NOV 15 1984

Docket Nos: 50-424
and 50-425

APPLICANT: Georgia Power Company

FACILITY: Vogtle, Units 1 and 2

SUBJECT: SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS AUDIT HELD AUGUST 27-30, 1984

From August 27 through August 30, 1984, the staff met with the applicant and its representatives at the Bechtel offices in Norwalk, California to discuss the applicant's responses to staff questions transmitted by letter dated April 30, 1984, and to audit the instrumentation and control systems at Vogtle, Units 1 and 2. The attendees are listed in Enclosure 1.

Enclosure 2 provides a brief summary of the applicant's response and discussion to each of the staff's questions. Enclosure 3 contains meeting handouts that pertain to specific questions. The status indicated on the summary pages indicates the status at the audit meeting and is not necessarily indicative of the staff's classification in its Safety Evaluation Report. The applicant will provide responses to these questions in Amendment 11 to the FSAR by incorporating additional discussion in the responses where necessary.

The staff and applicant also discussed Questions 420.2 through 420.6. In order to satisfy staff concerns, the applicant needs to include a positive statement in item 2 of its response to Q420.2 that emergency operating procedures will address the concerns of IE Bulletin 79-27. The staff indicated that the response to Q420.3 is acceptable. Additional scenarios besides the 4 identified in IE Information Notice 79-22 need to be addressed by the applicant in response to Q420.4. The applicant indicated that the analysis necessary to respond to Q420.5 has not been done yet but should be available in early 1985. In response to Q420.6, the applicant has referenced FSAR paragraph 7.7.2.9. The staff indicated at the meeting that this FSAR section does not contain enough information to answer the question. The applicant needs to revise their response to include the necessary information.

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Enclosures:
As stated

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Enclosure 1

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QUESTION 420.7 (7.1)

Identify any plant safety-related system or portion thereof, for which the design is incomplete at this time.

RESPONSE:

The following safety-related systems were discussed as having their design incomplete at this time.

1) Plant safety monitoring system (PSMS)

2) Alternative shutdown indication panel

3) Auto shunt trip for reactor trip shunt breakers

A description of the alternative shutdown indication panel design basis and auto shunt trip will be incorporated into the FSAR in Amendment 11.

STATUS: Closed

QUESTION 420.8 (7.1)

As called for in Section 7.1 of the Standard Review Plan, provide information as to how your design conforms with the following TMI Action Plan Items as described in NUREG-0737:

(a) II.D.3 - Relief and Safety Valve Position Indication

(b) II.F.1 - Accident Monitoring Instrumentation (Subpart 4)

(c) II.K.3.10 - Proposed Anticipatory Trip Modification

RESPONSE

(a) The design of the relief and safety valve position indication was discussed. The description of the stem mounted reed switches for the valves will be incorporated into the FSAR. Table 7.5.2-1 will be revised to correctly identify the power supply to be class 1E. The alarms that are available will be addressed.

STATUS: Open as of August 27, 1984

(b) The containment pressure normal and extended range instrumentation was discussed. Table 7.5.2-1 will be revised to identify physical limits of indication for level instrumentation instead of 0-100% of span.

STATUS: Confirmatory pending FSAR amendment of table 7.5.2-1.

(c) The setpoint for P-9 at 50% was discussed. The associate analysis will be submitted in response to RSB Question 440.140.

STATUS: Closed

QUESTION 420.9 (7.1)

Provide a brief overview of the plant electrical distribution system, with emphasis on vital buses and separation divisions, as background for addressing various Chapter 7 concerns.

RESPONSE:

A brief overview of the plant electrical distribution system was provided.

STATUS: Closed

QUESTION 420.10 (7.1)

Describe design criteria and tests performed on the isolation devices in the Balance of Plant Systems. Address results of analysis or tests perform to demonstrate proper isolation between separation groups and between safety and non-safety systems.

RESPONSE:.

The various isolation devices were discussed.

- Class 1E 4.16 kV circuit breaker tripped on SI
- ferro-resonant transformers
- circuit breakers - redundant, molded case
- battery chargers
- isolation relays
- fuses
- current transformers
- optical isolators

Additional information will be provided on testing of isolation devices regarding faults imposed and tests performed.

STATUS: Open as of August 27, 1984.

QUESTION 420.11 (7.1)

Describe features of the Vogtle Units 1 & 2 environmental control system which insure that instrumentation sensing and sampling lines for systems important to safety are protected from freezing during extremely cold weather. Discuss the use of environmental monitoring and alarm systems to prevent loss of, or damage to systems important to safety upon failure of the environmental control system. Discuss electrical independence of the environmental control and monitoring system circuits.

RESPONSE:

The two types of heat tracing systems were discussed.

(1) ambient sensed freeze protection for NSCW system

(2) process lines maintained at preselected temperatures controlled by RTDs

Different control panels are used for each train.

Regulatory Guide 1.151, Rev 0 will be evaluated for VEGP, but this RG is not a part of VEGP design basis.

STATUS: Closed

QUESTION 420.12 (7.1)

Provide a list of any non-Class 1E control signals that provide input to class 1E control circuits.

RESPONSE:

The three systems with interface between non-Class 1E and Class 1E control circuits were discussed.

1) AFW pump start on Main Feedwater Pump (MFP) loss

2) BATP interface with non-1E makeup system

3) 4.16 kV Class 1E supply breaker

Isolation devices are provided to separate 1E and non-1E items.

STATUS: Closed

QUESTION 420.13 (7.1)

Identify where microprocessors, multiplexers, or computer systems are used in or interface with safety-related systems. Also identify any "first-of-a-kind" instruments used for safety-related systems.

RESPONSE:

The staff was referred to the standard W SSPS design, which incorporates signal multiplexing for the Control Board and the computer, which is applicable to Vogtle.

The staff was also referred to sections 11.5 and 12.3.4 which contain information regarding the microprocessor based Process and Effluent Radiation Monitoring System (PERMS).

Vogtle is also installing a microprocessor based Plant Safety Monitoring System (PSMS) which provides for qualified display of Reg. Guide 1.97 Category 1 variables (excluding radiation monitoring).

In addition, hardware modifications are being proposed to utilize the PSMS hardware for providing Appendix R isolation capability. This system's design has not been finalized.

STATUS:

This item is confirmatory pending FSAR amendment describing interface between PSMS and alternate shutdown indication system.

QUESTION 420.14 (7.1)

We request that the setpoint methodology for each Reactor Protection Systems (RPS) and Engineering Safeguards Features (ESF) trip setpoint values be provided for both NSSS and BOP scope of supply at the time the Technical Specifications are submitted for review.

RESPONSE:

GPC committed to provide setpoint methodology at the time the Tech Specs are submitted (June 1985). GPC indicated that the W statistical methodology will be used for the NSSS values. A similar methodology will be used for BOP values.

STATUS:

Confirmatory pending T/S submittal.

QUESTION 420.15 (7.1)

Identify any Balance of Plant scope safety-related equipment (other than those listed in Section 7.1.2.5 of the FSAR) that cannot be tested during reactor operation. Include auxiliary relays or other components in the safety-related systems.

RESPONSE:

There are no other BOP scope of safety-related equipment other than those listed in paragraph 7.1.2.5 except for steam generator auxiliary nozzle feedwater isolation valves that cannot be tested during reactor operation. Paragraph 7.1.2.5 will be revised to include this addition.

Review safety-related equipment to ensure that paragraph 7.1.2.5 is complete prior to technical specification submittal scheduled for June 1985. The technical specification will be developed considering the appropriate "go" or "no go" testing arrangements for slave relays.

The turbine stop valve hydraulic pressure transmitters were discussed. The transmitters provide analog signals to bistables in BOP process racks. It was identified that the testing discussed in the standard tech specs cannot be performed on VEGP because indication of the analog signal value is not provided.

STATUS:

Confirmatory pending FSAR amendment and technical specification submittal.

QUESTION 420.16 (7.1)

Discuss the following:

(a) Response time testing of BOP and NSSS protection systems using the design criteria described in position C.5 of R.G. 1.118 and Section 6.3.4 of IEEE 338.

(b) Identify any temporary jumper wires or test instrumentation which will be used. Provide further discussion to describe how the test procedures for the protection systems conform to R.G. 1.118 position C.6.

(c) Typical response time test methods for pressure and temperature sensors.

RESPONSE:

a) The procedures addressing response time testing of protection systems will conform to RG 1.118 position C.5 and IEEE 338 section 6.3.4. Test Procedures will be available 90 days prior to fuel load. (See FSAR 8.1.)

b) No temporary jumper wires or test instrumentation has been identified at this time for safety-related applications. The test procedures will conform to RG 1.118 position C.6., if applicable.

c) VEGP will use in-situ test methods for pressure and temperature sensors.

STATUS: Closed

QUESTION 420.17 (7.2)

Using detailed plant design drawings, discuss the reactor trip breaker and undervoltage relay testing procedures, and the capability of independent verification of the operability of reactor trip breaker shunt and undervoltage coils.

