NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

DOCKET NUMBER 50-250/251

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TO: Mr G Lear

FROM: Florida Power & Light Co
Miami, Fla
R E Uhrig

DATE OF DOCUMENT 3-1-77

DATE RECEIVED 3-7-77

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DESCRIPTION

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REACTOR VESSEL OVERPRESSURIZATION
DISTRIBUTION PER G. ZECH 10-21-76

PLANT NAME: Turkey Pt 3 & 4

ENCLOSURE

Response to our 1-12-77 ltr....furnishing addl info re reactor vessel overpressurization....

10p

SAFETY — FOR ACTION/INFORMATION — 3-7-77 ehf

BRANCH CHIEF: (5)	Lear		
LIC. ASST:	Elliot		
PROJECT MANAGER:	Parrish		

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P. O. BOX 013100, MIAMI, FL 33101

FLORIDA POWER & LIGHT COMPANY

March 1, 1977
L-77-74

Office of Nuclear Reactor Regulation
Attn: George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Lear:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Overpressurization Issue

Your letter of January 12, 1977, requested that Florida Power & Light Company (1) identify the manner in which we plan to implement additional overpressure protection; and (2) supply additional information on interim measures being used to reduce the likelihood of overpressurization events.

The hardware improvements we plan to make to preclude exceeding the limits of Appendix G to 10 CFR Part 50, including a schedule for implementation, are described in Attachment A.

Our response to your request for additional information is contained in Attachment B. The procedural and administrative measures described therein will be continued wherever practical after long-term hardware improvements have been made.

Very truly yours,

Robert E. Uhrig
Vice President

REU/MAS/hlc
Attachments (2)

cc: Norman C. Moseley, Region II
Robert Lowenstein, Esq.

2428

ATTACHMENT A

TURKEY POINT UNITS 3 and 4
DOCKET NOS. 50-250 and 50-251
OVERPRESSURIZATION ISSUE

I. FPL PROPOSED OVERPRESSURE MITIGATING SYSTEM

Our proposed "Overpressure Mitigating System" is an extension of the "Reference Mitigating System" included in our December 10, 1976, submittal. Additional features have been included to be responsive to the design criteria proposed at the November 4, 1976, meeting between the NRC staff and utility representatives.

II. SYSTEM DESCRIPTION

The power operated relief valves, equipped with a low setpoint feature, will be used as the pressure relieving mechanism. The low setpoint feature is energized and de-energized by the operator by use of an administratively controlled key-lock switch in the control room. The pressure signal for the Overpressure Mitigating System will be obtained from redundant wide range pressure transmitters - the same transmitters that control the RHR suction valve interlocks. An interlock with reactor coolant temperature is included to reduce the probability of inadvertent actuation. Temperature indication for the interlock is obtained from the RCS wide range temperature instrumentation. Figure 1 presents a functional representation of the proposed system. The proposed low pressure feature parallels and does not override the existing actuation logic.

The power operated relief valves are spring loaded closed and require air to open. The air is presently supplied by a control air source. A redundant supply of air to the valves will be provided through the existing SIS accumulator nitrogen supply and pressure regulator with redundant check valves to ensure that backfeeding the air supply does not occur.

III. DESIGN BASES

1. OPERATOR ACTION

This design will be verified by a detailed analysis currently being pursued by Westinghouse Electric Corporation. In this analysis, no credit is taken for operation prior to 10 minutes after the operator should have been made aware of the occurrence.

2. SINGLE FAILURE CRITERIA

The present power supply alignment of the solenoid valves controlling air flow to the power operated relief valves will be retained. The enable/disable switches on the control board will conform to the separation criteria requirements for the Turkey Point Plant. Utilization of the redundant wide range pressure transmitters completes mechanical and electrical separation of the two power operated relief valve actuation trains from sensor to valve, thus protecting against failure of one loop.

As outlined in the system description, a redundant air supply will be provided to protect against failure of instrument air.

It is our belief that results of analyses currently being performed by Westinghouse will confirm that the capacity of one power operated relief valve of the type installed at Turkey Point is sufficient to mitigate the most restrictive initiating event. In this case, the proposed system provides complete redundancy and protects against any single failure in the mitigating system.

3. TESTABILITY

Testability will be provided. Verification of operability is possible prior to solid-system, low-temperature operation by use of the remotely operated isolation valve, enable/disable switch, and normal electronics surveillance. Testing requirements could be incorporated in the operating procedures to assure performance prior to existence of plant conditions requiring operability of the mitigating system.

