NON-PROPRIETARY VERSION

(TO BE INSERTED AS APPENDIX A OF VOLUME III

OF WESTINGHOUSE TOPICAL REPORT - WCAP-9601)

APPENDIX A

412 STANDARD PLANT

REFERENCE EMERGENCY OPERATING INSTRUCTIONS

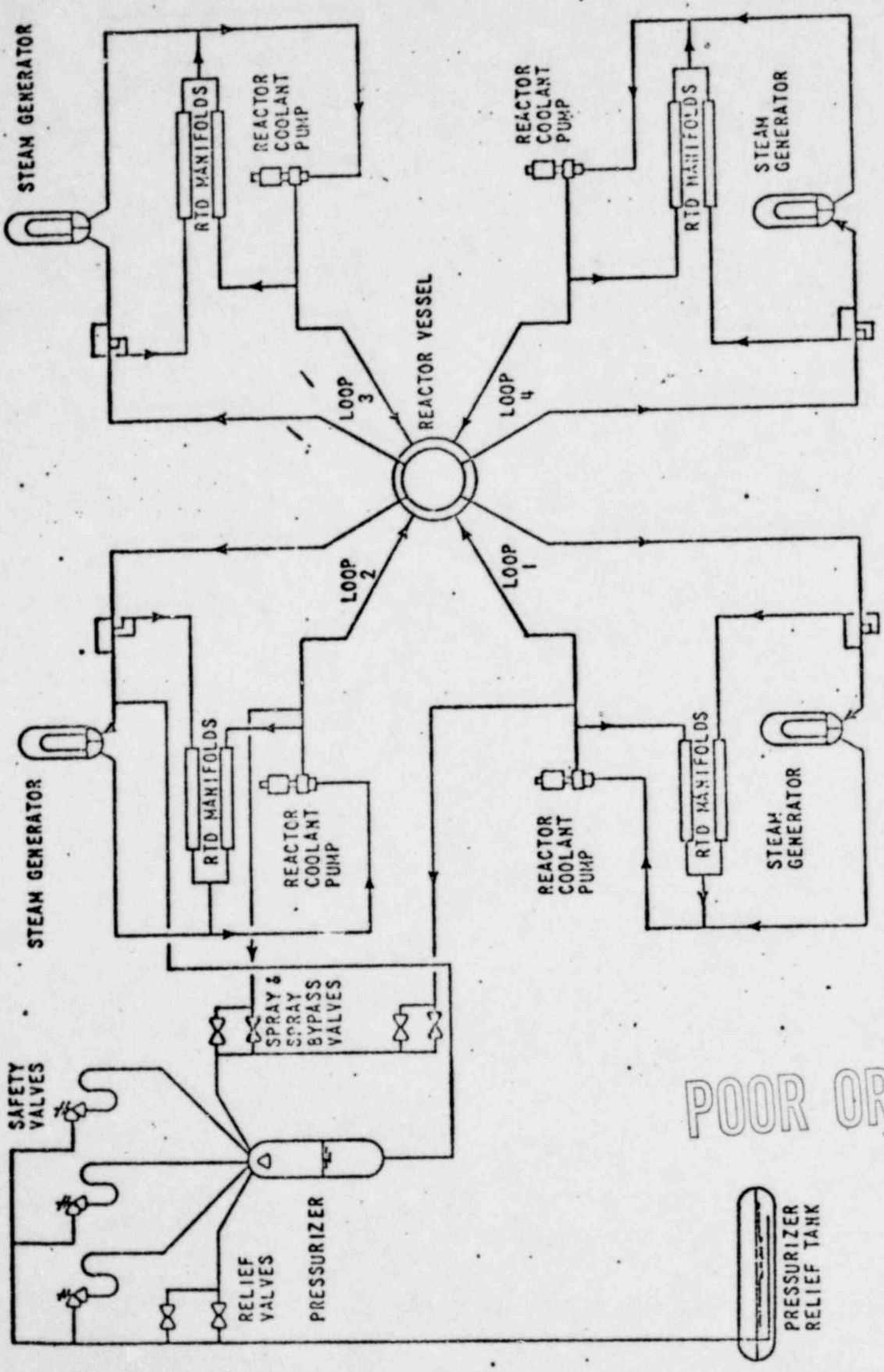