RESPONSE:

The Westinghouse generic automatic shunt trip is being incorporated into the VEGP design. Westinghouse Technical Bulletin 83-03 will be used until auto shunt trip modification has been implemented. The automatic shunt trip feature allows the capability of independent verification of the operability of the added circuitry of reactor trip breaker shunt and undervoltage coils during on-line operation. The technical specification will address the automatic shunt trip.

STATUS: Confirmatory pending technical specification submittal.

QUESTION 420.18 (7.2) (7.3)

Describe the steam generator level instrumentation. Identify the instrument channel used for protection functions and the control functions. Address the control and protection interaction conformance to Section 4.7 of IEEE Std. 279-1971 and the use of the selector switch in steam generator level input shown in FSAR Figure 7.2.1-1 (Sheet 13).

RESPONSE:

The staff was referred to Figure 7.2.1-1 (sheets 7, 13 and 14). Sheet 7 is being revised to change Steamline Isolation on 2/3 Hi-Hi S/G level to 2/4 Hi-Hi S/G level. Conformance to Section 4.7 of IEEE-279-1971 was addressed.

STATUS: This item is confirmatory pending FSAR amendment to Figure 7.2.1-1 (sheet 7) incorporating this change.

QUESTION 420.19 (7.2) (7.6)

Using detailed schematics, describe the design of pressurizer PORV control and the block valve control, and verify that no single failure will preclude the automatic actuation logic for all modes of operation.

RESPONSE

Detailed schematics were used to discuss the design of the pressurizer PORV control and block valve control and to verify that no single failure will preclude the automatic actuation logic for all modes of operation. The Bechtel elementary diagram will be revised to correct the inconsistency with the Westinghouse diagram. Figure 7.2.1-1 (Sheet 17 and 18) will be verified and the cross references corrected in the figure.

STATUS

Confirmatory pending revision of elementary diagram and FSAR amendment.

QUESTION 420.20 (7.2)

The information in Section 7.2.1.1.2 for "Reactor Trip on a Turbine Trip" is insufficient. Please provide further design bases discussion on this subject, per BTP ICSB 26 requirements. As a minimum you should:

(1) Using detailed drawings, describe the routing and separation for this trip circuitry from the sensor in the turbine building to the final actuation in the reactor trip system (RTS).

(2) Discuss how the routing within the non-seismic Category 1 turbine building is such that the effects of credible faults or failures in this area on these circuits will not challenge the reactor trip system and thus degrade the RTS performance. This should include a discussion of isolation devices.

(3) Describe the power supply arrangement for the reactor trip on turbine trip circuitry.

(4) Discuss the testing planned for the reactor trip on turbine trip circuitry.

(5) Discuss seismic qualification of the sensors.

Identify other sensors or circuits used to provide input signals to the other protection systems which are located or routed through non-seismically qualified structures. This should include sensors or circuits providing input for reactor trip, emergency safeguards equipment such as the auxiliary feedwater system, and safety grade interlocks. Verification should be provided that the sensors and circuits meet IEEE-279 and are seismically and environmentally qualified. Testing or analyses performed to insure that failures of non-seismic structures, mountings, etc. will not cause failures which could interfere with the operation of any other portion of the protection system should be discussed.

RESPONSE

The reactor trip on a turbine trip circuitry was discussed including the routing and separation, qualification of the pressure transmitters and limit switches, and testing.

First stage impulse pressure transmitters which are located in the turbine building (a non-seismic structure) were discussed as providing input signals to the solid state protection system.

STATUS

Closed.

QUESTION 420.21 (7.2) (7.3)

Identify where instrument sensors or transmitters supplying information to more than one protection channel are located in a common instrument line or connected to a common instrument tap. The intent of this item is to verify that a single failure in a common instrument line or tap (such as break or blockage) cannot defeat required protection system redundancy. Include a discussion of the pressurizer pressure transmitters mentioned in the second paragraph on page 7.2.1-6 and the fifth paragraph on page 7.2.2-19 of the FSAR.

RESPONSE

The instrument transmitters with common instrument taps were discussed.

- pressurizer pressure transmitters
- reactor coolant flow transmitters.

FSAR pages 7.2.1-6 and 7.2.2-19 will be revised to reflect the design as shown in figure 7.2.1-1 (sheet 6).

STATUS

Confirmatory pending FSAR amendment.

QUESTION 420.22 (7.2)

Provide specific values for the P-6, P-9, and P-13 interlocks.

RESPONSE:

The staff was provided the following information:

P-6, which allows manual block of source Range Reactor Trip, is set at 10^{-10} amps (approximate).

P-9, which blocks Turbine-Trip-on-Reactor-Trip, is set at 50% power.

P-13, which inputs to P-7, is set at Turbine Impulse Pressure 10% of full load.

GPC committed to providing these numbers in the FSAR.

STATUS: This item is confirmatory pending FSAR amendment.

QUESTION 420.23 (7.2)

Discuss the method of redundantly tripping the turbine following receipt of reactor protection signals requiring turbine trip.

RESPONSE

The method of redundantly tripping the turbine following receipt of reactor protection signals requiring turbine trip was discussed including the routing and separation of the circuitry.

STATUS

Closed

QUESTION 420.24 (7.2)

Table 7.2.1-1 of the FSAR shows a 1/4 logic entry for reactor trip on low reactor coolant flow. Please discuss.

RESPONSE:

Table 7.2.1-1 will be clarified for reactor trip on low reactor coolant flow.

STATUS: Confirmatory pending FSAR amendment

QUESTION 420.25 (7.2)

As discussed in Section 7.2.2.3.1. of the FSAR, an isolated output signal from protection system channels is provided for automatic rod control. Discuss how this signal is derived. Discuss what steps, if any, are taken to prevent unnecessary control action during testing of protection system channels with a test source.

RESPONSE:

Testing will be performed in such a manner as to prohibit unwanted rod motion.

STATUS: Closed

QUESTION 420.26 (7.2)

Discuss surveillance of the RTD bypass loop flow indications. Confirm that technical specifications will include surveillance requirements for these indications.

RESPONSE:

The surveillance requirement will be included in Georgia Power Company's Planned Maintenance Program (PMP) but not in the technical specifications. The surveillance frequency will be at least once every refueling outage.

STATUS: Open.

QUESTION 420.27 (7.2)

Recent review of Waterford revealed heaters were used to control temperature and humidity within insulated cabinets housing electrical transmitters that provide inputs to the RPS. These heaters were unqualified and concern was raised that heater failure could cause transmitter degradation. Please address any similar installations at Vogtle Units 1&2. If heaters are used, describe design criteria.

RESPONSE:

The Waterford scenario is not applicable to VEGP.

STATUS: Closed.

QUESTION 420.28 (7.2)

Address the conflicts between the logic for the reactor coolant pump undervoltage and underfrequency trips described in Table 7.2.1-1 of the FSAR and that shown in Figure 7.2.1-1 (Sheet 5).

RESPONSE:

Table 7.2.1-1 will be clarified regarding trips on undervoltage (UV) and Underfrequency (UF). The channel identification of the UV and UF monitoring instrumentation shown in Figure 7.2.1-1, sheet 5, will be clarified.

STATUS: Confirmatory pending FSAR amendment

QUESTION 420.29 (7.3)

Using detailed plant design drawings, discuss the control room essential HVAC system.

RESPONSE

The control room essential HVAC system was discussed in detail using the P&IDs, logics and elementary diagrams. The staff has concerns on override/reset signals and input to the inoperable/ bypass status panel. Figure 7.2.1-1 (sheet 8) will be updated to include chlorine detection for toxic gas isolation.

STATUS

Confirmatory pending FSAR amendment.

QUESTION 420.30 (7.3)

Using detailed plant design drawings, discuss the containment automatic isolation system.

~~NOTES:~~

RESPONSE

The containment automatic isolation system was reviewed using logics and elementary diagrams. Reset/override of the radiation detector input to containment isolation logic will be addressed.

STATUS

Open

QUESTION 420.31 (7.3)

Using detailed logic and schematic diagrams, describe the combustible gas control system initiating circuits, bypasses, interlocks and functional testing.

RESPONSE

The combustible gas control system was discussed including the following subsystems:

- electric hydrogen recombiners
- Hydrogen monitors
- post LOCA cavity purge system
- hydrogen mixing (containment fan coolers)

The initiating circuits, bypasses, interlocks and functional testing were addressed for these subsystems. The post LOCA purge system was discussed briefly as being a non-safety related backup system.

STATUS

Closed.

QUESTION 420.32 (7.3) (7.4)

Using detailed system schematics, describe the sequence for automatic initiation, operation, reset, and control of the auxiliary feedwater system. The following should be included in the discussion:

a) the effects of all switch positions on system operation,
b) the effects of single power supply failures including the effect of power supply failure on auxiliary feedwater control after automatic initiation circuits have been reset in a post accident sequence.
c) any bypasses within the system including the means by which it is insured that the bypasses are removed.
d) initiation and annunciation of any interlocks or automatic isolations that could degrade system capability.
e) The safety classification and design criteria for any air systems required by the auxiliary feedwater system. This should include the design bases for the capacity of air reservoirs required for system operation.
f) design features provided to terminate auxiliary feedwater flow to a steam generator affected by either a steam line or feed line break.
g) system features associated with shutdown from outside the control room.