4. SEISMIC DESIGN AND IEEE-279 CRITERIA

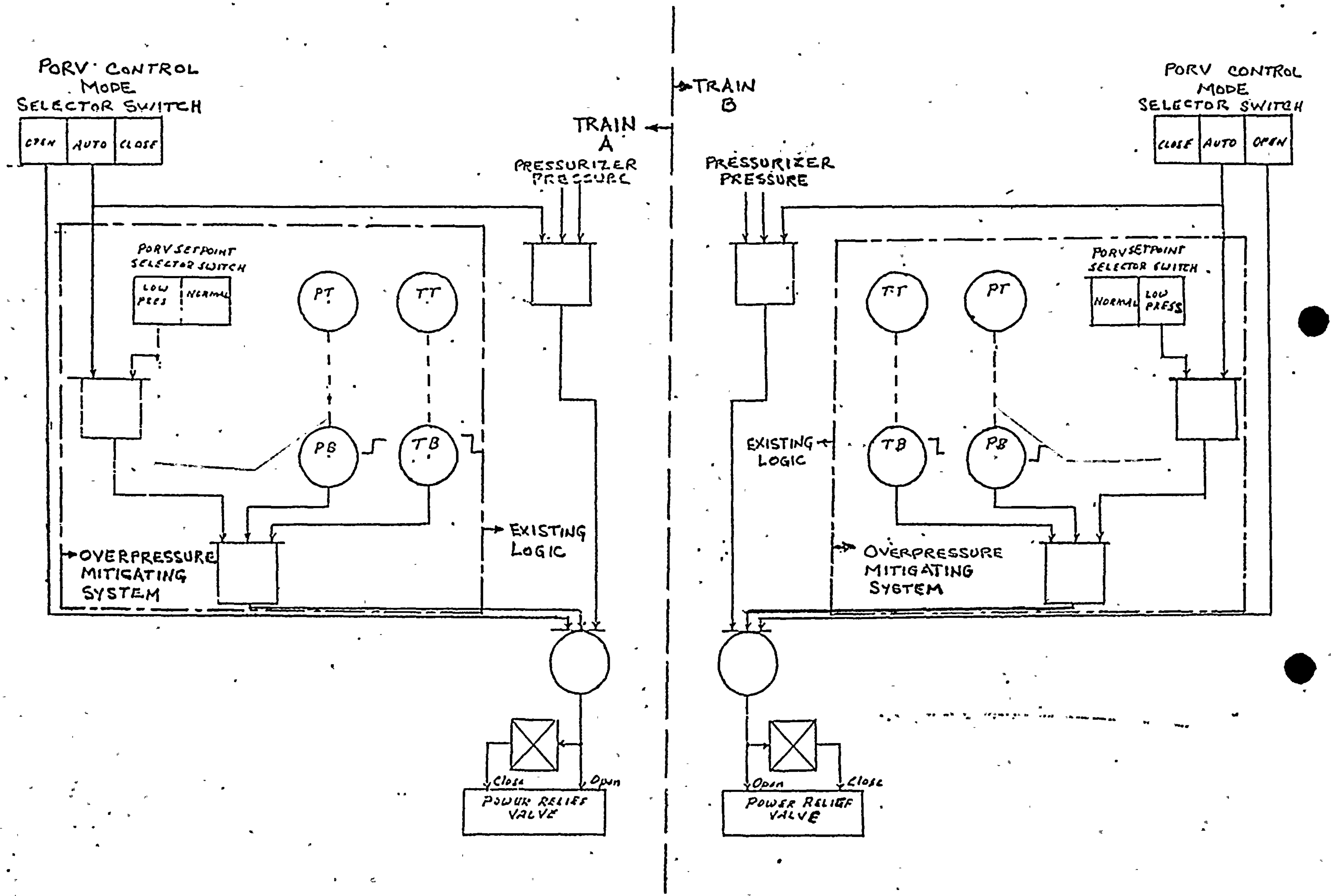
Seismic design of the electronic equipment presently installed in the Turkey Point Plant will be retained. Additional electronic equipment will be installed so as not to compromise the present seismic qualifications of existing safety systems. The redundant air supply is from the seismic qualified SIS accumulator supply.