Figure 1. 412 Reactor Coolant System

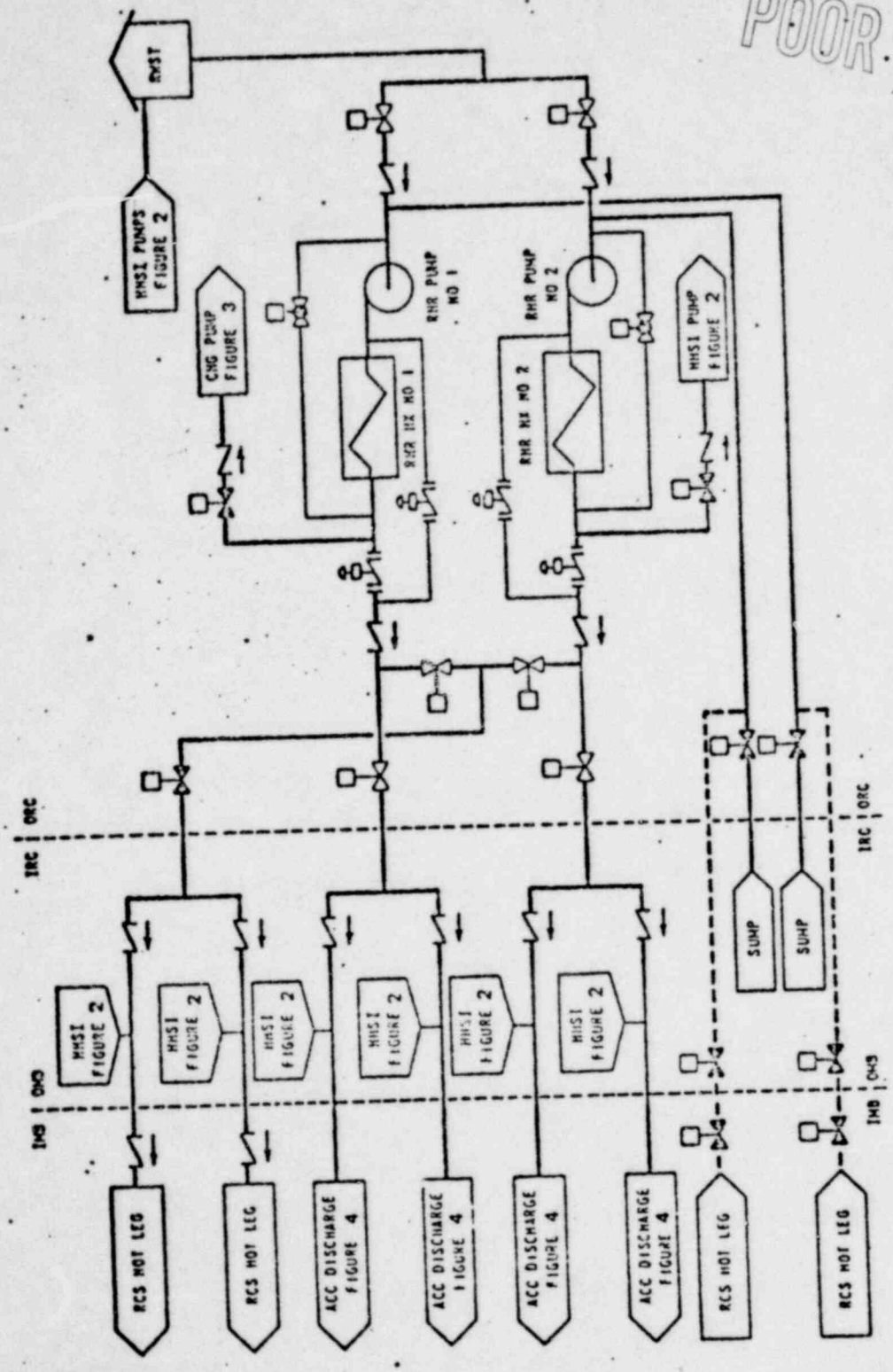

Figure 1. LHSI/RHR Subsystem

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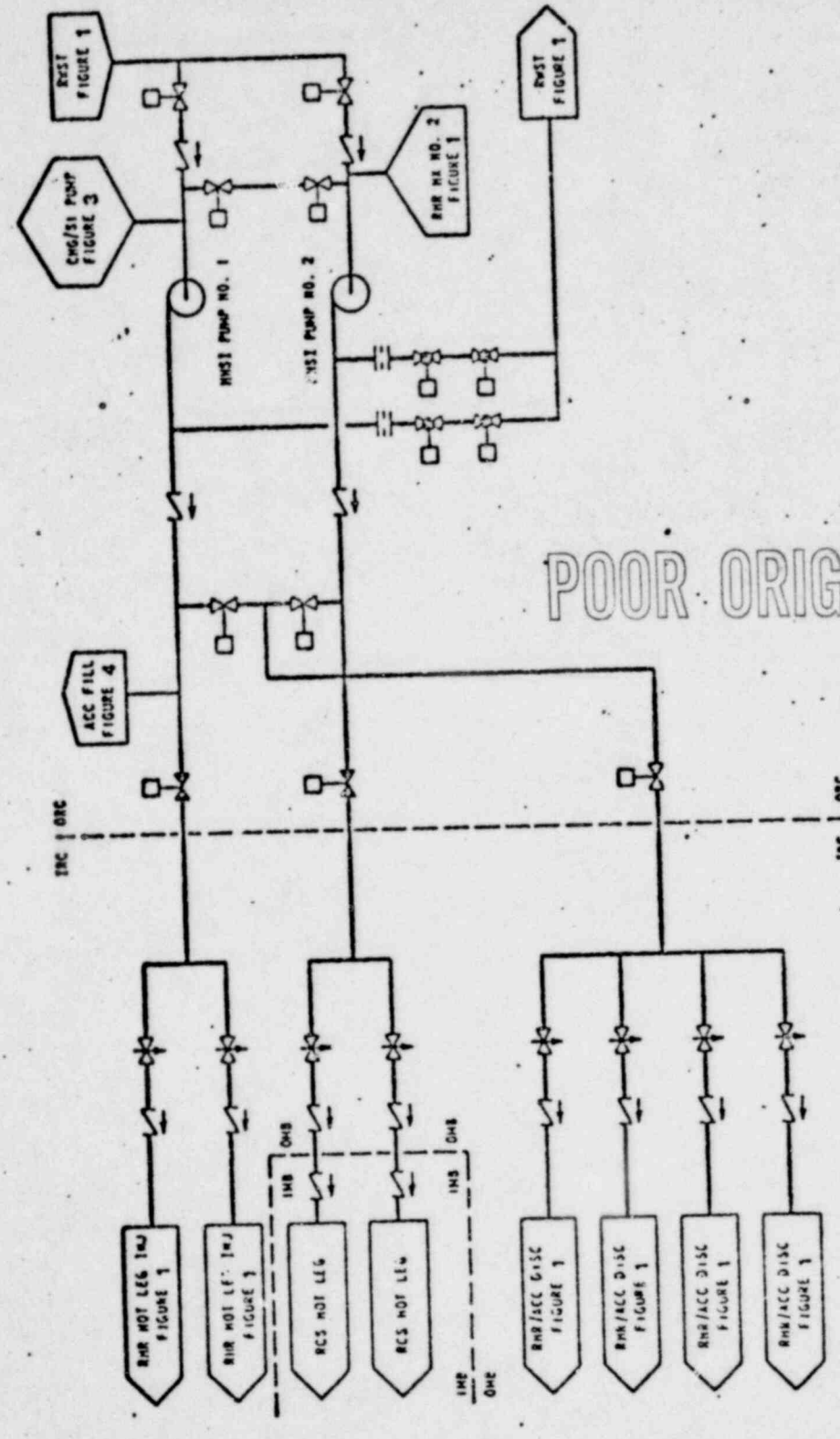


