Department of Energy
Washington, D.C. 20545

Docket No. 50-537
HQ:S:82:138

DEC 0 6 1982

Mr. Paul S. Check, Director
CRBR Program Office
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Check:

INSTRUMENTATION (CHAPTER 7) WORKING MEETINGS - ADDITIONAL INFORMATION

Reference: 1) J. R. Longenecker to P. S. Check, Subject: Meeting Summary for Instrumentation (Chapter 7) Working Meeting, September 21 and 22, 1982, dated September 24, 1982

2) J. R. Longenecker to P. S. Check, Subject: Meeting Summary for Instrumentation (Chapter 7) Working Meeting, November 18 and 19, 1982, dated November 29, 1982

Enclosed is the additional information requested during the subject meetings for which a response date of December 1, 1982, was projected. The amended Preliminary Safety Analysis Report (PSAR) pages will be incorporated into a future PSAR revision.

Any questions regarding the information provided or further activities can be addressed to Mr. R. Rosecky (FTS 626-6149) or Mr. A. Meller (FTS 626-6355) of the Project Office Oak Ridge staff.

Sincerely,

John R. Longenecker

John R. Longenecker
Acting Director, Office of
Breeder Demonstration Projects
Office of Nuclear Energy

D001
1/39

Enclosure

cc: Service List
Standard Distribution
Licensing Distribution

ENCLOSURE

Instrumentation and Control (Chapter 7) September 21 and 22, 1982, and November 18 and 19, 1982, Working Meetings Action Items Due to Nuclear Regulatory Commission December 1, 1982

September Item	(November Item)
4	(11)
32	(3, 15)
35	
52	(2)*
56	(5)
65	(17)
N/A	(20)

*The attached "CRBRP Remote Shutdown Design Compatibility with ISCB Statements of Guidance for Interpreting Criterion 19 of 10CFR50, Appendix A" will not become a part of the Preliminary Safety Analysis Report (PSAR). The amended Q/R 421.17 will become part of the PSAR.

Item 4: I&C Design Criteria - Tech. Basis

(11)

Comments: (From Nov. 18-19 meeting, Item 11) The plant will comply with Regulatory Guide 1.75, including wiring inside cabinets. A discussion of Regulatory Guide 1.75 compliance will be included in Chapter 8. Chapter 7 will reference Chapter 8 for Regulatory Guide 1.75 compliance.

Resolution: Amended response to Item 4 attached.

7.1.2.2 Independence of Redundant Safety Related Systems

To assure that independence of redundant safety related equipment is preserved, the following specific physical separation criteria are imposed for safety related instrumentation.

- All interrack PPS wiring shall be run in conduits (or equivalent) with wiring for redundant channels run in separate conduits. Only PPS wiring shall be included in these conduits. Primary RSS wiring shall not be run in the same conduit as secondary RSS wiring. Wiring for the CIS may be run in conduits containing either primary RSS wiring or conduits containing secondary shutdown system wiring, but never intermixed. Expanded criteria for physical separation of the CIS are given in Section 7.3.2.2.

- Wiring for other safety related systems may be run in conduits containing either primary RSS wiring or conduits containing secondary RSS wiring, but never intermixed, provided that no degradation of the separation between primary and secondary RSS results.

- Wiring for redundant channels shall be brought through separate containment penetrations with only PPS wiring brought through these penetrations. Primary RSS wiring shall not be brought through the same penetration as secondary RSS wiring. Wiring for the CIS and other safety related systems will be brought through the same penetration as the RSS wiring with which it is routed.

- Instrumentation equipment associated with redundant channels shall be mounted in separate racks (or completely, metallically enclosed compartments). Only PPS channel instrumentation shall be mounted in these racks. Primary RSS equipment shall not be located in the same rack as Secondary RSS equipment.

- INSERT → The physical separation between conduits, penetrations, or racks containing redundant instrument channels shall be specified on an individual case basis to meet the requirements of Regulatory Guide 1.75. This separation shall provide assurance that credible single events do not simultaneously degrade redundant channels or redundant shutdown systems.

