ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

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GINNA STATION
UNIT #1
COMPLETED

DATE :

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PROCEDURE NO. E-1.3 REV. NO. 7

LOSS OF SECONDARY COOLANT

TECHNICAL REVIEW

PORC 12/3/79

J C Bodine
O/C REVIEW

12-3-79
DATE

APPROVED FOR USE

for J C Moon
PLANT SUPERINTENDENT

12-3-79
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E-1.3

LOSS OF SECONDARY COOLANT

1.0 SYMPTOMS:

1.1 Refer to Section 1.0 of E-1.1, if not already performed.

2.0 IMMEDIATE OPERATOR ACTIONS:

2.1 Refer to Section 2.0 of E-1.1, if not already performed.

2.2 Verify the actuation of steamline isolation. If not actuated, manually initiate steamline isolation on both S/G's.

3.0 SUBSEQUENT OPERATOR ACTIONS:

CAUTION: The diesels should not be operated at idle or minimum load for extended periods of time. If the diesels are shut down, they should be prepared for restart.

NOTE: The process variables referred to in this Instruction are typically monitored by more than one instrumentation channel. The redundant channels should be checked for consistency while performing the steps of this Instruction.

CAUTION: Do not rely upon S/G or Pressurizer level indication after any event where a high energy line break has occurred inside of containment. An erroneous level indication will be caused by reference leg heatup and possible boiling as a result of increased CV temperature and/or changes in S/G or pressurizer pressures. Basis for this is shown in Tables 1-4 and Figures 1-4 attached.

If S/G and pressurizer levels are maintained between 85% and 25%, this will ensure an actual water level is present.

NOTE: The pressurizer water level indication should always be used in conjunction with other specified reactor coolant system indications to evaluate system conditions and to initiate manual operator actions.

3.1 If reactor coolant pressure is above the RHR Pump shut-off head, manually reset safety injection after MOV 825A or 825B SI Pump suction from RWST is open so that safeguards equipment can be controlled by manual action. Ensure that containment isolation is maintained. Stop the RHR Pumps and place in the standby mode.

CAUTION: Whenever the wide range reactor coolant pressure decreases below the RHR shutoff head, the RHR pumps should be manually restarted to deliver fluid to the reactor coolant system.

CAUTION: Subsequent to this Step, should loss of offsite power occur, manual safety injection initiation will be required to load the safeguards equipment onto the diesel powered emergency busses.

3.2 Stop all reactor coolant pumps after high head safety injection pump operation has been verified and when the narrow range reactor coolant pressure is at 1715 psig.

CAUTION: If the reactor coolant pumps are stopped, the seal injection flow should be maintained if possible.

NOTE: The conditions given above for stopping reactor coolant pumps should be continuously monitored throughout this instruction.

3.3 Determine which steam generator is affected by observing the individual steamline pressures. A low steamline pressure compared to the others denotes the faulted loop; terminate auxiliary feedwater to that steam generator and close and pull stop the turbine driven steam supply valve from that S/G.

NOTE: If no loop has a low steamline pressure compared to the others and all steamlines have been isolated, determine if a break has occurred in the steamline, in the main feedline or in any piping system that connects with the secondary pressure boundary. If no indication of a break in the pressure boundary is found, go to Section 3.0 of E-1.1 and re-evaluate the accident with particular emphasis on the Loss of Reactor Coolant. If a leak from the secondary systems if found, continue to follow these instructions.

3.4 Regulate the auxiliary feedwater flow to the good steam generator to restore and/or maintain an indicated narrow range steam generator water level of 25%, sufficient to assure that the steam generator tubes are covered. If water level increases in an unexplained manner in one steam generator, go to E-1.4, Steam Generator Tube Rupture.

NOTE: Monitor the primary water supply (Condensate Storage Tank) for the auxiliary feedwater pumps and upon reaching a low level, switch over to an alternate water supply source (per procedure T-41E).

3.5 Monitor Refueling Water Storage Tank level

3.5.1 If containment spray has been actuated, and if the containment pressure is reduced to a value below 30 psig, the containment spray actuation pressure, reset containment spray. Spray pumps should be shut off and placed in the standby mode with operable flow paths.