Figure 2. HHSI Subsystem 412 Safety Injection System

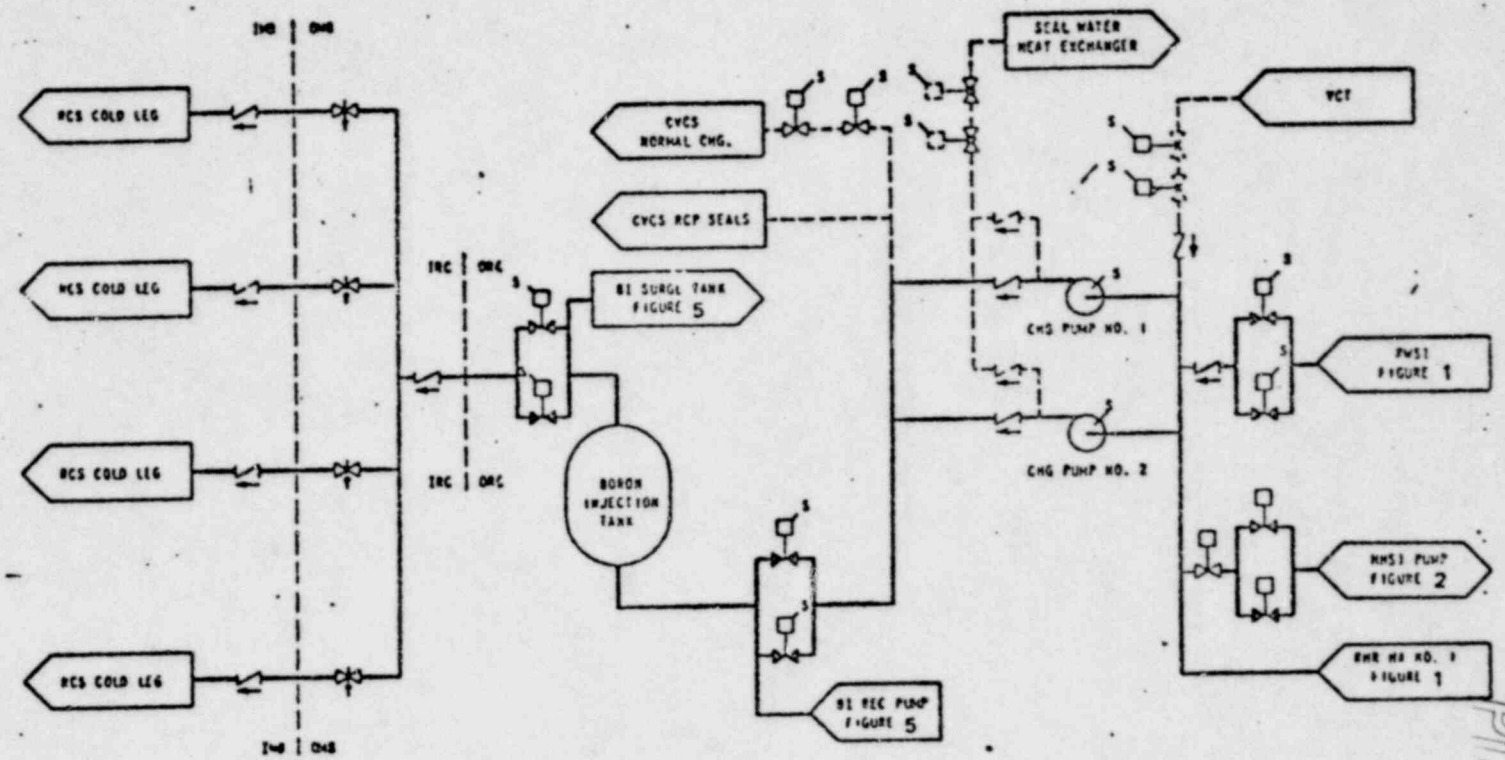
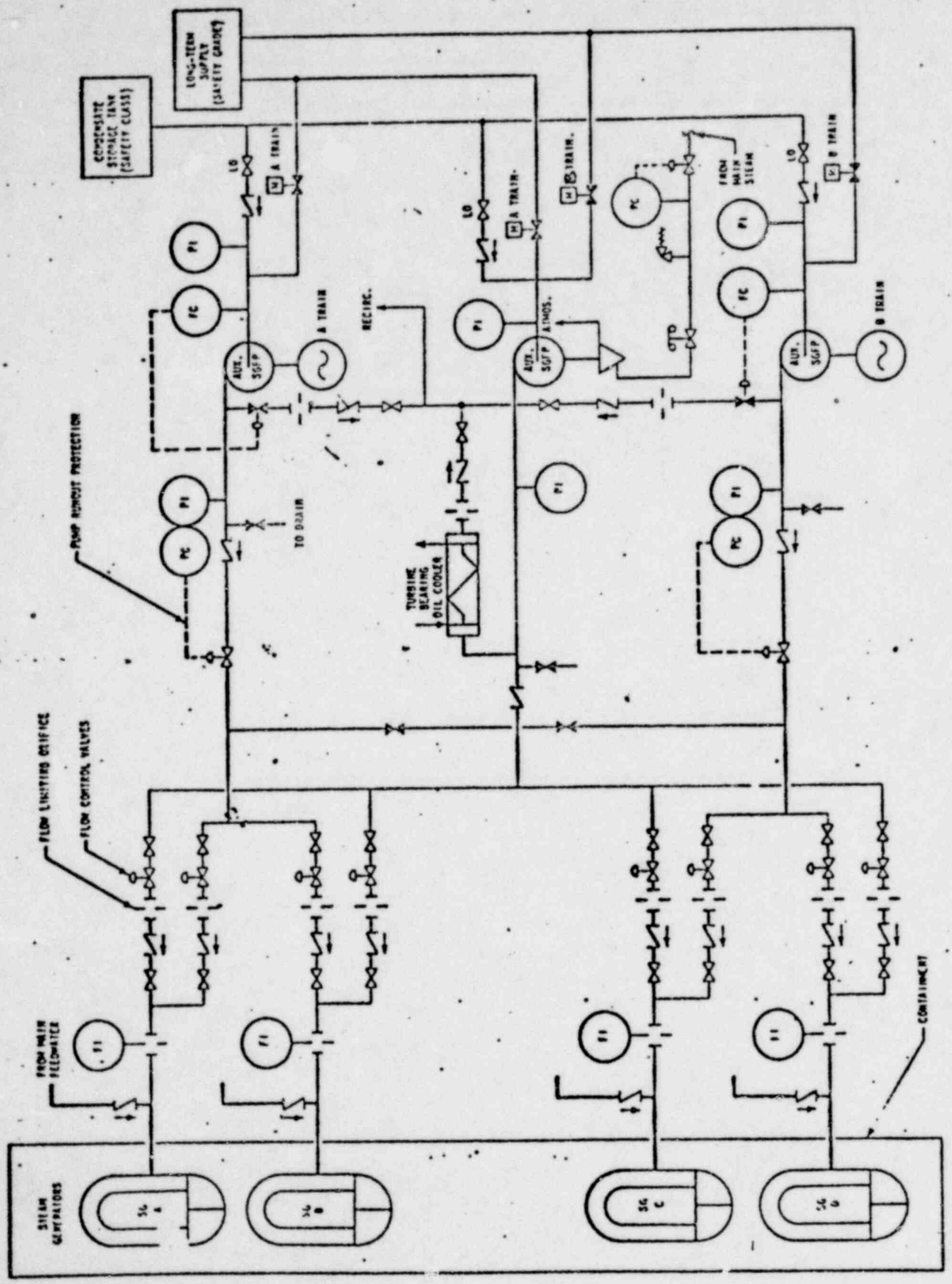


Figure 3. Charging/SI Subsystem 412 Safety Injection System.