- The wiring from a PPS buffered output which is used for a non-PPS purpose may be included in the same rack as PPS equipment. The PPS wiring shall be physically separated from the non-PPS wiring. The amount of separation shall meet the requirements of IEEE 384-1974.

- Electrical power for redundant PPS equipment shall be supplied from separate sources such that failure of a single power source

(insert to 7.1.2.2)

The physical separation between conduits, penetrations, or racks containing redundant instrument channels shall meet the requirements of Regulatory Guide 1.75. Redundant instrument channels in the primary RSS shall be physically separated from one another in accordance with the requirements of Regulatory Guide 1.75. Redundant instrument channels in the secondary RSS shall be physically separated from one another in accordance with the requirements of Regulatory Guide 1.75. Functional capability is maintained in the event of single design basis events which might impact more than one sensor by alternate protective functions as described in Table 7.2-2. Requirements for separation delineated in Section 8.3.1.2.14 shall also apply.

NRC CONCERN

Item 32 & 35 (32 & 35) Provide more information on ESF I&C functions and a description of Safety-Related Display information.

Provide more detailed design (including diversity) criteria discussion of ESF I&C in the PSAR. (BRI Items 32 and 35 and input to LRM Item 62 from September 21, 1982 NRC Meeting.)

RESPONSE:

A discussion of the ESF Atmosphere Clean-up Systems and the Steam Generator Building Aerosol Mitigation Release System is provided in attached revised PSAR Sections 6.1, 7.3 and 7.6.4.

TABLE 6.1-1

LIST OF ENGINEERED SAFETY FEATURES IN CRBRP

Engineered Safety Features	PSAR Section
Reactor Confinement/Containment	6.2
Reactor Containment Isolation System	6.2.4 & 7.3.1
RCB Annulus Filtration System	6.2.5 & 7.3.3
Reactor Service Building Filtration System	6.2.6 & 7.3.2
Steam Generator Building Aerosol Release Mitigation System	6.2.7, ~~7.4.1~~, 13.4 9.13.2, 9.6
Habitability Systems	6.3 & 7.3.3
Reactor Guard Vessel	5.2
Guard Vessels of PHTS Major Components	5.3
Residual Heat Removal System	5.6, 7.4.1 & 7.6.3
Cell Liner System	6.4, 3.8-B, & 3A.8
Catch Pan & Fire Suppression Deck System	6.5, 3.8-C, 3A.9, 9.13.2

~~Amend. 64~~
~~Jan. 1982~~

7.3.3 ESF Atmosphere Clean-up Systems

The ESF Atmosphere Clean-up Systems are as follows:

a) RCB Annulus Filtration System

b) RSB Filtration System

c) Control Habitability System

These systems are described in the following sections.

7.3.3.1 Design Criteria

The following design criteria are applicable to the ESF Atmosphere Clean-up ~~safety-related HVAC~~ Instrumentation and Control Systems:

A. Compliance with CRBRP General Design Criterion 11 as listed in Section 3.1.3.

B. Class 1E power supply, backed up by Diesel Generators, provide power to all ~~safety-related HVAC System~~ components.

C. No single failure of an instrument, interconnecting cable or panel will prevent a key process variable from being controlled or monitored in redundant divisions.

D. Physical and electrical separation of redundant portions of the ~~HVAC~~ System is provided.

E. Manual initiation of each protective action is provided at the system level.

F. Instrumentation used in the control of ESF Atmosphere Clean-up ~~HVAC~~ Systems will function during and after an SSE.

G. Instrumentation used in the control of ESF Atmosphere Clean-up ~~HVAC~~ Systems will function during normal environmental conditions and during environmental conditions created by any design basis accident.

H. Capabilities for periodic testing and calibration of all instruments are provided.

I. Capabilities for remote operation of the RCB Annulus Filtration System and RSB Filtration System ~~shutdown~~ are provided, should the Control Room become uninhabitable.

J. Capabilities are provided to monitor the bypass or inoperable status of components in accordance with NRC Regulatory Guide 1.47.