RESPONSE:

Using P&IDs and elementary diagrams, the above items a) through g) were reviewed. Georgia Power Company is to provide a commitment regarding testing of the auxiliary feedwater system (item c).

STATUS:

Confirmatory pending FSAR amendment on testing.

QUESTION 420.33 (7.3)

Section 7.3.1.1.1.1 of the FSAR does not include the turbine-driven auxiliary feedwater pump as relying on ESFAS initiation. Please discuss.

RESPONSE

FSAR figure 7.2.1-1 (sheet 15) shows the ESFAS initiation for turbine-driven auxiliary feedwater pump. It was indicated that initiation on SI signal could produce excessive cooldown. The pump is initiated on low-low level in 2 of 4 steam generators. FSAR figure 7.2.1-1 (sheet 15) will be clarified regarding the use of the term blackout.

STATUS

Confirmatory pending FSAR amendment.

QUESTION 420.34 (7.3) (7.4)

Using detailed plant design drawings, illustrate that the components in the auxiliary feedwater turbine-driven pump fluid paths are totally dependent from AC power sources. Discuss the capability to control or terminate auxiliary feedwater flow under a loss of AC power event.

RESPONSE:

The elementary diagrams were reviewed and it was demonstrated that the turbine driven pump fluid paths are independent of AC power sources.

STATUS:

Closed

QUESTION 420.35 (7.3) (7.4)

Discuss the water sources of the auxiliary feedwater system and the capability to transfer one source to the other.

RESPONSE:

The water sources of the auxiliary feedwater system (redundant CSTs) were reviewed and the capability to transfer one source to the other was discussed.

STATUS:

Closed

QUESTION 420.36 (7.3)

For main steam and feedwater line valve actuation, describe control circuits for isolation valves and include automatic, manual and test features. Indicate whether any valve can be manually operated and indicate specific interfaces with the safety system electrical circuits.

~~NOTES:~~

RESPONSE

Reviewed main steam and feedwater line valve actuation including electrical wiring diagrams. Automatic, manual and test features were discussed. Interfaces with the safety system electrical circuits were also discussed. Table 7.3.1-2 will be revised to include all actuation signals for feedwater and steam line isolation. Provide justification for no-go testing arrangements which do not check continuity through the final testable actuating device.

STATUS

Open.

QUESTION 420.37 (7.3)

Using detailed schematics, describe the operation of the containment heat removal system initiating circuits, interlocks and functional testing.

RESPONSE

The containment heat removal systems, containment spray and containment coolers, were reviewed with the aid of the P&IDs, logics and elementary diagrams. The testability of the containment spray system and containment coolers was discussed and confirmed. FSAR subsection 8.3.1 will be clarified regarding flooding of containment narrow range level indication and inconsistency with Table 7.5.2-1.

STATUS

Confirmatory pending FSAR amendment.

QUESTION 420.38 (7.3)

Using logic and schematic diagrams, describe the safety injection system initiating circuits, bypasses, interlocks and functional testing.

RESPONSE

The safety injection system initiating circuits, bypasses, interlocks and functional testing were discussed using the logics, P&IDs, and elementary diagrams.

STATUS

Closed.

QUESTION 420.39 (7.3)

Using logic and schematic diagrams, describe the AC emergency power system (diesel generators and sequencer), initiating circuits, bypasses, interlocks and functional testing.

RESPONSE

Referred to previously submitted response to question 430.69. The response addressed sequencer logic, operation, and testing. The sequencer logic diagram was reviewed.

STATUS

Closed.

QUESTION 420.40 (7.3)

As discussed in Section 5.4.15.2 of the FSAR, the reactor vessel head vent system consists of two parallel flow paths with redundant isolation valves in each flow path. Discuss operation of this system from the control room. Since the redundant valves are powered from the same vital power supply, discuss what measures (separation, grounded shield leads, etc.) are used to satisfy item A(8) of II.B.1 of NUREG-0737.

RESPONSE

The reactor vessel head vent system was discussed including power supply and action item II.B.1 of NUREG-0737. It was identified that Target Rock valves are used in the system.

STATUS

Closed

QUESTION 420.41 (7.3)

Using detailed drawings, describe the ventilation systems used to support engineered safety features areas including areas containing systems required for safe shutdown. Discuss the design bases for these systems including redundancy, testability, etc.

RESPONSE

The list of ventilation systems used to support engineered safety features was presented. The control room HVAC and fuel handling building HVAC were reviewed in detail using the logics, P&IDs and elementary diagrams. The electrical tunnel ventilation system was reviewed briefly.

The staff was concerned on the control room and fuel handling building HVAC override/reset design and the input to the inoperable bypass status panel (Question 420.29).

The tunnel system fan initiation will be reviewed as part of the Regulatory Guide 1.151 evaluation (Question 420.11).

STATUS

Closed.

QUESTION 420.42 (7.3)

Using detailed electrical schematics and piping diagrams, discuss the automatic and manual operation and control of the station service cooling water system and the component cooling water system. Discuss the interlocks, automatic switchover, testability, single failure, channel independence, indication of operability, and the isolation functions.

RESPONSE

With the aid of elementary diagrams and P&IDs, the component cooling water system and nuclear service cooling water system were reviewed including interlocks, automatic switchover, testability, single failure, channel independence, indication of operability, and isolation functions.

STATUS

Closed.

QUESTION 420.43 (7.3)

Identify any pneumatically operated valves in the ESF system. Using detailed schematics, describe their operation on loss of instrument air system.

RESPONSE

The pneumatically operated valves in the ESF systems are identified in table 9.3.1-2. This table will be revised to include valves HV-606, HV-607, FV-618, and FV-619. These valves fail to their safe condition on loss of air.

STATUS

Confirmatory pending FSAR amendment.

QUESTION 420.44 (7.3)

Discuss the testing provision in the engineered safety feature P-4 interlocks.

RESPONSE:

The design will include a permanently installed voltmeter. This design will be described in the FSAR.

STATUS: Confirmatory pending FSAR amendment

QUESTION 420.45 (7.3)

On May 21, 1982, Westinghouse notified the Commission of a potentially adverse control and protection system interaction whereby a single random failure in the volume control tank (VCT) level control system could lead to a loss of redundancy in the safety injection system for certain Westinghouse plants. Discuss the VCT level control system in the Vogtle Unit 1 and 2 design.

RESPONSE

The VCT level control system for VEGP was discussed, with the aid of the P&IDs.

STATUS

Closed.

QUESTION 420.46 (7.3)

Confirm that the BOP interface requirements specified in WCAP-8760, "Failure Mode and Effects Analysis of the Engineered Safety Features Actuation System" have been met, and include a statement in the FSAR to that effect.

RESPONSE

The design criteria for controls and electrical design incorporates the requirements of WCAP-8760. The FSAR will be revised to include an appropriate statement.

STATUS

Confirmatory pending FSAR amendment.

QUESTION 420.47 (7.3)

On August 6, 1982, Westinghouse notified the staff of a potential undetectable failure in online test circuitry for the master relays in the engineered safeguards systems. The undetectable failure involves the output (slave) relay continuity proving lamps and their associated shunts provided by test pushbuttons. If after testing, a shunt is not provided for any proving lamp because of a switch contact failure, any subsequent safeguards actuation could cause the lamp to burn open before its associated slave relay is energized. This would then prevent actuation of any associated safeguards devices on that slave relay. Until an acceptable circuit modification is designed, Westinghouse has provided test procedures that ensure that the slave relay circuits operate normally when testing of the master relays is completed. Discuss this issue as applied to Vogtle Units 1 and 2.

RESPONSE:

The hardware modification identified by Westinghouse will be implemented. A description of the modification will be described in the FSAR.

STATUS: Confirmatory pending FSAR amendment.

QUESTION 420.48 (7.4)

Use plant design drawings to discuss the main steam power operated relief valve control scheme. Is this a safety grade system?

RESPONSE:

Using plant design drawings, the main steam power operated relief valve control scheme was discussed. The valves are safety related electro-hydraulic valves.

STATUS:

Closed

QUESTION 420.49 (7.4)

Describe the capability of achieving hot and cold shutdown from outside the control room. As a minimum, provide the following information:

a) Location of transfer switches and remote control stations (include layout drawings, etc.)

b) Design criteria for the remote control station equipment including transfer switches.

c) Description of distinct control features to both restrict and to assure access, when necessary, to the displays and controls located outside the control room.

d) Discuss the testing to be performed during plant operation to verify the capability of maintaining the plant in a safe shutdown condition from outside the control room.

e) Description of isolation, separation and transfer/overide provisions. This should include the design basis for preventing electrical interaction between the control room and remote shutdown equipment.

f) Description of any communication systems required to coordinate operator actions, including redundancy and separation.

g) Description of control room annunciation of remote control or overriden status of devices under local control.

h) Means for ensuring that cold shutdown can be accomplished.

i) Discuss the separation arrangement between safety-related and non-safety-related instrumentation on the auxiliary shutdown panel.