Auxiliary Feedwater System 4-Loop Plant

LHSI/RHR Pumps

Number	2
Type	Vertical (in-line) centrifugal
Design pressure, psig	600
Design temperature, °F	400
Design flow rate, gpm	3800
Design head, ft	350
Maximum flow rate, gpm	5500
Min. head at maximum flow rate, ft	260
Shutoff head, ft	450
Motor capacity, hp	545

HHSI Pump

Number	2
Type	Horizontal centrifugal
Design pressure, psig	1750
Design temperature, °F	300
Design flow rate, gpm	440
Design head, ft	2680
Maximum flow rate, gpm	660
Min. head at maximum flow rate, ft	1650
Shutoff head, ft	3545
Motor capacity, hp	495

CHG/SI Pumps

Number	2
Type	Horizontal centrifugal
Design pressure, psig	2800
Design temperature, °F	300
Design flow rate, gpm	150
Design head, ft	5800
Maximum flow rate, gpm	550
Min. head at maximum flow rate, ft	1400
Shutoff head, ft	6200
Motor capacity, hp	600

412 STANDARD PLANT

E-0

EMERGENCY INSTRUCTIONS

IMMEDIATE ACTIONS AND DIAGNOSTICS

A. PURPOSE

This instruction presents the automatic actions, the immediate operator actions and the diagnostic sequence which is to be followed in the identification of the following:

1. Spurious Actuation of Safety Injection
2. Loss of Reactor Coolant
3. Loss of Secondary Coolant
4. Steam Generator Tube Leak

The reactor automatic protection equipment is designed to safely shut down the reactor in the event of any of the above emergencies. The safety injection system is designed to provide emergency core cooling and boration to maintain the safe reactor shutdown condition. These plant safeguards systems operate with offsite electrical power or from onsite emergency diesel-electric power should offsite power not be available.

In the subsequent documents in this series (E-1, E-2 and E-3), instructions for recovery from the event are presented for each particular accident.

B. IMMEDIATE ACTIONS

1. Conditions warrarting reactor trip or safety injection may be characterized by a number of anomalous situations or unusual instrument indications.

   a. If the plant is in a condition for which a reactor trip is warranted and an automatic reactor trip has not yet occurred, manually trip the reactor. Continue monitoring plant conditions as shown in Figure 1.

   b. If the plant is in a condition for which safety injection is warranted and an automatic safety injection has not yet occurred, manually initiate safety injection.

2. Verify the following:

   a) Reactor trip and turbine trip have occurred.

   b) Bus voltages indicate that the busses are energized and all intended loads are being powered.

   c) Feedwater Isolation has occurred.

   d) Containment Isolation Phase A has occurred.

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e) Auxiliary Feedwater Pumps have started and the Auxiliary Feedwater System valves are in the proper position.

f) Safety Injection Pumps have started and the monitor lights indicate that the Safety Injection System valves are in the proper safeguards position.

g) Service and Component Cooling Water Pumps have started.

h) Containment Ventilation isolation has occurred.

i) Other essential equipment as required by the specific plant design has been put into service.

3. If any of the above automatic actions have not occurred and are required, they should be manually initiated.

Verify the following:

a) Safety Injection flow from at least one train is being delivered to the reactor coolant system. If not, attempt to operate equipment manually or locally.

b) Auxiliary Feedwater flow from at least one train is being delivered to the steam generators. If not, attempt to operate equipment manually or locally.

4. Whenever the Containment Hi-2 pressure setpoint is reached, verify that the Main Steam Isolation Valves have closed. If not, manually close the Main Steam Isolation Valves from the Control Board.

5. Whenever the Containment Hi-3 pressure setpoint is reached, verify that the following have occurred:

   a) Containment Spray is initiated

   b) Containment Isolation Phase B is initiated

   If not, manually initiate Containment Spray and Containment Isolation Phase B.

C. ACCIDENT DIAGNOSTICS (Refer to Figure 2)

1. Evaluate reactor coolant pressure to determine if it is low or decreasing in an uncontrolled manner. If it is low or decreasing, verify that:

   a. all pressurizer spray line valves are closed and

   b. all pressurizer relief valves are closed.

   If not, manually close the valves from the Control Board.

If the RCS pressure is above the low pressure reactor trip set-point and is stable or increasing, go to STEP 7.

2. Stop ALL Reactor Coolant Pumps after the high head safety injection pump operation has been verified and the reactor coolant pressure is decreasing and below 1250 psig plus indicated inaccuracy.

3. IF the condenser air ejector radiation or steam generator blowdown radiation monitor exhibit abnormally high readings, AND containment pressure, containment radiation and containment recirculation sump level exhibit normal readings, THEN go to E-3, "Steam Generator Tube Leak."

4. IF the steamline pressure is lower in one steam generator than in the other steam generators, THEN go to E-2, "Loss of Secondary Coolant."

5. IF containment pressure, OR containment radiation OR containment recirculation sump levels exhibit either abnormally high readings or increasing readings, THEN go to E-1, "Loss of Reactor Coolant".

NOTE: For very small breaks inside the containment building, the containment pressure increase will be very small and possibly not recognizable by the operator. For very small breaks the containment recirculation sump water level will increase very slowly and early in the transient may not be on scale.

CAUTION: If high radiation indication is present in the auxiliary building, it is possible that a breach of a process line that contains reactor coolant has occurred. Phase A containment isolation would have isolated and terminated the leak. Caution should be exercised in attempting to return the plant to normal make-up and letdown so that the leak is not re-initiated. Go to E-1, "Loss of Reactor Coolant".

6. IF the containment pressure, containment radiation AND containment recirculation sump level continue to exhibit stable readings in the normal pre-event range, THEN go to E-2, "Loss of Secondary Coolant".

7. In the event of a spurious safety injection signal, the sequence of reactor trip, turbine trip and safeguards actuation will occur.

   The operator must assume that the safety injection signal is non-spurious unless the following are exhibited:

   a. Normal readings for containment temperature, pressure, radiation and recirculation sump level AND

   b. Normal readings for auxiliary building radiation and ventilation monitoring AND

   c. Normal readings for steam generator blowdown and condenser air ejector radiation AND

d. All steam generators exhibit normal pressure and water level following reactor trip and safety injection actuation (similar to a reactor trip from normal conditions).