7.3.3.2 Monitoring Instrumentation

A. Typically, process variables are monitored and indication is provided in the Control Room and locally as follows (Also refer to P&ID's in section 1.6):

1. All valve and damper positions.

2. All fan operation status.

3. Filter unit humidity.

4. Filter unit discharge air flow (also recorded in the Control Room).

5. Filter unit adsorbent filter entering air and leaving air temperature (local only).

6. Filter unit differential pressure across each filter bank and across entire unit (local only).

7. Annulus to atmosphere differential pressure.

8. RSB confinement to atmosphere differential pressure.

9. Control Room HVAC unit supply air flow (also recorded in the Control Room).

10. Control Room HVAC unit discharge air, mixed air and return air temperatures.

11. Outside air INLET temperature.

12. Control Room main and remote air intake radioactivity level for radioactive gases, iodines and particulates.

13. Control Room differential pressure.

B. Typically, process variables are monitored and alarm annunciation is provided in the Control Room and locally as follows:

1. Motor thermal overload, high vibration or air flow low for each fan.

2. Differential pressure high across each filter bank and across entire filter unit.

3. Unit cooler or HVAC unit supply air temperature high or air temperature entering cooling coil low.

4. Smoke, ammonia, chlorine, ~~fluorine~~ HYDROGEN FLUORIDE or radiation present in Control Room main or remote air intake.

5. Control switch in the local mode (Control Room only alarm only).

C. Typically, process variables are provided as inputs to the Plant Data Handling & Display System as follows:

1. Control Room and computer room humidity.

2. Annulus differential pressure.

3. RSB confinement differential pressure (four different cells).

4. Control Room differential pressure.

5. Air temperature entering and leaving each filter unit.

6. Air temperature entering and leaving each HVAC unit.

7. Inoperable or bypass status of components.

7.3.3.3 Design Analysis

The ESF Atmosphere Clean-up Systems are designed to meet the requirements of Section 7.1 and the IEEE Standards listed in TABLE 7.3-2 with the exception of alarm circuits and inputs to the Plant Data Handling and Display System (PDH&DS) which are non-Class 1E circuits.

7.3.3.4 RCB Annulus Filtration System

7.3.3.4.1 Design Basis

The RCB Annulus Filtration System is designed to ensure that an acceptable upper limit of ~~leakage~~ RELEASE of radioactive material is not exceeded under the site suitability source term conditions.

7.3.3.4.2 System Description

Initiation and control of the RCB Annulus Filtration System is represented by Figures 7.3-3 through 7.3-9. The following initiation and control operations ~~shall be~~ are provided:

WITH RESPECT TO OUTSIDE ATMOSPHERE

1. Maintain the containment/confinement annulus space under 1/4 inch water gauge negative pressure during normal plant operation and accident conditions.

2. Provide filtering of the annulus exhaust during normal operation.

3. Provide filtering of the RCB ventilation exhaust air through the annulus filter system during RCB/RSB open hatch refueling operations.

4. Initiate filtering and recirculating of the annulus air during accident conditions.

The RCB Annulus Filtration System is also described in Section 9.6.2.2.4.

7.3.3.5 Reactor Service Building (RSB) Filtration System

7.3.3.5.1 Design Basis

The RSB Filtration System is designed to filter the RSB exhaust air in order to mitigate the consequences of the ~~Site Suitability Source Term (SSST)~~ RSB RADIATION RELEASE event.

7.3.3.5.2 System Description

Initiation and control of the RSB Filtration System is represented by Figures 7.3-10 through 7.3-13. The following initiation and control operations shall be provided:

1. Filter RSB exhaust during all plant conditions.

2. Initiate RSB confinement, recirculation and filtering during accident conditions.

3. Maintain the RSB confinement at under 1/4 inch water gauge negative pressure.

The RSB Filtration System is also described in Section 9.6.3.1.1.

7.3.3.6 Control Room Habitability System

7.3.3.6.1 Design Basis

The design basis for the Control Room Habitability System is detailed in Section 6.3.1.1.

7.3.3.6.2 System Description

A detailed description of the Control Room Habitability System is presented in Section 6.3.