NOTES:

Response:
a) transfer switches on remote panels located in two separate rooms.
b) The design criteria was reviewed and will be submitted in ~~a~~ FSAR amendment.
c) Access is controlled through key lock card readers tied into the plant security system.
d) ~~Preop~~ Initial testing in accordance with RG 1.68 and operational testing will be conducted during mode progression

e) The equipment necessary for cold shutdown is can be isolated from the control room through transfer switches.

f) Additionally one train (3) of selected indication and operator interface equipment necessary for cold shutdown would be isolated from control room. (see Q 420.7)

f) Refer to 9.5.2 for discussion of Plant communications

T 9.5.2-1 lists communication systems specifically available for Remote shutdown.

(g) all transfer switches of a train on a given panel are ganged together. One switch out of CR position annunciate in control room.

(h) The shutdown panels are designed to take the plant to cold shutdown.

(i) Reviewed the shutdown panel drawings. Separation is provided between safety and non-safety circuits

Status: Confirmatory pending submittal of design criteria in FSAR amendment.

QUESTION 420.50 (7.5)

Using detailed plant design drawings (schematics), discuss the design pertaining to bypassed and inoperable status indication. As a minimum, provide the information to describe:

1) The design philosophy used in the selection of equipment/systrems to be monitored.

2) Justification for not providing bypass and inoperable status indication in accordance with position B2 of ICSB Branch Technical Position No. 21 for the fuel handling building ESF HVAC system as stated in Section 7.5.5.3 of the FSAR.

The design philosophy should describe as a minimum the criteria to be employed in the display of inter-relationships and dependencies on equipment/systems and should insure that bypassing or deliberately induced inoperability of any auxiliary or support system will automatically indicate all safety systems affected.

~~NOTES:~~

RESPONSE

Detailed plant design drawings were discussed pertaining to bypassed and ~~or~~ inoperable status indication. The design philosophy used in the selection of the equipment/systems to be monitored were reviewed. The design is being modified to provide bypass/inoperable status indication in unit 2 for the FHB ESF HVAC system.

Procedures will be used to identify inoperability of other systems due to indicated inoperability. The interfacing systems will be ~~isolated~~ indicated manually.

STATUS

Open pending FSAR amendment describing annunciator response procedure.

QUESTION 420.51 (7.5)

Use schematic and layout drawings to discuss the physical separation and wiring for redundant safety related instruments on the main control board.

RESPONSE

The VEGP philosophy is the same as previously reviewed designs and is discussed in subsection 7.1.2. The safety related circuits are enclosed in metal module cans, flexible conduit and metal wire ways. At exit points barriers are provided or the circuits are separated by a distance of at least six inches.

STATUS

Closed.

QUESTION 420.52 (7.6)

Provide a discussion (using detailed drawings) on the residual heat removal (RHR) system as it pertains to Branch Technical Positions ICSB 3 and RSB 5-1 requirements. Specifically, address the following as a minimum:

a) Testing of the RHR isolation valves as required by Branch Position E. of BTP RSB 5-1.

b) Capability of operating the RHR from the control room with either only onsite or only offsite power available as required by Position A.3 of BTP RSB 5-1. This should include a discussion of how the RHR system can perform its function assuming a single failure.

c) Describe any operator action required outside the control room after a single failure has occurred and justify.

RESPONSE

The four channel design of the RHR suction valves, including four diverse pressure transmitters and interlocks were reviewed. The design satisfies RSB 5-1 and ICSB-3. Item c) of the question is not applicable due to four channel design.

STATUS

Closed.

QUESTION 420.53 (7.6)

Identify points (other than RHR) of interface between the Reactor Coolant System (RCS) and other systems whose design pressure is less than that of the RCS. For each such interface, discuss the degree of conformance to the requirements of Branch Technical Position ICSB 3. Also discuss how the associated interlock circuitry conforms to the requirements of IEEE Standard 279. The discussion should include illustrations from applicable drawings.

RESPONSE

The points of interface between high/low pressure interface were reviewed. For the interfaces, the applicability of ICSB-3 was reviewed. The only motor operated valves for which interlock circuitry as discussed in ICSB-3 is applicable is the RHR hot leg suction valves. This interlock circuitry conforms to IEEE Standard 279.

STATUS

Closed.

QUESTION 420.54 (7.6)

Using detailed system schematics, describe the power distribution for the accumulator valves and associated interlocks and controls including position indication in the control room and bypass indicator light arrangement. Discuss conformance to the requirements of Branch Technical Position ICSB-4.

RESPONSE

Referred to response previously submitted to question 430.73. The detailed system schematics, associated interlocks, position indication, and conformance with ICSB-4 were reviewed.

STATUS

Closed.

QUESTION 420.55 (7.6)

Discuss interlocks for RCS pressure control during low temperature operation.

RESPONSE

Referred to figure 7.2.1-1 (sheet 17) and described interlock between pressurizer pressure and PORV and block valve operation.

STATUS

Closed.

QUESTION 420.56 (7.6)

Describe the automatic and manual design features permitting switchover from the injection to the recirculation mode of emergency core cooling, including protection logic, component bypasses and overrides, parameters, monitored and controlled, and test capabilities.

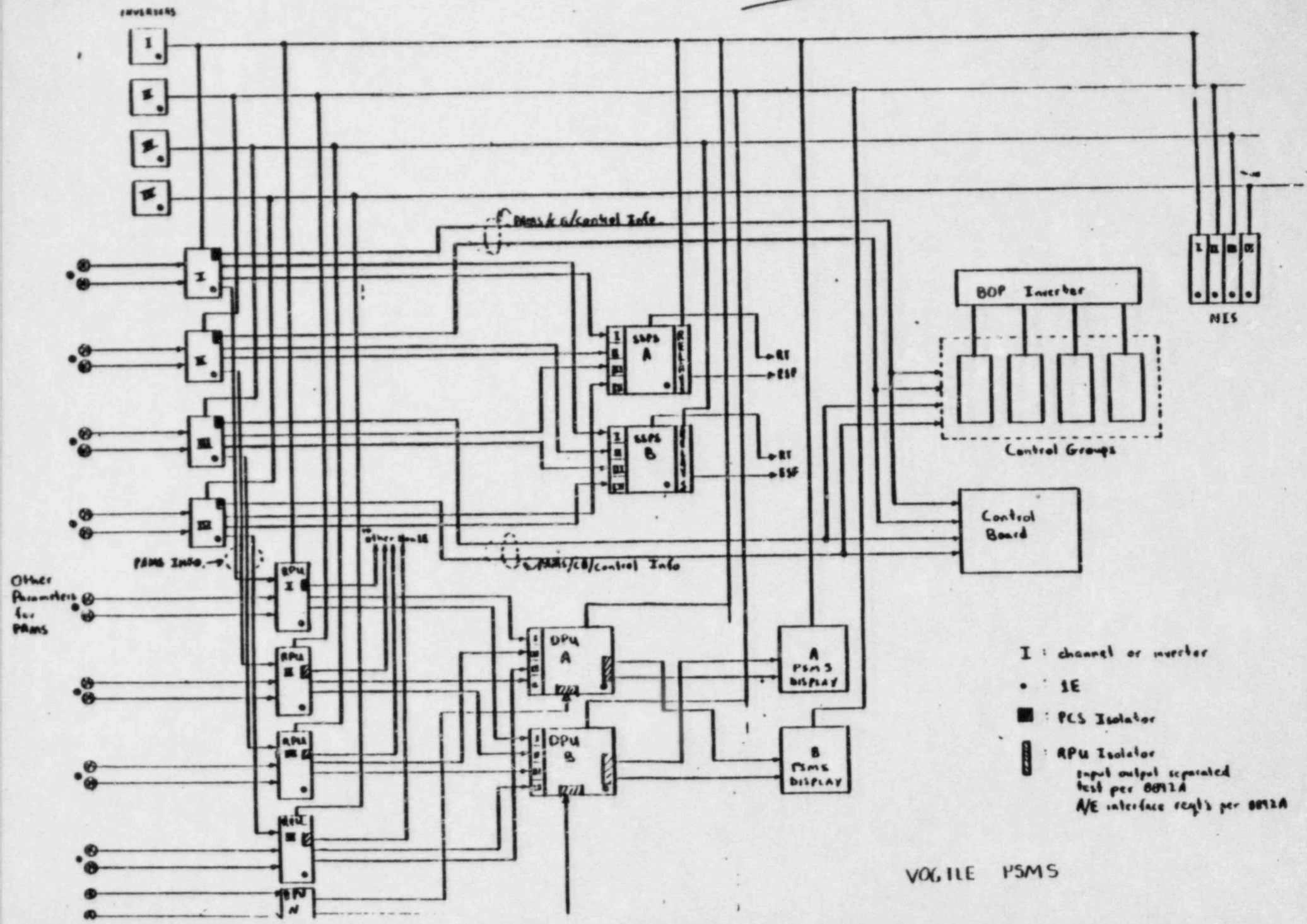
RESPONSE

The switchover sequence from the injection to the recirculation mode of emergency core cooling was discussed including protection logic, component bypasses and overrides, monitored and controlled parameters and test capabilities. Figure 7.6.5-1 (Sheet 2) will be revised to include indicating light for K740 (latch in relay). The FSAR will be revised to include a discussion.