IF all of the symptoms a through d above are met, THEN secure Safety Injection when the following are exhibited:

a) Reactor coolant pressure is greater than 2000 psig and increasing AND

b) Pressurizer water level is greater than 50% of span AND

c) Water level in at least one steam generator is in the narrow range span, or in the wide range span at a level sufficient to assure that the U-tubes are covered

NOTE: IF after securing safety injection and attempting to transfer to normal pressurizer pressure and level control, reactor coolant pressure drops 200 psi or more below the pressure at which Safety Injection was initially secured OR if pressurizer water level drops below 20% of span, THEN SAFETY INJECTION MUST BE MANUALLY REINITIATED. The operator must rediagnose plant conditions and proceed to the appropriate emergency instruction.

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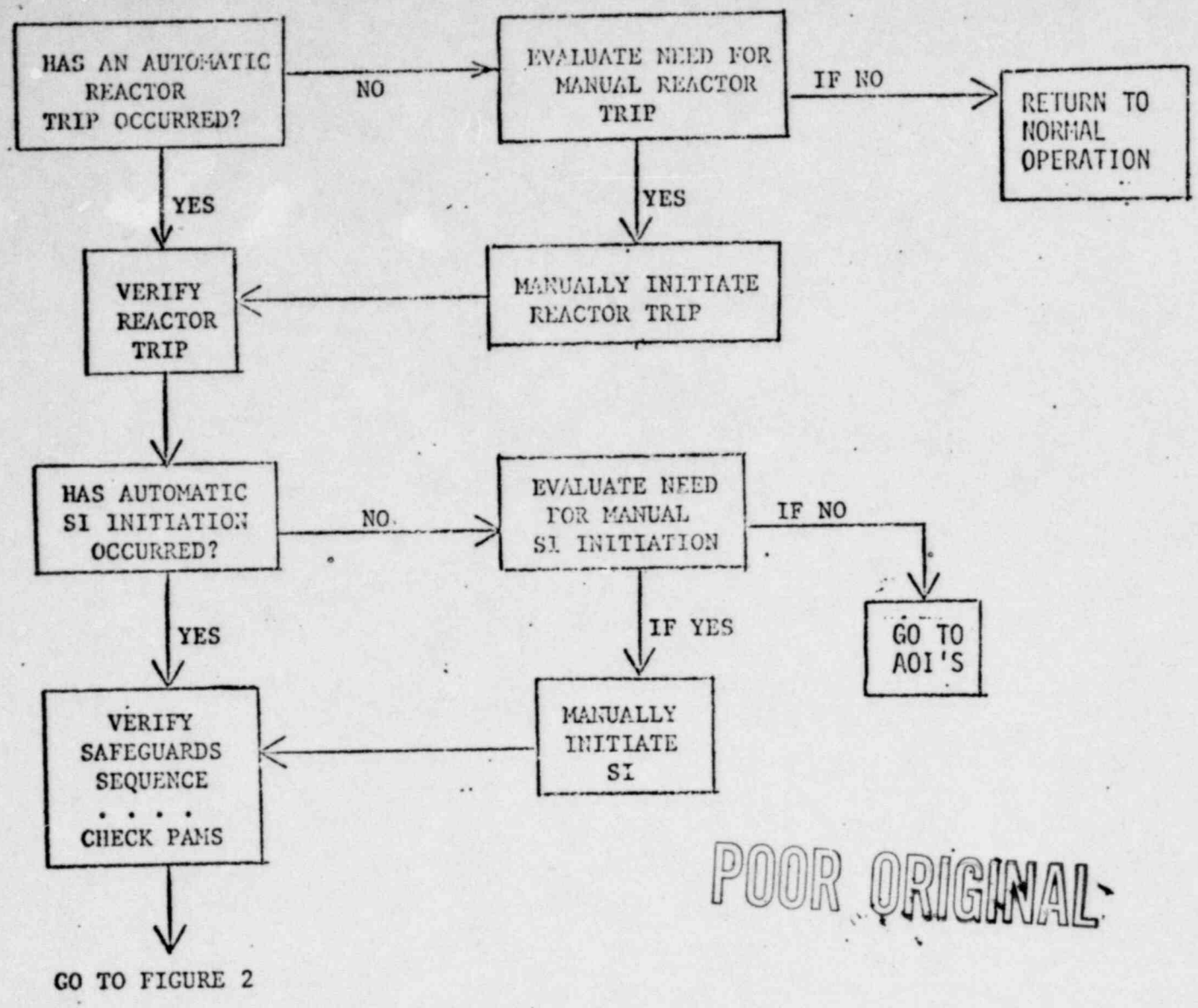
NOTE: IF after securing safety injection and transferring the plant to normal pressurizer pressure and level control, the reactor coolant pressure does not drop 200 psi or more below the pressure at which safety injection was initially secured and the pressurizer level remains above 20% span, THEN go to the abnormal operating instructions.