3.5.2 If a low Refueling Water Storage Tank level alarm is reached while the containment spray pumps are still running, stop 1 spray pump if 2 running. Spray pumps should be realigned to the recirculation mode per E-1.2.

.5.3 The safety injection pumps should remain aligned to the Refueling Water Storage Tank. If the Refueling Water Storage Tank low-low level alarm of 10% is reached stop all operating SI, RHR and Spray Pumps, reset safety injection if not done previously. Realign the safety injection pumps to the cold leg recirculation mode and spray pumps to the recirc mode if needed using procedure E-1.2.

NOTE: If the reactor coolant system pressure is above the shutoff head of the high head safety injection pumps, do not attempt to start pumps in recirc mode unless RCS pressure drops below their shutoff head as the pumps have no recirc in the recirculation mode.

3.6 IF

NOTE: The conditions given below for termination of safety injection should be continuously monitored throughout this instruction.

3.6.1 Any wide range reactor coolant temperature T_C is less than 350°F, AND

3.6.2 Wide range reactor coolant pressure is greater than 700 psig and is stable or increasing AND

3.6.3 Pressurizer water level is greater than 25% of span and rising (heaters covered) AND

3.6.4 The reactor coolant indicated subcooling is greater than 50°F per subcooling meters.

NOTE: As a backup to the subcooling meters, the average of thermocouples (points 11,15,18,19 & 20) may be used with pressurizer pressure and the attached saturation curve to verify 50°F subcooling.

3.6.5 Stop all safety injection pumps and place in the standby mode and maintain operable flow paths.

3.6.6 If wide range reactor coolant pressure decreases more than 200 psi or pressurizer water level decreases by 10% of span following termination of safety injection or the RCS subcooling is less than 50°F, MANUALLY REINITIATE safety injection pump operation to maintain reactor coolant pressure and pressurizer water level. Go to Section 3.0 of E-1.1 to reevaluate the event.

3.6.7 If all wide range reactor coolant temperature T_C indicators go above 350°F when attempting to satisfy the conditions of 3.6.1 thru 3.6.4, initiate safety injection pump operation and continue operation until conditions of 3.7 are satisfied.

3.6.8 If steps 3.6.6 and 3.6.7 do not apply go to step 3.10

3.7 IF

3.7.1 All wide range reactor temperature T_C are greater than 350°F, AND

3.7.2 Reactor coolant pressue is above the shutoff head of the safety injection pumps, AND

3.7.3 Safety injection flow to the Reactor Coolant System is zero,

3.7.4 THEN attempt to reestablish the reactor coolant pressure to greater than 2000 psig and pressurizer water level to greater than 50% of span by

3.7.4.1 Resetting safety injection, and

3.7.4.2 Establishing full charging flow.

CAUTION: Ensure that water addition during this process does not result in dilution of the reactor coolant system water.

3.8.1 IF All wide range coolant temperature T_C are greater than 350°F, AND

3.8.2 Wide range reactor coolant pressure is greater than 2000 psig and is stable or increasing, AND

3.8.3 Water level in at least one steam generator is $\geq$ 25% in the narrow range span AND

3.8.4 Pressurizer water level is greater than 50 percent of span, AND

3.8.5 The reactor coolant indicated subcooling is greater than 50°F per subcooling meters

NOTE: As a backup to the subcooling meters the average of thermocouples (points 11,15,18,19 & 20) may be used with pressurizer pressure and the attached saturation curve to verify 50°F subcooling.

THEN go to Step 3.9

3.9 Stop all safety injection pumps and place in the standby mode and maintain operable safety injection flowpaths.

CAUTION: If wide range reactor coolant pressure drops below the safety injection actuation pressure 1715 psig span following termination of safety injection or RCS subcooling < 50°F MANUALLY REINITIATE safety injection pump operation to maintain reactor coolant pressure to a nominal value of 2000 psig and pressurizer water level to a nominal value of 50 percent of span. Go to Section 3.0 of E-1.1 to reevaluate the event.