STATUS

Confirmatory pending FSAR amendment.

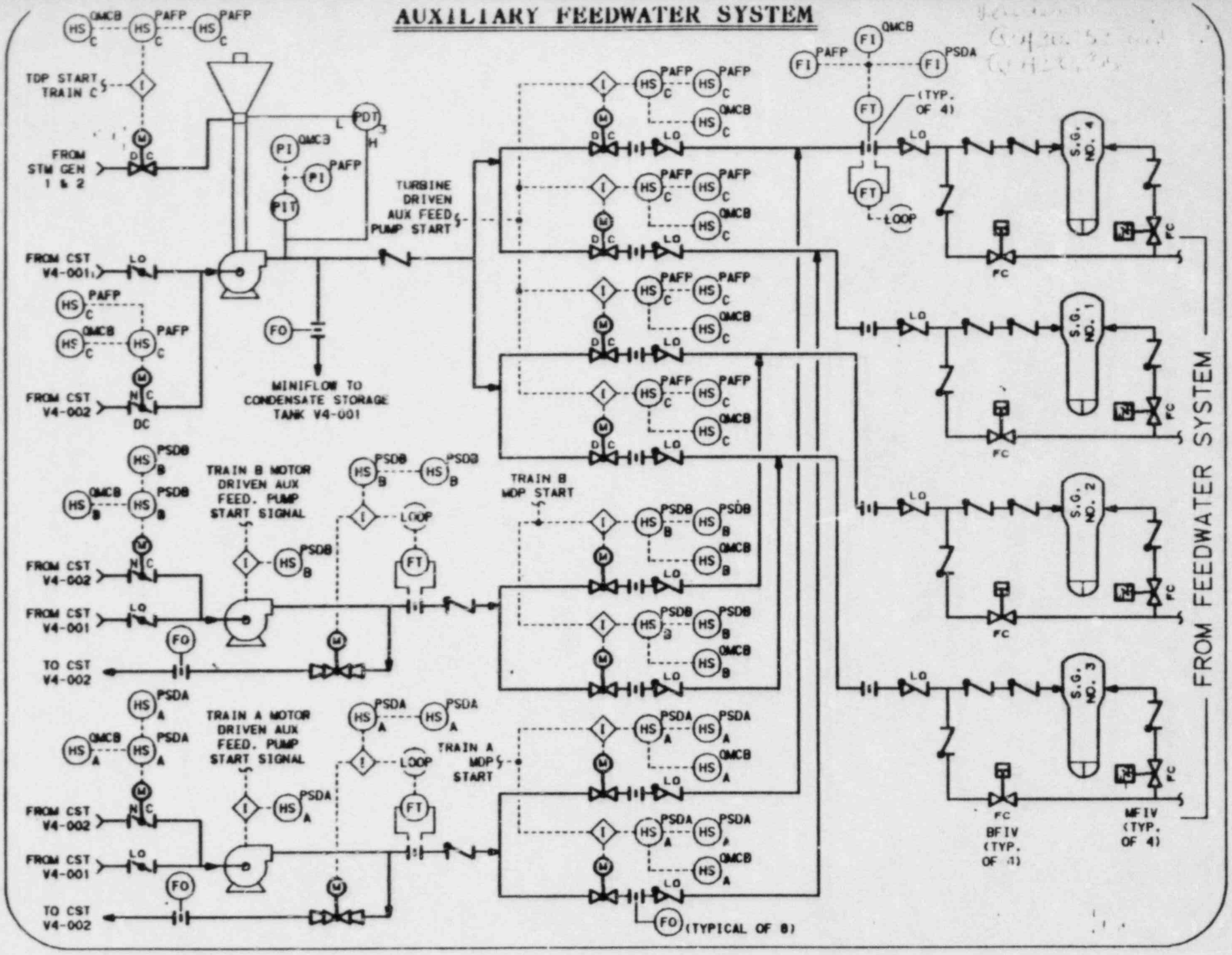
DRAFT



VOGTLE PSMS

Enclosure 3

AUXILIARY FEEDWATER SYSTEM



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VOGTLE AUXILIARY FEEDWATER SYSTEM

- CONFORMS TO (W) RECOMMENDED DESIGN FOR 4-LOOP PLANT, WITH 2 MOTOR-DRIVEN PUMPS (MDP'S) EACH FEEDING TWO STEAM GENERATORS AND ONE TURBINE-DRIVEN PUMP (TDP) FEEDING ALL FOUR STEAM GENERATORS.

- SYSTEM STARTS AUTOMATICALLY WHEN REQUIRED, AND IS FULL OPERABLE FROM EITHER THE CONTROL ROOM OR THE SHUTDOWN AND PAFP PANELS.

- THE MOTOR-DRIVEN TRAINS START AUTOMATICALLY UPON:

  A) SAFETY INJECTION
  B) LO-LO WATER LEVEL IN ONE STEAM GENERATOR
  C) TRIP OF BOTH MAIN FEEDWATER PUMPS
  D) LOSS-OF-OFFSITE POWER

- THE TURBINE-DRIVEN TRAIN STARTS AUTOMATICALLY UPON:

  A) LO-LO WATER LEVEL IN TWO OR MORE STEAM GENERATORS
  B) LOSS-OF-OFFSITE POWER

- EACH MDP AND TDP START SIGNALS ALSO OPEN THE RESPECTIVE PUMP DISCHARGE FLOW CONTROL VALVES.

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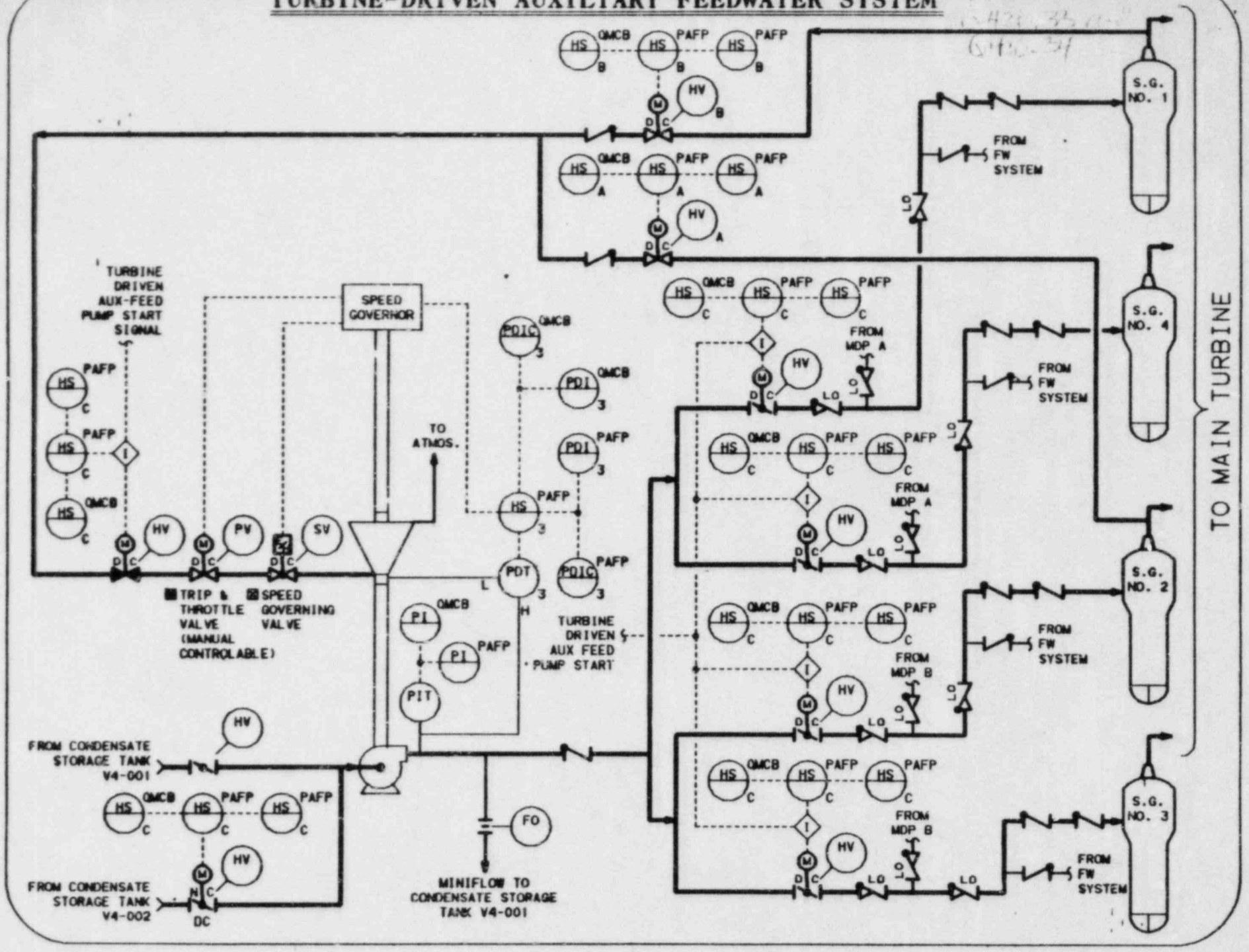
TURBINE-DRIVEN AUXILIARY FEEDWATER SYSTEM