IMMEDIATE ACTIONS

FIGURE 1

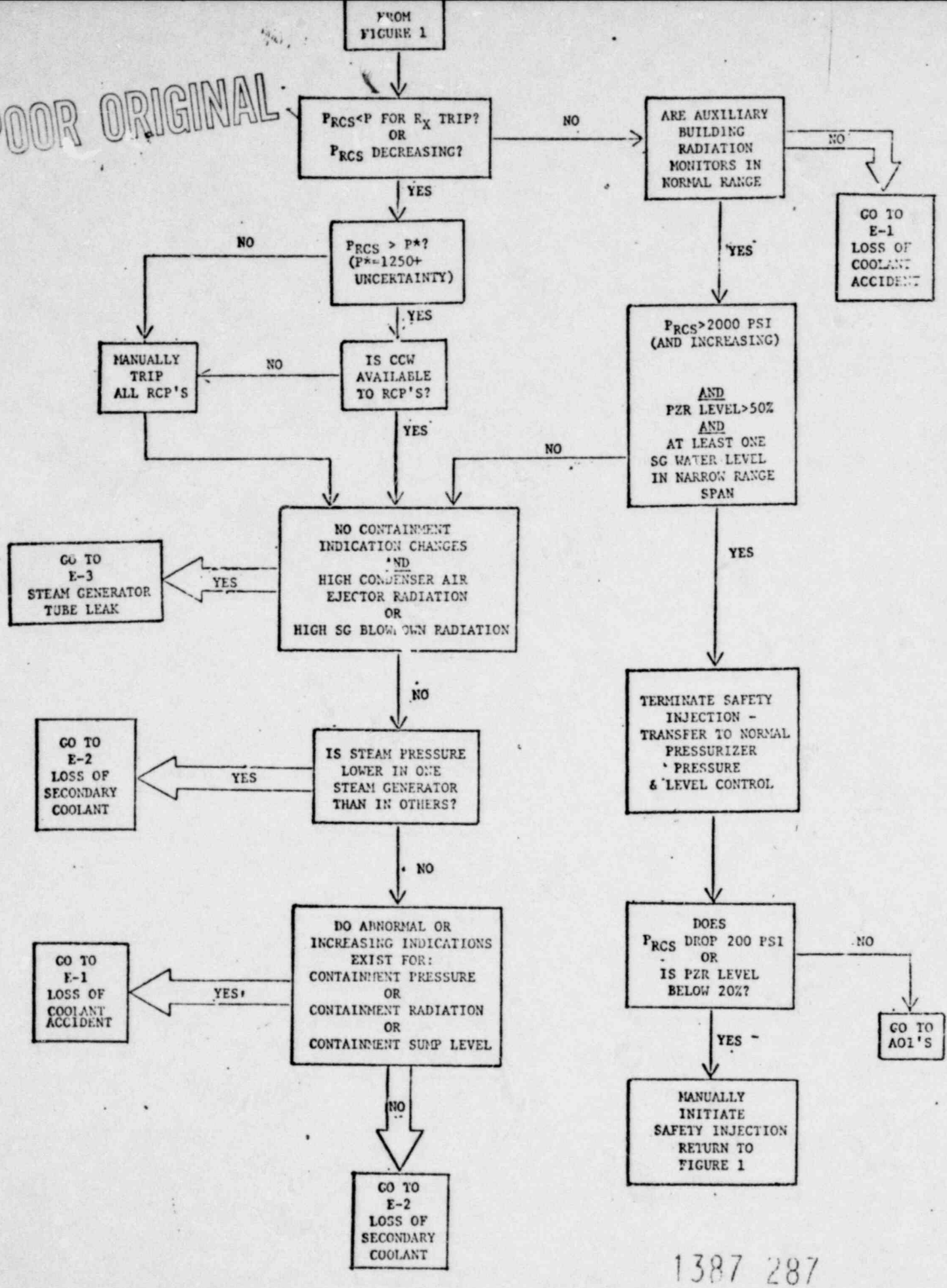


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FIGURE 2

EMERGENCY INSTRUCTION

LOSS OF REACTOR COOLANT

A. PURPOSE

The objectives of these instructions are to specify required operator actions and precautions necessary to:

1. Verify and establish short term core cooling to prevent or minimize damage to the fuel cladding and release of excessive radioactivity.

2. Maintain long term shutdown and cooling of the reactor by recirculation of spilled reactor coolant, injected water and containment spray system drainage.

3. Monitor Post Accident Monitoring System instruments to verify adequate performance of the systems required to mitigate the consequences of the accident.

B. IMMEDIATE ACTIONS

Refer to E-0, Immediate Actions and Diagnostics.

C. SUBSEQUENT ACTIONS

CAUTION: Monitor RWST level closely. If RWST level decreases rapidly such that the RWST low level alarm appears imminent, go directly to step 5.

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 operator should verify that the Post Accident Monitoring (PAM) instruments are operating and recording. These instruments include wide range RCS temperature and pressure, steam pressure, steam generator water level, containment pressure, RWST water level, condensate storage tank water level, pressurizer water level, and boric acid storage tank water level.

1. As the water level (PAMS) in the refueling water storage tank decreases under the action of the safeguards pumps, check that the recirculation sump water level instrumentation indicates an increase in water level in the sump. If a sump water level increase is not evident then a re-evaluation of the symptoms in E-0 must be conducted.

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Regulate the auxiliary feedwater flow to the unaffected steam generators to restore and/or maintain an indicated narrow range water level (PAMS). If narrow range water level increases in an unexplained manner in one steam generator, go to E-3, Steam Generator Tube Leak.

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.

2. Close all pressurizer power operated relief valves and backup isolation valves.

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

Safety Injection can be terminated IF:

(A) Reactor coolant pressure is greater than 2000 psig and increasing, AND

(B) Pressurizer water level is greater than 50% of span, AND

(C) Water level in at least one Steam Generator is in the narrow range span, or in the wide range span at a level sufficient to assure that the U-tubes are covered.

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THEN:

(A) Reset safety injection and stop safety injection pumps not needed for normal charging and RCP seal injection flow.

(B) Place all non-operating safety injection pumps in standby mode and maintain operable safety injection flowpaths. (Do not lock valves).

(C) Isolate safety injection flow to RCS Cold Legs via Boron Injection Tank and establish normal charging flow.

CAUTION: If reactor coolant pressure decreases in excess of 200 psi or pressurizer water level drops below 20% of span following termination of safety injection flow, MANUALLY REINITIATE safety injection to establish reactor coolant pressure and pressurizer water level. The reactor coolant pressure will stabilize at a pressure greater than 2000 psig and less than the safety valve set pressure. Go to E-0 to reevaluate the event, unless this reevaluation has already been performed.

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(D) Reestablish normal makeup and letdown (if letdown is unaffected) to maintain pressurizer water level in the normal operating range and to maintain reactor coolant pressure at values reached when safety injection is terminated. Ensure that water addition during this process does not result in dilution of the reactor coolant system boron concentration.

(E) Reestablish operation of the pressurizer heater When reactor coolant pressure can be controlled by pressurizer heaters alone, return makeup and letdown to pressurizer water level control only.

(F) Perform a controlled cooldown to cold shutdown conditions if required to effect repairs. Maintain subcooled conditions in the reactor coolant system. If subcooled conditions cannot be maintained, go to step 4.

4. If the conditions for terminating safety injection in step 3 are not met, maintain necessary safety injection pumps operating. If any safeguards equipment is not operating, attempt to operate the equipment from the control room or locally. Effect repairs if necessary. If reactor coolant pressure is above the low head safety injection pump shut-off head, manually reset

safety injection so that safeguards equipment can be controlled by manual action. Ensure that containment isolation is maintained, i.e., not reset until such time as manual action is required on necessary process streams. Stop the low head safety injection pumps and place in the standby mode.

CAUTION: Whenever the reactor coolant pressure decreases below the low head safety injection shutoff head, the low head safety injection pumps must be manually restarted to deliver fluid to the reactor coolant system.

5. Stop ALL Reactor Coolant Pumps after the high head safety injection pump operation has been verified and the reactor coolant pressure is decreasing and below 1250 psig plus indicated inaccuracy.

CAUTION: If component cooling to the reactor coolant pumps is isolated on a containment pressure signal, all reactor coolant pumps are to be stopped within 5 minutes because of loss of motor bearing cooling.