Since the pressure control and alarm instrumentation and electric equipment associated with the Overpressure Mitigating System are not designated as components of a "protection system," the requirements of IEEE 279 will not be blanketly applied.

As stated in III.2 above, the proposed system is redundant and incorporates the separation criteria requirements for the Turkey Point Plant.

As stated in your November 17, 1976, letter documenting the November 4 meeting, the basic objection is that the system should not be vulnerable to an event which causes both a pressure transient and a failure of equipment needed to terminate the transient. The proposed Overpressure Mitigating System meets and exceeds this requirement by being able to accommodate a single failure in the mitigating system, as well as the initiating event. A more strict application of IEEE 279 and seismic criteria will not appreciably improve the design features of the proposed system, but would lengthen lead times on materials, thereby lengthening the time before implementation can begin. A stricter interpretation of IEEE 279 would also result in a more extensive backfit program. A more extensive backfit, just by its complexity, tends to decrease rather than increase the reliability as compared to a more simple backfit.

IV. With the exception of the redundant air supply, it is our objective to install the Overpressure Mitigating System during the next scheduled refueling of each unit (4/77 for Unit 4, 10/77 for Unit 3). Delivery of required components may preclude this early installation, but with the exception of the redundant air supply, we plan to have the system installed by the end of 1977. The redundant air supply is planned to be installed during the scheduled refuelings in 1978.



PORV CONTROL MODE SELECTOR SWITCH
OPEN
AUTO
CLOSE
TRAIN A
TRAIN B
PRESSURIZER PRESSURE
PRESSURIZER PRESSURE
PORV CONTROL MODE SELECTOR SWITCH
CLOSE
AUTO
OPEN
PORV SETPOINT SELECTOR SWITCH
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EXISTING LOGIC
OVERPRESSURE MITIGATING SYSTEM
Close
Open
POWER RELIEF VALVE
PORV SETPOINT SELECTOR SWITCH
NORMAL
LOW PRESS
TT
PT
TB
PB
EXISTING LOGIC
OVERPRESSURE MITIGATING SYSTEM
Open
Close
POWER RELIEF VALVE

FIGURE 1

ATTACHMENT B

Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Overpressurization Issue

The information in this Attachment is numbered to correspond to the Additional Information Request enclosed with the January 12, 1977, letter from George Lear, NRC, to Robert E. Uhrig, Florida Power & Light Company.

1.a. Training will be held for all licensed operators to review applicable overpressurization events that have occurred at other PWR facilities. The training will be conducted in two ways: (1) A copy of this letter will be included in the weekly training information required to be reviewed by all licensed operators. This review will be completed by June 1, 1977. (2) Formal training will be held as part of the normal operator requalification program conducted by the Training Department in discussions with off-shift operators. This training will be completed for all operators by March 1, 1978.

b. See 1.a above.

c. & d. The answers to these questions will be forwarded to the NRC by March 15, 1977.

2.a. A maximum temperature differential of 200°F between the pressurizer and the reactor coolant loop is imposed by the technical specifications to limit the thermal shock which may be imposed upon the surge line connection to the hot leg. It is this limit, in combination with the pressure limits for RCP operation, that act to limit operational flexibility. An RCS pressure of 325 to 350 psig is required for operation of the RCP's. The associated saturation temperature in the pressurizer is from 406°F to 414°F. In order to maintain the required 200°F ΔT, it is necessary during plant heatup to run the reactor coolant pump while solid to heat the RCS and pressurizer concurrently until saturation temperature is reached in the pressurizer. During cooldown, the opposite situation is encountered whereby the pressurizer bubble is collapsed and the pressurizer circulated to maintain the required ΔT.

b. The only pressure limitation associated with RCP operation is to maintain a pressure differential of at least 200 psia across the number one seal.

This condition is normally met if the RCS pressure is maintained between 325 and 350 psig.

The plant procedures that specify this requirement are:

1. O.P. 1001.1 (RCS fill and vent)
2. O.P. 202.1 (Cold condition to hot shutdown condition)

The reason for this requirement in the fill and vent procedure is to properly vent the RCP's and to circulate the RCS to ensure complete venting of the system.