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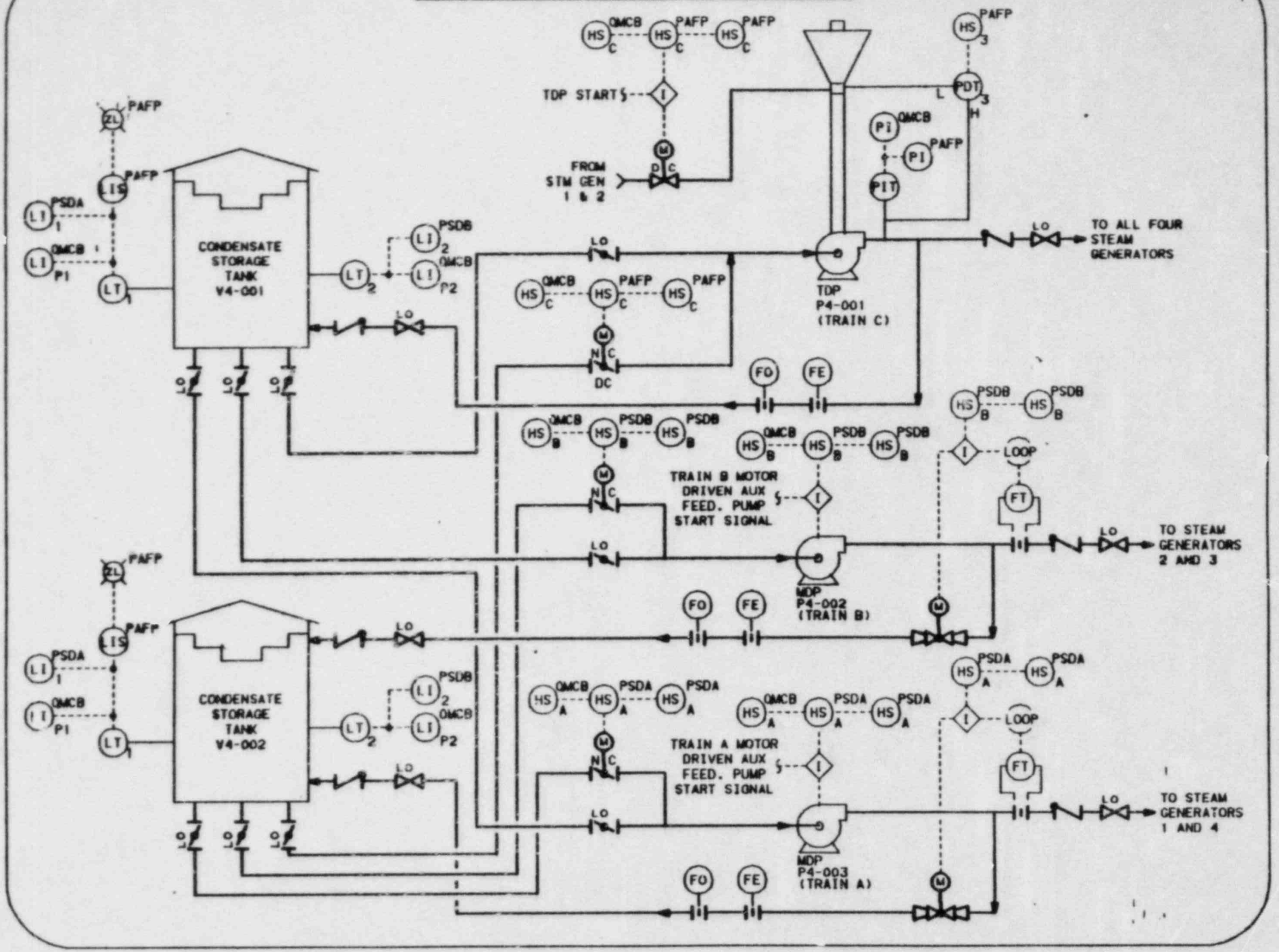
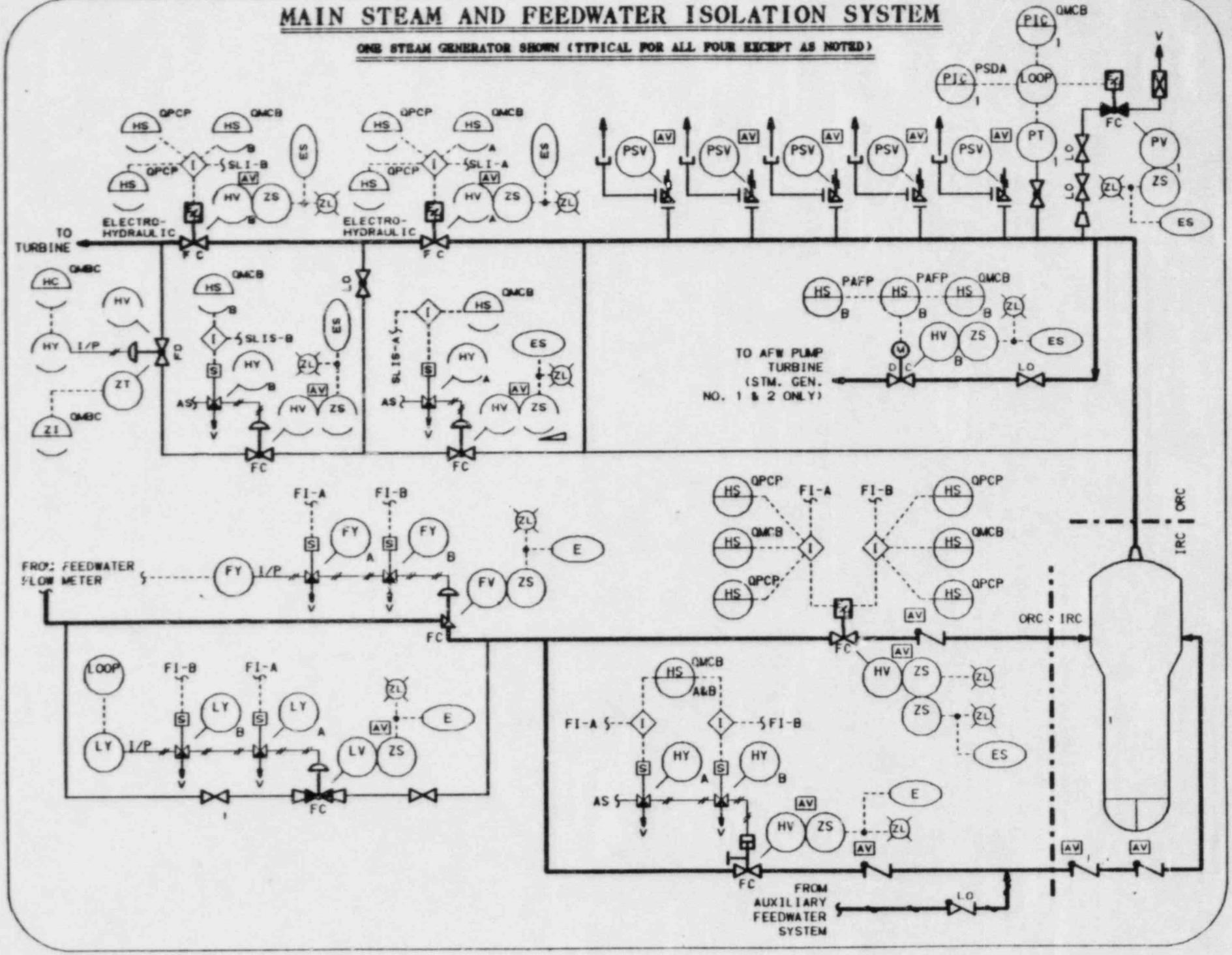
CONDENSATE STORAGE SYSTEM



MAIN STEAM AND FEEDWATER ISOLATION SYSTEM

ONE STEAM GENERATOR SHOWN (TYPICAL FOR ALL FOUR EXCEPT AS NOTED)



MAIN STEAM ISOLATION VALVE (MSIV)

- CLOSES UPON THE FOLLOWING (SLIS):
  - LOW STEAM LINE PRESSURE IN ONE OF FOUR LOOPS
  - HIGH CONTAINMENT PRESSURE (HI-2)
  - HIGH STEAM PRESSURE RATE IN ONE OF FOUR LOOPS
  - MANUAL ACTUATION (INDIVIDUALLY OR AS A GROUP)