3.10 Reset containment isolation by performing the following:

3.10.1 Place CV Sump A pumps in pull-stop position

3.10.2 Place all containment isolation (T signal) valve switched in the closed position and manually reset containment isolation by use of key switch. (Refer to Automatic Actions in Section 4 of E-1.1 for Containment Isolation Valve numbers)

3.10.3 If outside power has been lost, close bus tie breaker 14 to 13 and/or 16 to 15 and restart instrument Air Containment Compressors as necessary.

3.10.4 Open the Instrument Air Containment Isolation valve.

NOTE: Upon loss of instrument air operation of the pressurizer PORV's using the RCS overpressurization Nitrogen system can be achieved if

1). RCS pressure is $\geq$ 435 psig and
2). There is $\geq$ 200 psig of Nitrogen available from overpressurization storage tanks (normally at aproximately 700 psig)

are satisfied.

CAUTION: One operator will have to be on the back of the board turning key switches as instructed below while another operator is watching pressure indication from the front of the control board.

To open PCV 431C:

1). Turn "PC 431 SV8619B" to Arm
2). Turn "Surge TK V802B SV8616B" to open

To open PCV 430:

1). Turn "PC430 SV8619A" to Arm.
2). Turn "Surge TK V802A SV8616A" to open.

These steps will open respective PORV until 1 of the 2 valves in the train is closed.

If Nitrogen supply runs low, tanks can be refilled using procedure S29.2. This will require reset of CV isolation.

3.10.5 If outside power is lost restore service water to the operating component cooling water heat exchangers and Turbine Building. Start one component cooling water pump and restore MCC 1C and 1D by resetting relays at the respective motor control centers.

3.10.6 Use the pressurizer PORV's for pressure control if necessary.

3.11 Re-establish normal makeup to maintain pressurizer level in the normal operating range and to maintain system pressure;

3.11.1 at values reached when safety injection was terminated at ($T_C \leq 350°F$)

OR

3.11.2 to a nominal value of 2000 psig ($T_C \geq 350°F$).

CAUTION: Ensure that water addition during this process does not result in dilution of the reactor coolant system boron concentration.

3.12 Reestablish operation of the pressurizer heaters (refer to o-8.1, "Restoration of pressurizer heaters to maintain natural circulation at HSD" if no RCP's are running) after verification of sufficient pressurizer level 50% to assure coverage of the pressurizer heaters, an alternate means would be to compare pressurizer surge line, water space, and vapor space temperatures. When system pressure can be controlled by pressurizer heaters, and containment temperatures are low enough to assure proper operation of control systems, restore normal pressurizer level control.

3.13 Monitor either the subcooling meters or the average temperature indication of core exit thermocouples (Points 11,15,18,19, & 20) to verify that RCS temperature is at least 50°F less than saturation temperature at RCS indicated pressure per attached saturation curve.

3.14 If 50°F indicated subcooling is not present, then attempt to establish 50°F indicated subcooling by steam dump from the steam generator to the condenser or the atmosphere.

CAUTION: If steam dump is necessary, reduce the steam generator pressure at least 200 psi below the lowest steam safety valve setpoint and maintain a reactor coolant cooldown rate of no more than 50°F/HR, consistent with plant make-up capability.

3.15 Steam dump should be initiated in the following manner to stabilize reactor coolant system temperature:

3.15.1 Establish a flow path in at least one steamline in an intact loop (if possible) IF the main condensor is available and IF an uncontrolled steam release is not reinitiated upon opening the MSIV. Transfer the steam dump system to steam header pressure control. Set the steam header pressure control setpoint to the pressure in the intact steam generator(s) at the time safety injection was terminated.

OR

3.15.2 IF all steamline stop valves are CLOSED and cannot be reopened, the main condenser is not available, or the rupture is downstream of the main steamline isolation valves, dump steam to the atmosphere from the intact loop using the steam generator power operated relief valve. Set steam generator power operated relief valve pressure control setpoint to the pressure in the intact steam generator at the time safety injection was terminated.

If 50°F indicated subcooling cannot be established or maintained, then manually reinitiate safety injection. Go to Section 3.0 of E-1.1 to reevaluate the event.

3.16 When the reactor coolant temperature and pressure are stable, borate the reactor coolant system to cold shutdown conditions and verify by sampling.