The reason for this requirement in the heat up procedure is to utilize RCP pump heat for system heat up and to ensure isothermal conditions are maintained during system heat up.

c. A plant procedure or situation other than those discussed in 2.b that requires a water solid situation is the plant cool down procedures OP. 0205.2. This procedure is performed to cool down the RCS if required by technical specifications or for maintenance on the system. There is no provision for maintaining a bubble in the pressurizer for the cold shutdown conditions.

d. The use of a nitrogen or air bubble during these operations is not preferred. Nitrogen and air are non-condensable gases and have compressibility characteristics much "harder" than that of steam. Large quantities of either gas would be required to provide significant mitigation of overpressure transients, particularly when operator action may not be assumed for ten minutes following initiation of the transient. Transition from gas to a steam bubble would necessitate spending additional time in a condition of undesirable pressure control. Holdup and disposal of the required volume of gas is beyond the current capability of the plant.

3. The answer to this question will be forwarded to the NRC by March 15, 1977.

4.a. All components and systems that receive a safety injection signal are tested during the emergency safeguards integrated test. The test is conducted during the unit refueling outage.

In addition, the SIS pumps are tested monthly, and the cold leg injection valves are cycled monthly.

4.b. Initial conditions for the integrated safeguards test specifiy which valves are to be closed to isolate the SIS pumps from the test unit RCS. See attached FSAR Figure 6.2-1 and list of isolation valves. NOTE: The accumulator MOV's are closed during the integrated test, but are later tested individually.) Normally, this test is run with the RCS depressurized and the head removed. However, the procedures list the necessary precautions for running this test with the system solid. These precautions include monitoring RCS pressure and taking action to ensure the RCS pressure does not go above 450 psig.

During the monthly SIS pump test, with one unit at cold shutdown, the isolation requirements of the cool down procedure will ensure no accidental injection to the shutdown unit during the test. The procedure for valve cycling precludes the possibility of accidental injection caused by cycling more than one valve at a time. In addition, during cold shutdown conditions, the Nuclear Plant Supervisor is required by procedure to evaluate plant conditions prior to valve cycling.

5.a. An alarm will be provided. It will use signals from the redundant wide range pressure transmitters. It will provide annunciation at the control board in the RCS annunciation panel.

Our objective is to have this alarm installed during the next refueling outage for each unit. Delivery of required isolation devices may preclude this early installation, but the alarm should be installed by the end of 1977.

b. Isolation devices are being added to ensure isolation of the two redundant pressure instruments. Pulling cable is the only additional modification.

c. A fixed alarm setpoint of 450 psia is presently being considered. Final results of the analysis being performed by Westinghouse may require a modification to this setpoint. An audible alarm will be provided. Redundant wide range pressure transmitters will provide the signal.

d. Either or both of the two redundant instrument loops will initiate the alarm and clearing of the alarm in one loop will not remove the alarm signal, thus protecting against failure of one loop. A discussion of alarm surveillance will be forwarded to the NRC by March 15, 1977.

6. The answer to this question will be forwarded to the NRC by March 15, 1977.

7.a. During the latter part of the cool down procedure, after the system is solid and pressurizer cooled down, the RCP's are secured. The pressure is maintained automatically by the charging and letdown system until the system is depressurized prior to draining.

The system is again returned to the water solid condition during the fill and vent procedure. Pressure is controlled by the charging and letdown system during the system fill and vent and during system heat up until the pressurizer bubble is drawn.

The RCP's are started and stopped during the fill and vent, but are continuously running prior to drawing the bubble.

b. See 2.d above.

c. There are no temperature limits associated with starting the RCP's in a water solid condition.

d. See FSAR Figure 4.2-1 for location of RCS temperature elements.