- ELECTRO-HYDRAULIC VALVE USING STORED GAS (GN_2) WHICH DRIVES A HYDRAULIC PISTON FOR FAST VALVE CLOSURE (5 SECS). DUAL REDUNDANT HYDRAULIC AND ELECTRIC CIRCUITS PROVIDED FOR FAST CLOSURE MODE

- AIR-DRIVEN HYDRULIC PUMP (NOT REDUNDANT) PROVIDED FOR SLOW OPENING AND SLOW CLOSURE MODES

- VALVE CAN BE STROKED TO 90% OPEN POSITION TO TEST VALVE ACTUATOR DURING POWER GENERATION

- 3 SETS OF DUAL POSITION SWITCHES (FULL-OPEN, 90% OPEN, FULL CLOSED)

- INSTRUMENTATION PROVIDED TO MONITOR HYDRAULIC LEVEL AND HYDRAULIC GN_2 PRESSURE

MAIN FEEDWATER ISOLATION VALVE (MFIV)

- CLOSES UPON THE FOLLOWING (FI) (ALSO CLOSES BFIV & FW CONTROL & BYPASS)
  - SAFETY INJECTION SIGNAL (SI)
  - STEAM GENERATOR HI-HI WATER LEVEL IN ANY STEAM GENERATOR
  - LOW T_{ave} COINCIDENT WITH REACTOR TRIP
  - INDIVIDUALLY BY MANUAL CONTROL

- ELECTRO-HYDRAULIC VALVE USING STORED GAS (GN_2) WHICH DRIVES A HYDRAULIC PISTON FOR FAST VALVE CLOSURE AND OPENING. DUAL REDUNDANT HYDRAULIC AND ELECTRIC CIRCUITS PROVIDED FOR FAST ACTUATION MODE

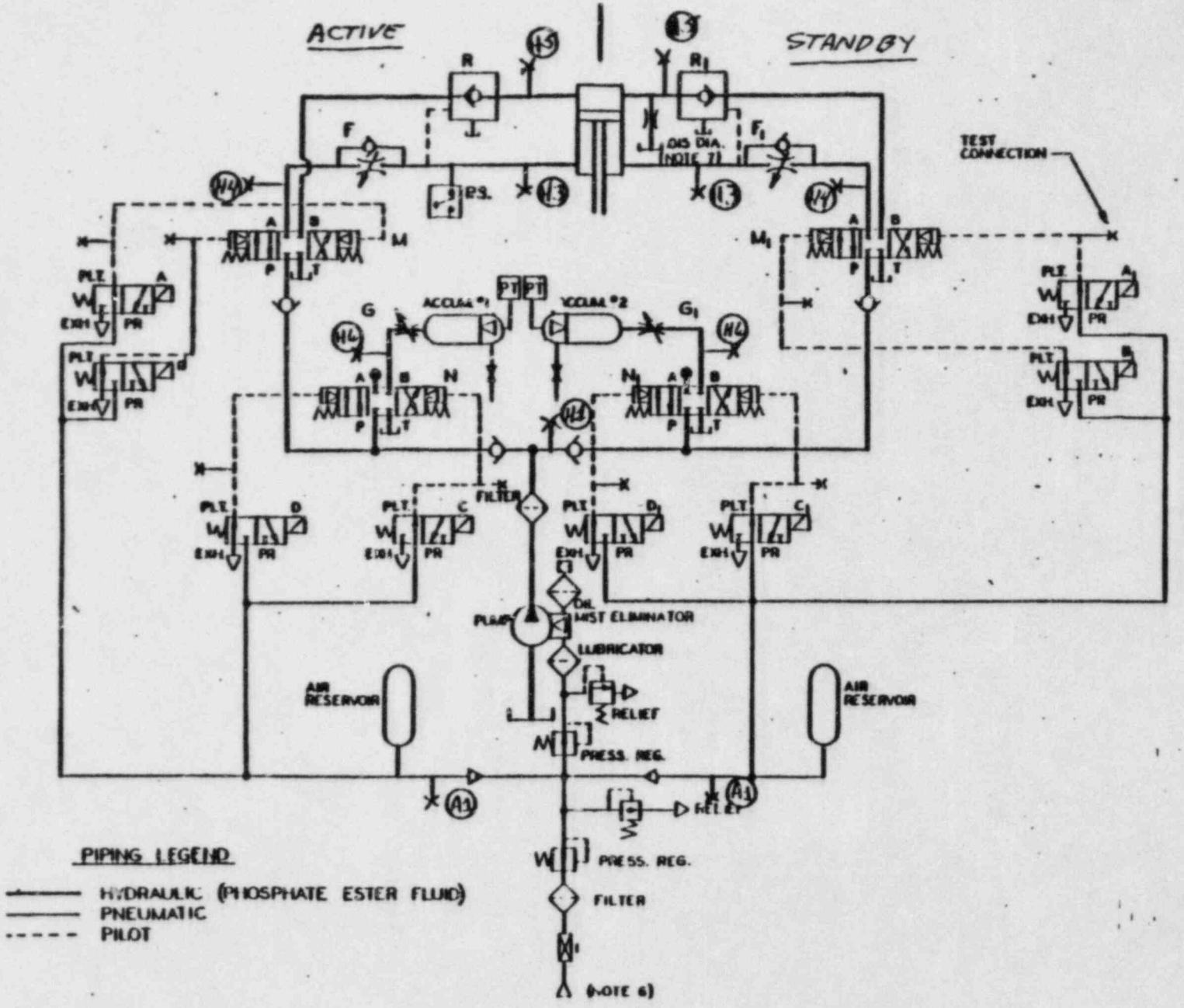
- AIR-DRIVEN HYDRAULIC PUMP (NOT REDUNDANT) PROVIDED FOR SLOW OPENING AND SLOW CLOSURE MODES

- VALVE CAN BE STROKED TO 90% OPEN POSITION TO TEST VALVE ACTUATOR DURING POWER GENERATION

- 3 SETS OF DUAL POSITION SWITCHES (FULL-OPEN, 90% OPEN, FULL CLOSED)

- NITROGEN PRESSURE AND HYDRAULIC LEVEL SWITCHES FOR LOW ALARMS

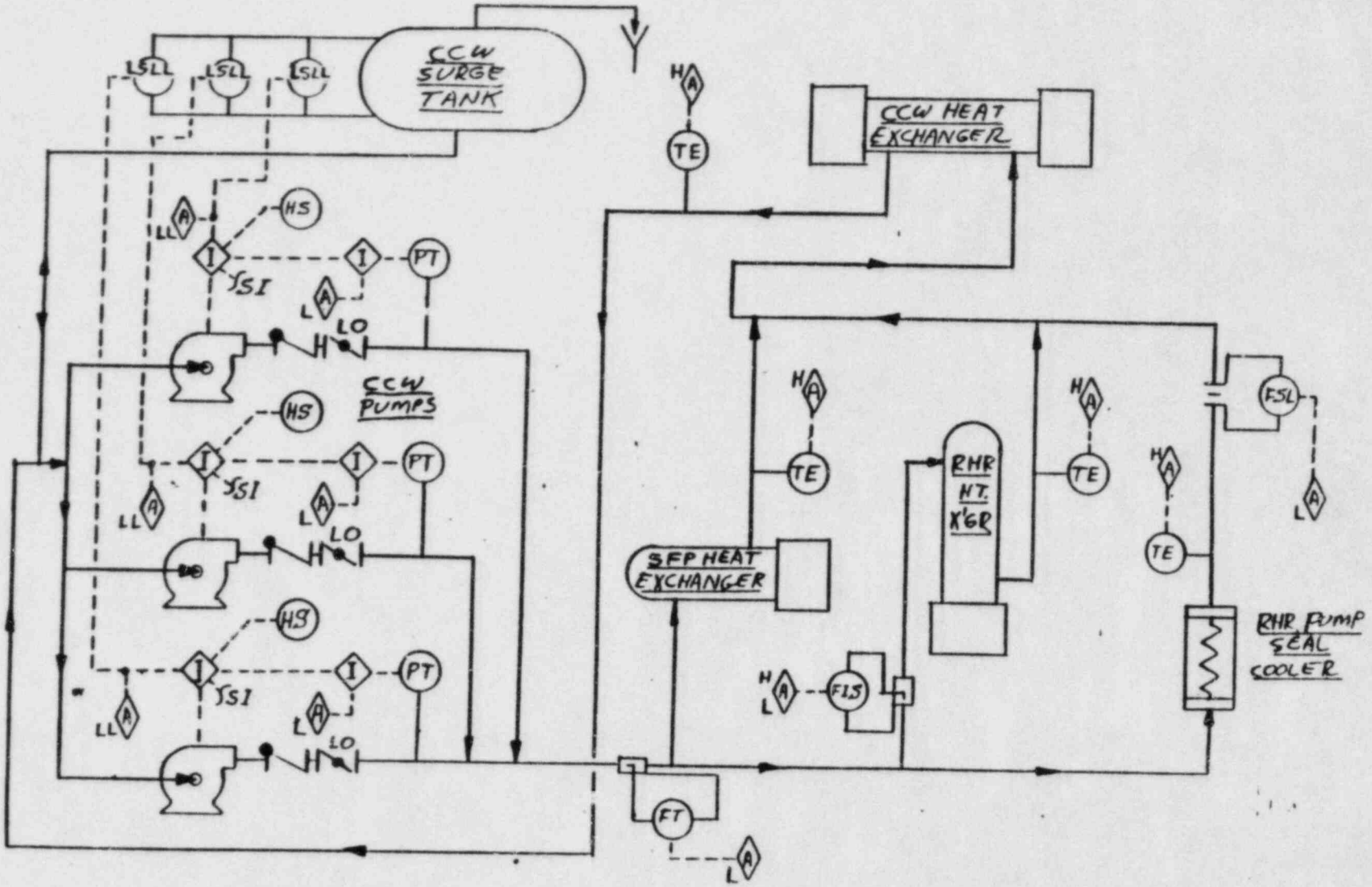
MFWIV ACTUATOR SCHEMATIC



Related to QA 20042-

COMPONENT COOLING WATER (CCW) SYSTEM

(One Train Shown - Other Train Essentially Identical)



