cooldown. Maintain steady RCS temperature.

6.11.2 Terminate any RCS depressurization operation which may be taking place, such as auxiliary spray to Pressurizer or Pressurizer PORV operation.

6.11.3 Verify Pressurizer liquid level is above the no load value of 15% and establish Pressurizer Heaters.

6.11.4 Monitor natural circulation and verify adequate Core cooling and heat removal from the RCS. See Emergency Operating Instruction S01-1.8-1, if inadequate core cooling is suspected.

6.0 PROCEDURE (continued)

6.11 (continued)

6.11.5 Allow Pressurizer temperature to increase and thus increase RCS pressure until system pressure control is again from the Pressurizer and the steam void in the Vessel Head has been collapsed.

6.11.6 Hold steady state natural circulation conditions maintaining RCS pressure steady by Pressurizer Heater operation. Monitor Reactor Head temperature to verify it decreases as it cools toward the bulk RCS temperature.

6.11.7 When RCS conditions are stable, Pressurizer Heaters may be turned off and the cooldown continued, but it should be at a reduced rate to avoid additional void formations.

6.11.8 Continue to monitor for steam void formations as operation continues with the procedure.

6.12 Monitor the Reactor Coolant Outlet temperature (Core Exit T/C) to verify that the Reactor Coolant is being cooled at the desired rate by the discharge of steam from the Steam Generators and that the subcooling of the Reactor Coolant (as determined by wide range pressure and Core Exit T/C) is increasing.

NOTE: The observed Loop temperatures and temperature differences (T_H, T_C, ΔT) can be expected to vary from loop-to-loop and may deviate at single observation. Only the trended values of these parameters should be utilized to infer the continued existence of natural circulation flow within the Reactor Coolant System. Adequate core cooling is verified by use of the averaged reading of all Core Coolant Exit Thermocouples.

NOTE: After the Natural Circulation Cooldown has been established the Reactor Coolant Outlet temperature should trend down with the decreasing steam pressure. If the Reactor Coolant Outlet temperature stops trending down with the steam pressure, decrease or stop the Steam Dump Operation and allow the natural circulation to reestablish itself before continuing the Cooldown Operation.

6.0 PROCEDURE (continued)

6.13 Manually block the Safety Injection Actuation Circuit when the alert to block Safety Injection Alarm is received or when pressure is approximately 1750 psig.

6.14 As Cooldown progresses, maintain the Pressurizer liquid as high as possible but less than 90% level. This promotes better cooling of the metal in the upper steam space.

6.15 Periodically open the Pressurizer Auxiliary Spray Valve to cooldown and depressurize the Pressurizer.

CAUTION: Maintain a 50°F subcooling margin during the Depressurization, except as required by Precaution 4.4. If the subcooling margin cannot be maintained, stop the Cooldown and depressurization, and reestablish subcooling.

CAUTION: Maintain normal letdown to provide reheating for charging flow used for auxiliary spray. Do not exceed 320°F WT betwen Auxiliary Spray and Pressurizer temperature. If letdown is not in service or auxiliary spray is not effective, consideration should be given to depressurizing by intermittently opening the Pressurizer PORV's. Monitor Pressurizer Relief Tank integrity if the PORV's are used. Verify PORV closure using the Stem-Mounted Position Indicators. If a PORV fails to close, close the PORV Isolation Valve(s).

6.16 As the Reactor Coolant Pressure is decreased, the Letdown Flow Rate will decrease. Open additional Letdown Orifice Isolation Valves, and/or reset the Low Pressure Letdown Control Valve, to maintain a maximum Letdown Flow Rate.

6.17 At 500 psig, establish two positive barriers between the Feedwater and Reactor Coolant System per Operating Instruction S01-4-17.

6.18 When system pressure decreases to 400 psig, arm the OMS by operating PORV-545 and PORV-546 OMS Lo Pressure Set Point switch to the ENABLE postion.

6.19 When the Reactor Coolant Pressure decreased to 400 psig, start preliminary alignment of the Residual Heat Removal System. See Operating Instructions S01-4-9.

6.20 Place the Residual Heat Removal Loop in service in accordance with Operating Instruction S01-4-9.

NOTE: If any of the Residual Heat Removal Pump or Heat Exchangers are not operable, maintain at lease one Steam Generator operable for Decay Heat Removal.

6.0 PROCEDURE (continued)

6.21 Following the placing of the RHR system in service the normal Cooldown instruction, Operating Instruction S01-3-5, may be used to continue with the Cooldown except that steam dump should be maintained as long as it is effective to aid in cooling the Steam Generators.

7.0 RECORDS

7.1 Readings of the Pressurizer Liquid and RCS Liquid temperatures and pressure, if required, should be filed in the Ontage Package for the Shutdown.

8.0 ATTACHMENTS

8.1 None.

R.R. Brunet

R.R. BRUNET
SUPERINTENDENT, UNIT 1

Approved:

J.M. Curran

J. M. CURRAN,
PLANT MANAGER

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