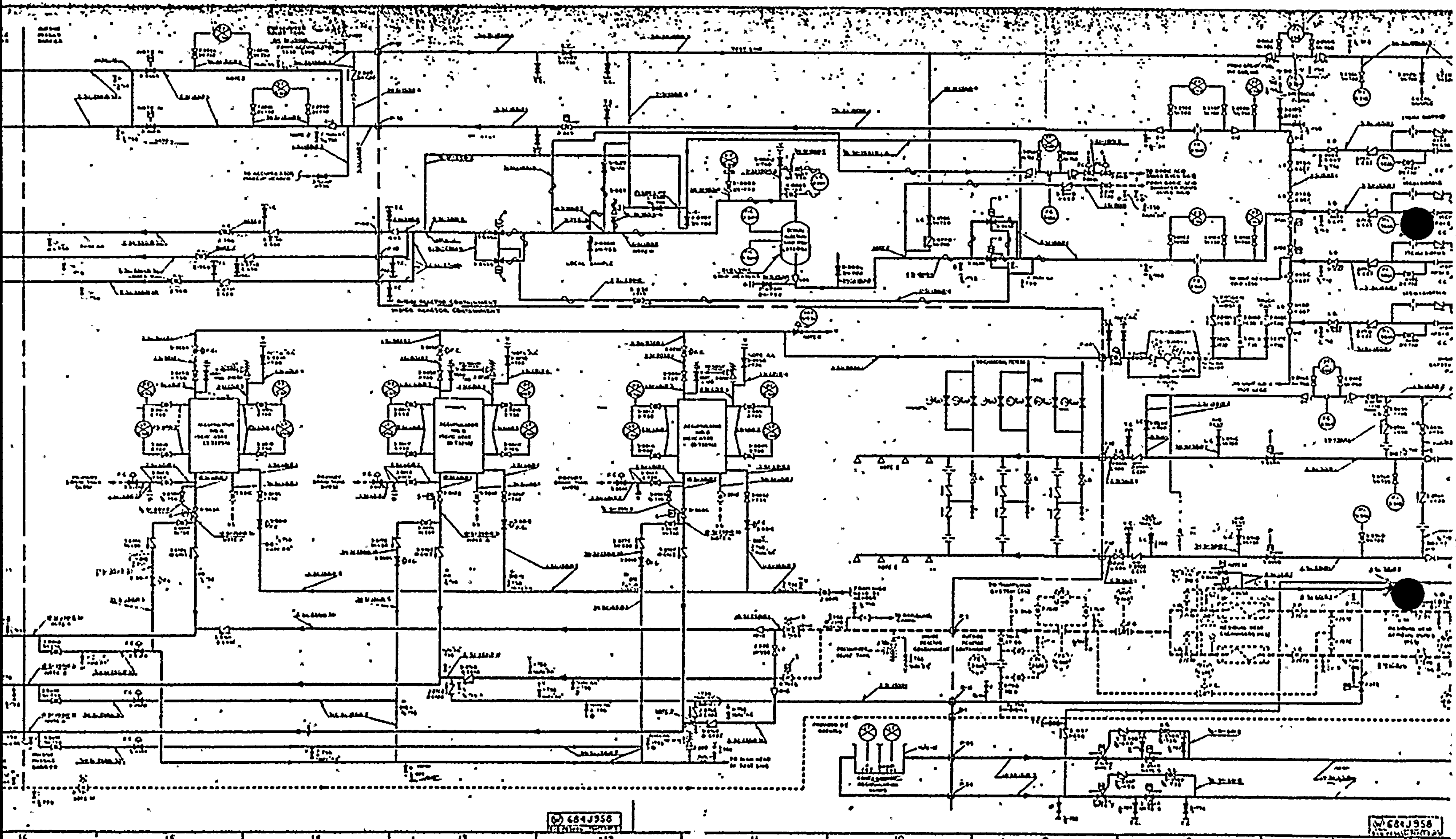
e. Prior to securing the RCP's, the RCS is brought to an isothermal condition by cooling down the RCS, removing the steam generators from service, collapsing the bubble, and cooling down the pressurizer.

f. In general, only one RCP is started at a time, and it is allowed to come to rated speed before the second pump is started. During the fill and vent and heat up procedure, the RCP's are started sequentially and in a controlled fashion so that thermal transients and pressure spikes will not produce an overpressure condition.

During the solid system pressure operation, the RCP operating procedures specify the following for restarting an RCP after all pumps have tripped:

1. Reduce charging flow to 30 gpm.
2. Open all letdown orifice isolation valves.
3. Adjust charging and letdown to approximately 325 psig.
4. Then restart the RCP's using the normal starting procedure.

If an RCP is lost after establishing a pressurizer bubble, ensure either the B or C RCP is started first to establish pressurizer spray flow.



VALVES CLOSED TO ISOLATE SIS FROM RCS DURING COLD SHUTDOWN CONDITION.

866A & B 865A, B, & C
843A & B 867A & B

VALVES CLOSED TO ISOLATE SIS FROM RCS DURING INTEGRATED SAFEGUARDS TEST.

866A & B *888A, B, C, & D
878A & B 865A, B, & C

* FOR UNIT UNDER TEST ONLY

FSAR FIGURE 6.2-1