3.17 After offsite power is available if lost, establish the auxiliary systems necessary for a controlled cooldown to cold shut-down. If offsite power is available and all reactor coolant pumps are stopped, restart at least one reactor coolant pump in the intact loop for cooldown purposes in accordance with procedures. Maintain subcooled conditions in the reactor coolant system consistent with the normal cooldown curve. If these subcooled conditions cannot be maintained, restart safety injection pumps.

NOTE: If there is significant radioactivity in the intact steam generator's secondary side due to tube leaks and steam is being dumped to the atmosphere, begin cooldown and depressurization of the reactor coolant system to limit the release of radioactivity to the environs.

NOTE: Safety injection pump operation should be reinitiated if an uncontrolled reactor coolant system depressurization or an uncontrolled drop in pressurizer water level occurs during the cooldown process. These criteria apply in lieu of those given in Step 3.6.

3.18 After establishing operation of auxiliary systems, initiate a controlled cooldown and depressurization to cold shutdown conditions using Normal Cooldown Procedures.

NOTE: Safety Injection should be reinitiated if an uncontrolled reactor coolant system depressurization or an uncontrolled drop in pressurizer water level occurs during the cooldown process. These criteria apply in lieu of those given in 3.6.

NOTE: During the controlled cooldown, the reactor coolant system pressure will decrease below 1715 psig. Tripping the operating reactor coolant pump due to the pressure criteria of Step 3.2 is not required. Other criteria of Step 3.2 are still applicable at this time.