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

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

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6. In the case of a break characterized by reactor coolant pressure quickly decreasing below steam generator pressure, go to step 7. In the case of a break characterized by a slowly decreasing reactor coolant pressure or stabilized reactor coolant system pressure above the lowest steam system safety valve setpoint, (plant specific) psig, the following additional manual actions should be taken to aid the cooldown and depressurization of the reactor coolant system:

   a. If the main condenser is in service, open at least one main steamline isolation valves or bypass valves and transfer the steam dump control to steam header pressure control and dump steam to the condenser to lower the reactor coolant temperature (PAMS) and consequently the reactor coolant pressure.

   b. If the main condenser is not in service, dump steam to the atmosphere with the steam relief valves to lower the reactor coolant temperature and consequently the reactor coolant pressure.

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

7. Adjust recirculation sump pH, if required. If containment spray has been actuated, and if the containment pressure is reduced to nominal operation containment pressure, reset containment spray. Spray pumps should be shut-off and placed in the standby mode with operable flow paths.

8. Go to the Cold Leg Recirculation Instruction presented in Table E-1.1.

CAUTION: The cold leg recirculation instruction given in Table E-1.1 may be different for each plant's ECCS design. This instruction should be modified to be compatible with the plant design.

9. Periodically check auxiliary building area radiation monitors for detection of leakage from ECCS during recirculation. If significant leakage has been identified in the ECCS, attempt to isolate the leakage. The operator must maintain recirculation flow to the RCS at all times.

10. While the plant is in cold leg recirculation mode, plant operators should make provision for an evaluation of all the equipment in the plant. This evaluation should include the primary safeguards equipment e.g., RCS pumps and valves, emergency diesels, containment fan coolers, etc. and support equipment e.g., ECCS HVAC equipment, diesel fuel supply, diesel start air supply, sampling of RCS for boron concentration and fuel damage, sampling of containment atmosphere, etc.

11. Prior to the time specified for the plant for the switchover to the hot leg recirculation mode, the operator in the control room should:

    a. Ensure that control room valve switches are aligned in the proper positions for cold leg recirculation mode.

    b. Re-energize the breakers, as required, for valves needed to effect switchover to the hot leg recirculation mode.

12. At (plant specific) hours after the accident, realign the safety injection systems for hot leg recirculation. Go to Table E-1.2.

    CAUTION: The hot leg recirculation switchover instruction given in Table E-1.2 may be different for each plant's ECCS design. The instruction should be modified to be compatible with the plant design.

13. Continue to implement the hot leg recirculation mode of cooling.

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

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TABLE E-1.1

COLD LEG RECIRCULATION SWITCHOVER INSTRUCTIONS

PREREQUISITES AND PRECAUTIONS:

A. Prior to receipt of the Refueling Water Storage Tank (RWST) Low Level Alarm restart any safety injection pump not operating and reset/defeat the safety injection signal. Also open component cooling water (CCW) valves to Residual Heat Removal (RHR) heat exchangers if these valves are not interlocked to open automatically.

B. The Refueling Water Storage Tank (RWST) Low Level Alarm signifies automatic initiation of cold leg recirculation. The containment recirculation sump valves will immediately start to open automatically.

C. IMMEDIATELY perform all steps given below when the recirculation sump isolation valve position lights indicate that the valve is fully open.

D. Do not close a RWST/RHR pump suction valve unless the corresponding recirculation sump valve is open.

E. All operator actions must be performed expeditiously, in a precise, orderly sequence. Do not interrupt this operation until all actions are completed. When both trains are initially available and a valve

fails to respond or to complete its demanded operation, postpone any corrective action until the subsequent operational steps are performed.

F. IMMEDIATELY stop any pumps taking suction from the RWST on receipt of a RWST empty alarm. Complete the switchover steps listed below, then restart required pumps.

OPERATIONAL STEPS (NO SINGLE FAILURES):

STEP 1

a) Close the RWST to low head safety injection pump suction isolation valves

b) Close the high head safety injection pump miniflow valves

c) Close the low head safety injection crossover isolation valves

STEP 2

a) Open parallel valves in the high head safety injection and charging safety injection pump common suction header.

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b) Open the low head safety injection to high head safety injection and charging/safety injection pump suction isolation valves

c) After completion of the above steps VERIFY that the two high head safety injection pumps and the two charging/safety injection pumps are receiving suction flow from the low head safety injection pumps.

CAUTION: Do not perform the following steps until the above verification is made.

STEP 3

a) Close the RWST to high head safety injection pump suction valves

b) Close the RWST to charging/safety injection pump suction isolation valves

STEP 4

The utility should provide spray system switchover procedures and integrate them into this instruction.

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NOTE: For plant designs which utilize only the spray system heat exchanger to remove energy from the containment recirculation sump the spray system must be operated during the long term even if it was not automatically actuated.

VERIFICATION:

STEP 5

After completing the preceding steps, verify that the safety injection system is aligned for cold leg recirculation as follows:

a) One low head safety injection pump is delivering from the containment recirculation sump directly to two reactor coolant system cold legs and to the suction of two charging/safety injection pumps.

b) The other low head safety injection pump is delivering from the containment recirculation sump directly to two reactor coolant system cold legs and to the suction of two high head safety injection pumps.

c) The two high head safety injection and two charging/safety injection pumps are taking suction from the low head safety injection pumps and are delivering to four reactor coolant system cold legs.

d) The suction paths from the RWST to all safety injection pumps have been isolated.

e) If containment spray is required, verify that flow is being delivered.

STEP 6

If the system alignment has been verified go to E-1 Step 9. If any failures have occurred, proceed to contingency actions.

CONTINGENCY ACTIONS

1. CONTAINMENT RECIRCULATION SUMP VALVE FAILS TO OPEN

If a containment recirculation sump valve cannot be opened, stop the corresponding low head safety injection pump and verify that:

a) One low head safety injection pump is delivering flow to two reactor coolant system cold legs and to the suction of the two high head safety injection and two charging/safety injection pumps.

b) The two high head safety injection and the two charging/safety injection pumps are delivering to four reactor coolant system cold legs.

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2. LOSS OF ONE TRAIN OF ELECTRICAL POWER

NOTE: If the single active failure is the failure of one of the emergency diesel generators to start in conjunction with a LOCA and a loss of offsite power, electrical power would not be available to one of the vital safeguard busses. As a consequence, all engineered safeguards equipment assigned to that corresponding electrical power train would not be available for operation until power could be restored to that bus. The instruction for switchover to cold leg recirculation, assuming a train failure, is essentially the same as the instruction above, which assumed no single failures. The operator could follow the above instruction with the understanding that those valves, without power, do not have to be repositioned.