COMPONENT COOLING WATER (CCW)
PUMP OPERATION

- TWO PUMPS IN ONE TRAIN IN CONTINUOUS OPERATION, REMAINING PUMP AND OTHER TRAIN ON STANDBY

- PREFERRED PUMPS START UPON THE FOLLOWING:

  A) MANUALLY FROM CONTROL ROOM OR SHUTDOWN PANEL
  B) AUTOMATICALLY UPON:

     1) LOSS-OF-OFFSITE POWER OR SAFETY INJECTION
     2) AUTO TRIP OF ANY PUMP IN SAME TRAIN
     3) LOW DISCHARGE HEADER PRESSURE, ONE OTHER PUMP IN SAME TRAIN RUNNING

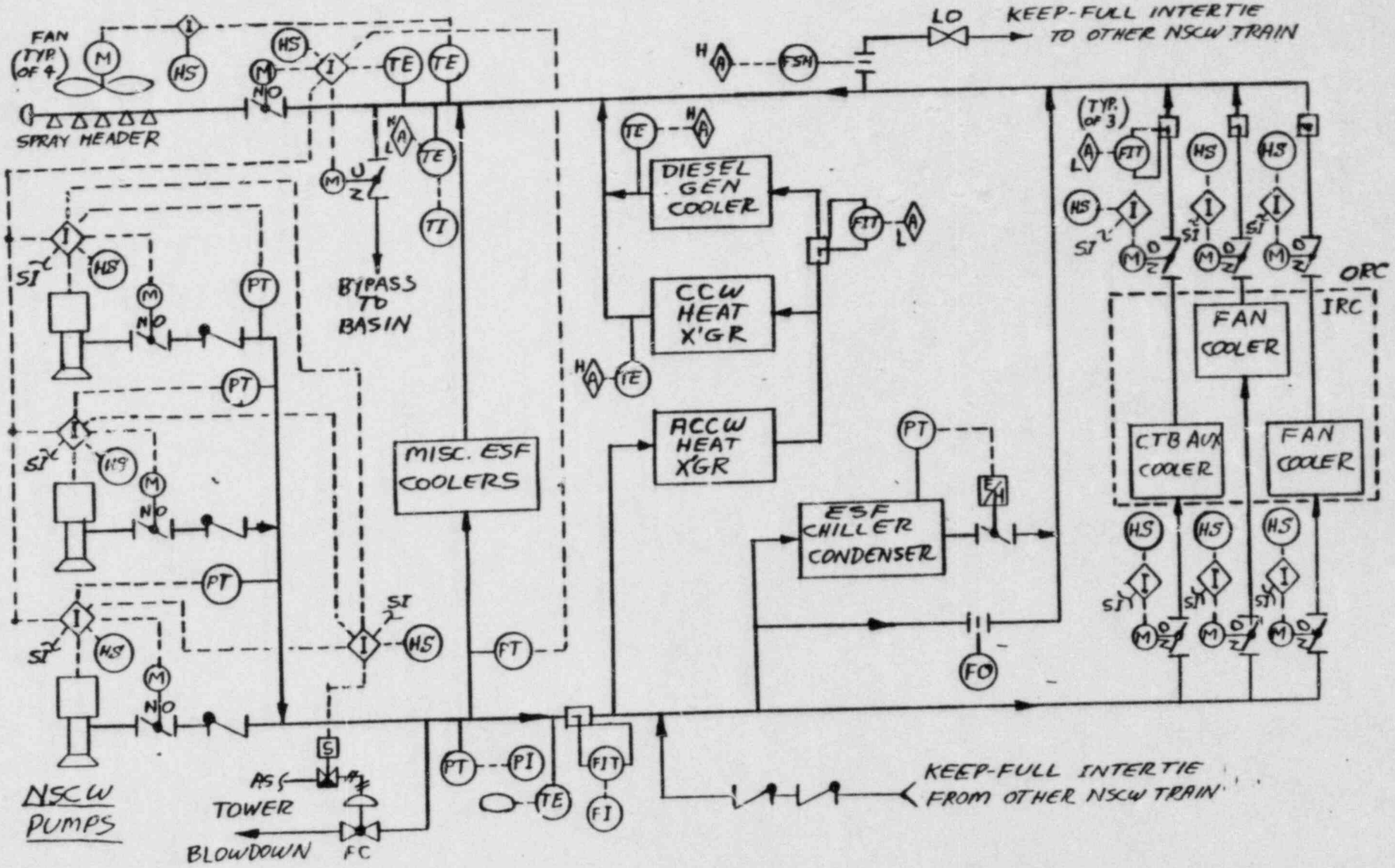
- STANDBY PUMP IN EACH TRAIN STARTS UPON THE FOLLOWING:

  A) MANUALLY FROM CONTROL ROOM OR SHUTDOWN PANEL
  B) AUTOMATICALLY UPON:

     1) LOSS-OF-OFFSITE POWER OR SAFETY INJECTION IF ONE PREFERRED PUMP DOES NOT START
     2) AUTO TRIP OF ANY PUMP IN SAME TRAIN
     3) LOW DISCHARGE HEADER PRESSURE, ONE OTHER PUMP IN SAME TRAIN RUNNING

NUCLEAR SERVICE COOLING WATER (NSCW) SYSTEM

(One Train Shown - Other Train Essentially Identical)



NUCLEAR SERVICE COOLING WATER (NSCW) SYSTEM OPERATION

- TWO PUMPS IN ONE TRAIN IN CONTINUOUS OPERATION, REMAINING PUMP AND OTHER TRAIN ON STANDBY
- STANDBY PUMP IN OPERATING TRAIN STARTS AUTOMATICALLY UPON AUTO-TRIP OF ANY PUMP IN SAME TRAIN, OR UPON LOW DISCHARGE HEADER PRESSURE WITH ONE OTHER PUMP IN SAME TRAIN RUNNING.
- PUMP DISCHARGE MOV CLOSES WHENEVER RESPECTIVE NSCW PUMP NOT RUNNING, AND OPENS COINCIDENT WITH PUMP START. VALVE MUST BE CLOSED BEFORE PUMP CAN START.
- TOWER MOV'S PROCESS CONTROLLED BY RETURN WATER TEMPERATURE, WITH BOTH VALVES CLOSED WHEN RESPECTIVE TRAIN NOT IN SERVICE.
- TOWER FANS PROCESS CONTROLLED BY RETURN WATER TEMPERATURE, WITH NO OTHER INTERLOCKS.
- TOWER BLOWDOWN ISOLATED UPON SAFETY INJECTION OR IF RESPECTIVE TRAIN NOT IN SERVICE.

NSCW SYSTEM OPERATION POST-LOCA COINCIDENT WITH LOSS-OF-OFFSITE POWER

- DATA APPLIES TO TRAIN IN SERVICE AT TIME OF ACCIDENT
- ALL TIMES INCLUDE 10.0 SECONDS FOR THE DIESEL GENERATOR TO START AND ACCEPT LOAD.
- BOTH TOWER VALVES FULLY CLOSED AT 30.5 SECS.
- ALL PUMP DISCHARGE VALVES START TO CLOSE AT 10.5 SECS. AND ARE FULLY CLOSED AT 40.5 SECS.
- AT LEAST TWO NSCW PUMPS START AT 45.5 SECS. AND RESPECTIVE DISCHARGE VALVES START TO OPEN.
- PUMP DISCHARGE VALVES FULLY OPENED AT 75.5 SECS. AND NSCW SYSTEM REPRESSURIZED.
- ONE TOWER VALVE (PROCESS CONTROLLED) STARTS TO OPEN BETWEEN 50.5 AND 70.5 SECS., AND IS FULLY OPENED 20 SECONDS LATER.
- NSCW SYSTEM FULLY OPERATIONAL WITHIN 70.5 AND 90.5 SECONDS AFTER THE ACCIDENT.