3.19 Recovery procedures for the particular event must be developed and implemented to effect plant return to service.

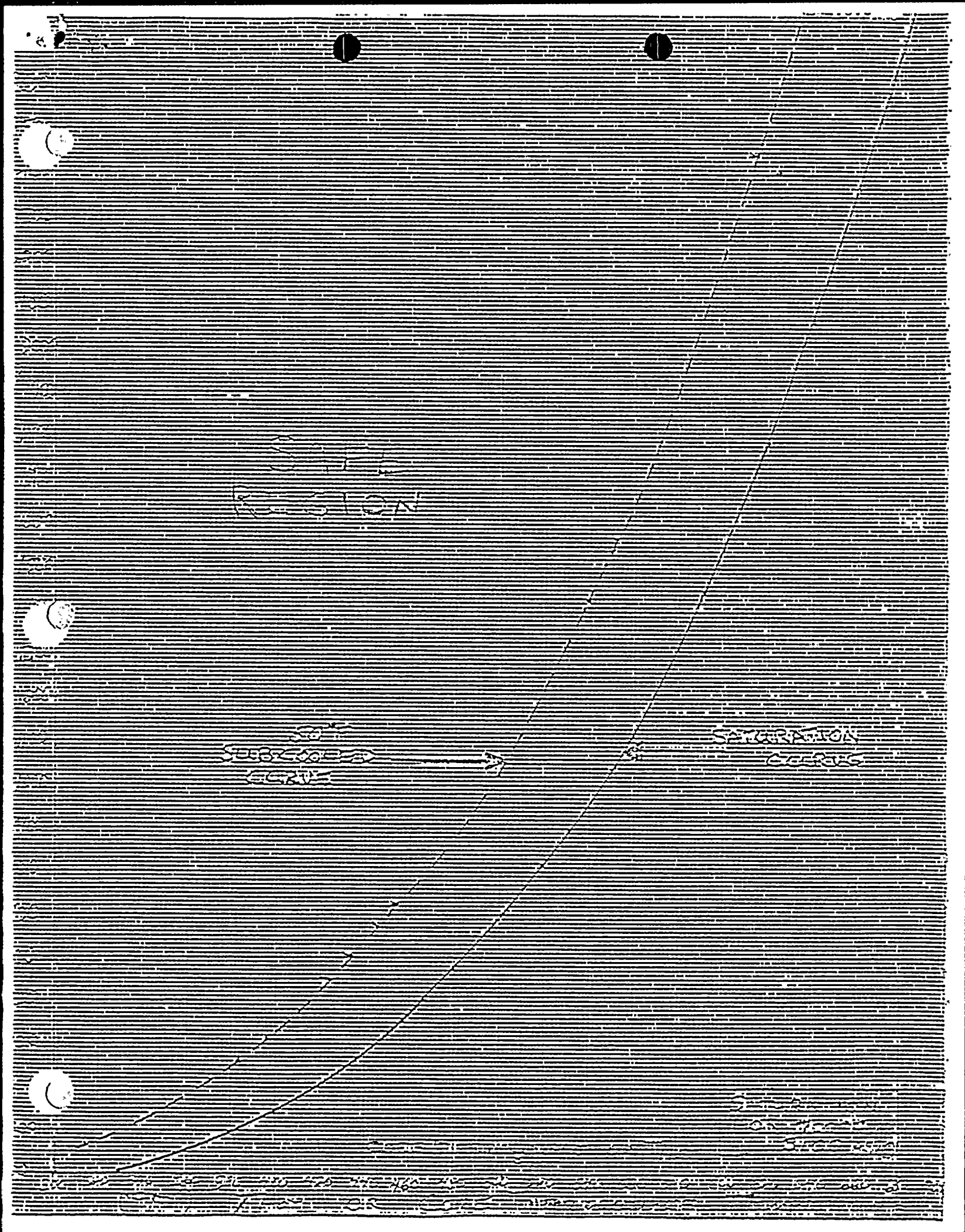

Table 1

Correction to indicated Steam Generator Water level for Reference Leg Heatup effects due to post-accident containment temperature (before reactor trip)

Maximum Containment temperature reached before reactor trip, °F	Correction to S/G Level % of Span
90°	0%
150°	2%
200°	5%
250°	8%
300°	12%
350°	16%
400°	21%

Basis:

Level Calibration Pressure $\leq$ 1000 Psia
Reference Leg calibration temperature $\geq$ 90°F
Height of Reference Leg $\leq$ 1.1 x Level Span

Table 2

Corrections to allowable indicated Steam Generator water level for Reference Leg Heatup and Pressure changes following a high-energy line break, to assure that true level is between the level taps

Containment temperature °F	Correction to Minimum allowed Indicated Level % of Span	Correction to Maximum allowed Indicated Level % of Span
90°	+ 1	-4
150°	+ 3	-4
200°	+ 6	-4
250°	+ 9	-4
300°	+13	-4
350°	+17	-4
400°	+22	-4

Basis:

Level calibration Pressure $\leq$ 1000 Psia
Reference Leg Calibration Temperature $\geq$ 90°F
Height of Reference Leg $\leq$ 1.1 x Level Span
Pressure $\geq$ 50 Psia
Pressure $\leq$ 200 Psi + Calibration Pressure

Boiling in the Reference Leg is not assumed.

Table 3

Correction to indicated Pressurizer water level for Reference Leg Heatup effects due to post-accident containment temperature

Maximum Containment temperature reached °F	Correction to Pressurizer Level % of Span
90°	0%
150°	3%
200°	7%
250°	12%
300°	17%
350°	23%
400°	30%

Basis:

Level Calibration Pressure = 2250 Psia
Reference Leg Calibration Temperature > 90°F
Height of Reference Leg ≤ 1.1 x Level Span

Table 4

Corrections to allowable indicated Pressurizer water level for Reference Leg Heatup and Pressure changes following a high-energy line break, to assure that true level is between the level taps

Containment temperature °F	Correction to Minimum allowed Indicated Level % of Span	Correction to Maximum allowed Indicated Level % of Span
90°	+ 6	-9
150°	+ 9	-9
200°	+13	-9
250°	+18	-9
300°	+23	-9
350°	+29	-9
400°	+36	-9

Basis:

Level Calibration Pressure = 2250 Psia
Reference Leg Calibration Temperature $\geq$ 90°F
Height of Reference Leg $\leq$ 1.1 x Level Span
Pressure $\geq$ 100 Psia
Pressure $\leq$ 350 Psi + Calibration Pressure

Boiling in reference Leg is not assumed.