The following instruction is provided to illustrate the similarity between the instruction which assumes no single failures, and an instruction which assumes one complete electrical power train failure. For this instruction, it is assumed that Train B failed simultaneously with the loss of reactor coolant. It should be noted that if a train failed subsequent to the initiation of the "S" signal additional steps may be required. For example, if no failure is assumed, the parallel suction valves in the line

from the RWST to the charging/safety injection pump suction header would open on an "S" signal. Should a subsequent failure of one of the electrical trains occur, one of the parallel suction valves could not be closed from the main control board. Therefore, positive isolation of the RWST to charging/safety injection pump suction path would have to be accomplished locally.

OPERATIONAL STEPS: (Assume only Train A available)

STEP 1

a) Close the RWST to low head safety injection pump suction isolation valve

b) Close the high head safety injection pump miniflow valves

c) Close the low head safety injection crossover isolation valve

STEP 2

a) Open one of the parallel valves in the high head safety injection and charging/safety injection pump common suction header

1387 403

b) Open the low head safety injection to charging/safety injection pump suction isolation valve

After completing the above steps, verify that the one high head safety injection pump and one charging/safety injection pump are receiving suction flow from the one operating low head safety injection pump.

Caution: Do not perform the following steps unless the above verification is absolute.

STEP 3

a) Close the RWST to high head safety injection pump suction valve

b) Close the RWST to charging/safety injection pump suction valve

VERIFICATION:

STEP 4

After completing the above step, verify that the safety injection system is aligned for cold leg recirculation as follows:

a) One low head safety injection pump is delivering from the containment recirculation sump to two reactor coolant system cold legs and to the suction of one high head safety injection and one charging/safety injection pump.

b) The one high head safety injection and one charging/safety injection pump are taking suction from the low head safety injection pumps and are delivering to four reactor coolant system cold legs.

c) The suction paths from the RWST to all safety injection pumps have been isolated.

d) If containment spray is required, verify that flow is being delivered.

STEP 5

If the system alignment in Step 4 has been verified, go to E-1 Step 9. If any failures have occurred, attempt to operate the equipment manually and locally.

1387 305

TABLE E-1.2

HOT LEG RECIRCULATION SWITCHOVER INSTRUCTIONS

NOTE: Hot Leg Recirculation Phase - At approximately 24 hours after the accident, hot leg recirculation shall be initiated. The following manual operator actions are required to complete the switchover operation from the cold leg recirculation mode to the hot leg recirculation mode. In this instruction it is assumed that both electrical power trains A and B are available and that all safety injection pumps are operating. (No single failure has occurred).. If failures have occurred continue through the instruction to contingency actions.

OPERATIONAL STEPS BASED ON NO SINGLE FAILURE

Step 1: Terminate low head safety injection pump flow to reactor coolant system cold legs and establish low head safety injection flow to reactor coolant system hot leg by performing the following actions:

a) Close the low head safety injection cold leg header isolation valves

b) Open the low head safety injection crossover isolation valves

c) Open the low head safety injection leg header isolation valve

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Step 2: Terminate high head safety injection pump flow to reactor coolant system cold legs and establish high head safety injection flow to reactor coolant system hot legs by performing the following steps:

a) Stop high head safety injection pump no. 1

b) Close the corresponding high head safety injection cross-over header isolation valve

c) Open the corresponding hot leg header isolation valve

d) Restart the high head safety injection pump no. 1

e) Stop high head safety injection pump no. 2

f) Close the corresponding high head safety injection cross-over isolation valve

g) Close the corresponding high head safety injection cold leg header isolation valve

h) Open the corresponding high head safety injection hot leg header isolation valve

i) Restart the high head safety injection pump no. 2

VERIFICATION:

STEP 3

After completing the above steps, verify that the safety injection system is aligned to hot leg recirculation as follows:

a) Both low head safety injection pumps is aligned to deliver flow directly to the two reactor coolant system hot legs via the single low head safety injection hot leg header while each high head safety injection pump is aligned to deliver flow to the two reactor coolant system hot legs via two separate and redundant high head safety injection hot leg headers.

b) The low head safety injection pumps continue to provide suction flow to the high head safety injection and charging pumps.

c) The charging pumps continue to provide flow directly to the four reactor coolant system cold legs.

d) If containment spray is required, verify flow is being delivered.

STEP 4

If the system alignment has been verified go to E-1 Step 13. If any failures have occurred, proceed to contingency actions.

1387 308

CONTINGENCY ACTIONS

1. LOSS OF ONE TRAIN OF ELECTRICAL POWER:

In the event that a single failure had resulted in a complete loss of power to one of the electrical power trains in conjunction with a LOCA and a loss of offsite power, the hot leg switchover procedures would require some operations to be performed outside the main control room, unless power could be restored to the failed train during the 24 hour cold leg recirculation phase. These operations, outside the main control room, would be necessary to open a hot leg isolation valve and to close a cold leg isolation valve. In both cases this can be accomplished either by manually operating the valve or by disconnecting the power to the valve from the failed train and temporarily connecting it to the available power.

In the following steps, it is assumed that train B failed simultaneously with the accident.

OPERATIONAL STEPS (Assume only Train A Available)

STEP 1

Terminate low head safety injection pump flow to reactor coolant system cold legs and establish low head safety injection flow to reactor coolant system hot legs.

1387 309

a) Close the low head safety injection cold leg header isolation valves

NOTE: Since it is assumed in this case that train B has failed, power to close one isolation valve may not be available. This valve could be closed manually or it could be closed remotely by disconnecting it from train B and temporarily connecting it to train A.

b) Open the low head safety injection crossover isolation valve

c) Open the low head safety injection hot leg header isolation valve

NOTE: Since it is assumed in this case that train B has failed, power to open this valve may not be available. This valve could be opened manually or it could be opened remotely be disconnecting it from train B and temporarily connecting it to train A.

STEP 2

After completing the above step, verify that the safety injection system is aligned to hot leg recirculation as follows:

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a) Both low head safety injection pumps is aligned to deliver flow directly to the two reactor coolant system hot legs via the single low head safety injection hot leg header while each high head safety injection pump is aligned to deliver flow to the two reactor coolant system hot legs via two separate and redundant high head safety injection hot leg headers.

b) The low head safety injection pumps continue to provide suction flow to the high head safety injection and charging pumps.

c) The charging pumps continue to provide flow directly to the four reactor coolant system cold legs.

d) If containment spray is required, verify flow is being delivered.

STEP 3

Go to E-1 Step 13. If any failures have occurred, attempt to operate the equipment manually or locally.

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