Figure 1
Bias Due to Steam Generator Reference Leg Heatup
Masis Weight of Reference Leg 1000 lbs
Calibration at 90°F

Reference Leg Temperature, °F

Percent of Level Span

Correction for Reference Leg Heatup

Figure 2

Bias Due to Pressurizer Reference Leg Heatup

Basis: Height of Reference Leg = 1.1 x Level Span
Calibration at 90°F, 2250 Psia

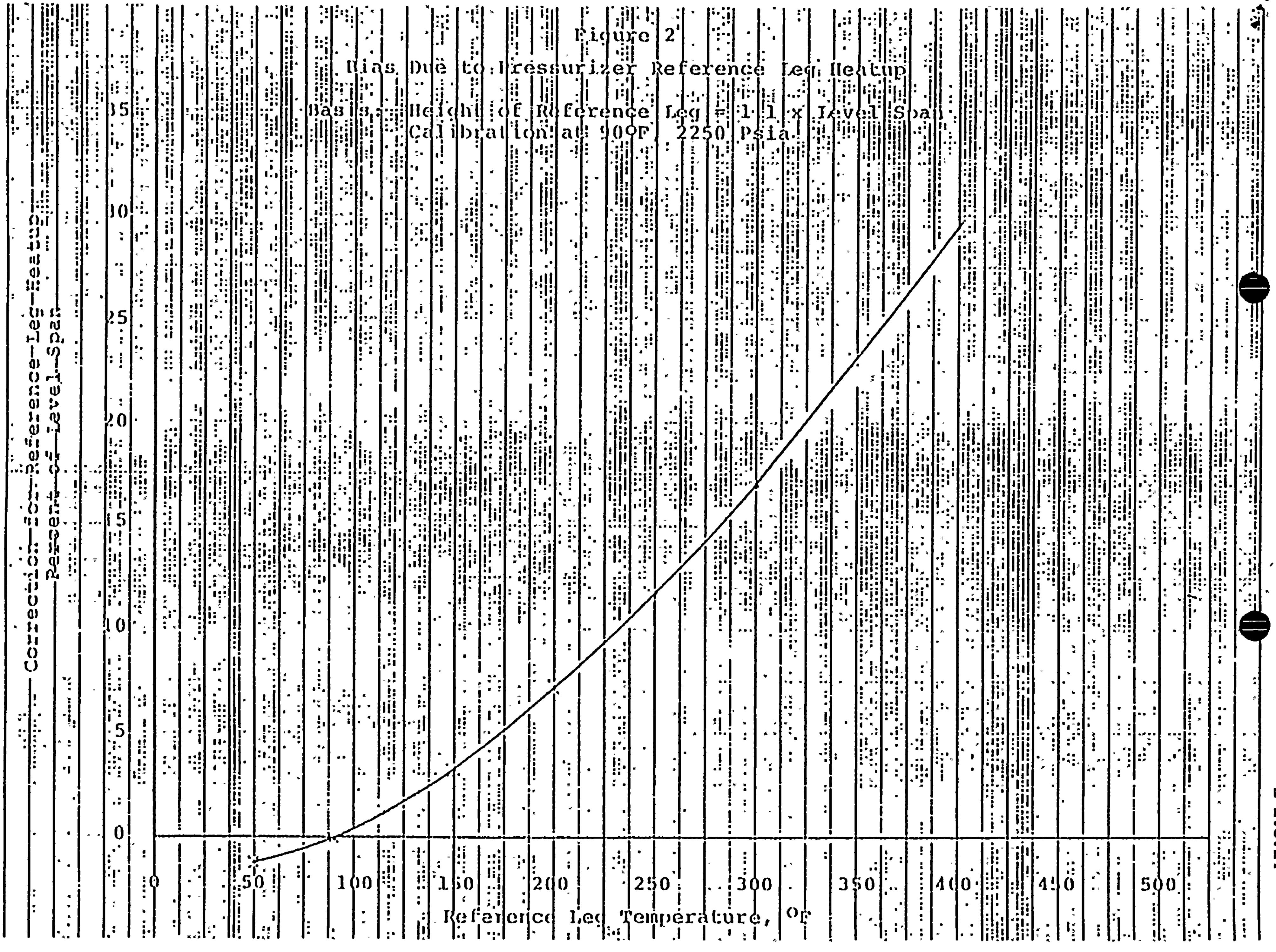

Figure 3

Bias Due to Steam Generator Pressure Change

Basis: Height of Reference Leg = 1.1 x Level Span
Calibration at 90°F, 1000 Psia

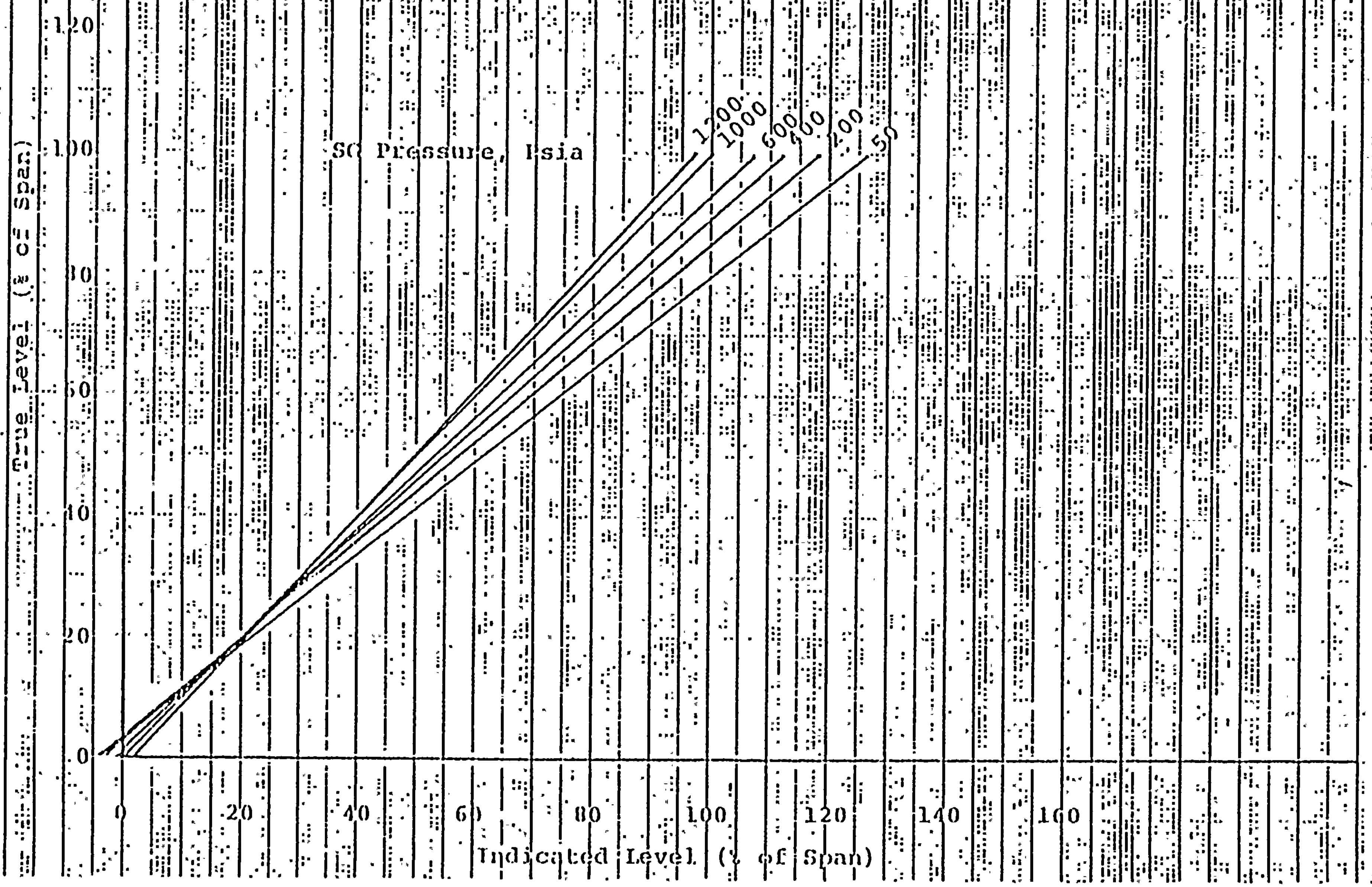

Figure 4

Bias Due to Pressurizer Pressure Change

Basis: Weight of Reference Leg = 1 1 x Level Span
Calibration at 90°F, 2250 Psia