Figures 7.3-14 through 7.3-~~26~~ 24 represent initiation and control of the Control Room Habitability System. A summary of the functions performed by this system is as follows:

a) Maintain the Control Room at positive pressure ~~at all times~~ when SIAS signal is present, or to minimize the infiltration of radioactive or chemical contamination.

b) Initiate Control Room isolation when smoke or toxic gases are present at either the remote or main air intake, or radiation is above a fixed setpoint at the main air intake.

c) Initiate Control Room recirculation/filtration mode when containment isolation is initiated, when Control Room isolation is initiated or by manual initiation.

7.3.4 Steam Generator Building Aerosol Mitigation Release System (ARMS)

7.3.4.1 System Description

A description of the system and design basis is included in Section 6.2.7. Figures 7.3 (to be provided later) represent initiation and control of the SGB ARMS.

7.3.4.2 Design Criteria

The following design criteria are applicable to the SGB ARMS:

A. Compliance with CRBRP General Design Criterion 11 as listed in Section 3.1.3.

B. Class 1E power supply, backed up by Diesel Generators, provide power to all system components.

C. No single failure of an instrument, interconnecting cable or panel will prevent a key process variable from being controlled or monitored in redundant divisions.

D. Physical and electrical separation of redundant portions of the system is provided.

E. Manual initiation of each protective action is provided at the system level.

F. Instrumentation used in the control of ARMS system will function during and after an SSE.

G. Instrumentation used in the control of AMRS systems will function during normal environmental conditions and during environmental conditions created by any design basis accident.

H. Capabilities for periodic testing and calibration of all instruments are provided.

I. Capabilities are provided to monitor the bypass or inoperable status of components in accordance with NRC Regulatory Guide 1.47.

7.3.4.3 Design Analysis

The SGB ARMS is designed to meet the requirements of Section 7.1 and the IEEE Standards listed in Table 7.3-2.

3

TABLE 7.3-2

LIST OF IEEE STANDARDS APPLICABLE TO ESF Systems

IEEE-279-1971	IEEE Standard: Criteria for Protection Systems for Nuclear Power Generating Stations
IEEE-308-1974	Criteria for Class 1E Power Systems for Nuclear Power Generating Stations
IEEE-323-1974	IEEE Trail-Use Standard: General Guide for Qualifying Class 1E Electric Equipment for Nuclear Power Generating Stations
IEEE-338-1977	Criteria for the Periodic Testing of Nuclear Power Generating Station Protection Systems
IEEE-379-1972	IEEE Trial-Use Guide for the Application of the Single-Failure Criterion to Nuclear Power Generating Station Protection Systems
IEEE-383-1974	IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices and Connections for Nuclear Power Generating Stations
IEEE-384-1974	IEEE Trial-Use Standard Criteria for Separation of Class 1E Equipment and Circuits

TABLE 7.3-3

SYMBOLS

ALARM

INOPERABLE STATUS MONITORING

RED IND LITE

GREEN IND LITE

WHITE IND LITE

COMPUTER INPUT

NOTES:

1) Control switches are spring return to auto from start with a maintained stop unless otherwise stated.

ABBREVIATIONS

SSPLS	-	Solid State Programmable Logic System
CR	-	Control room (remote)
L	-	Local (not control room)
T.D.	-	Time delay
N.C.	-	Normally closed
F.C.	-	Fail closed
S.O.V.	-	Solenoid operated valve
A.O.V.	-	Air operated valve
MOD	-	Motor operated damper
ZS	-	Position switch
CIS	-	Containment isolation signal
PPS	-	Plant Protection System
E/H	-	Electro-hydraulic

TABLE 7.3-3 (Continued)

TE	-	Temp element
TT	-	Temp transmitter
TIC	-	Temp ind RATING controller
OAI	-	Outside air intake
TMD	-	Temp MPERATURE modulated damper
RA	-	Return air
PDI	-	Pressure differential indicator
PDC	-	Pressure differential controller
PMD	-	Pressure modulated damper
PDISH	-	Pressure differential indicating switch high
FR	-	Flow recorder
FIC	-	Flow indicating controller
FSL	-	Flow switch low
FT	-	Flow transmitter
FMD	-	Flow modulated damper
FE	-	Flow element
M	-	Moisture
PB	-	Pushbutton
MUX	-	Multiplexing
AHU	-	Air handling unit

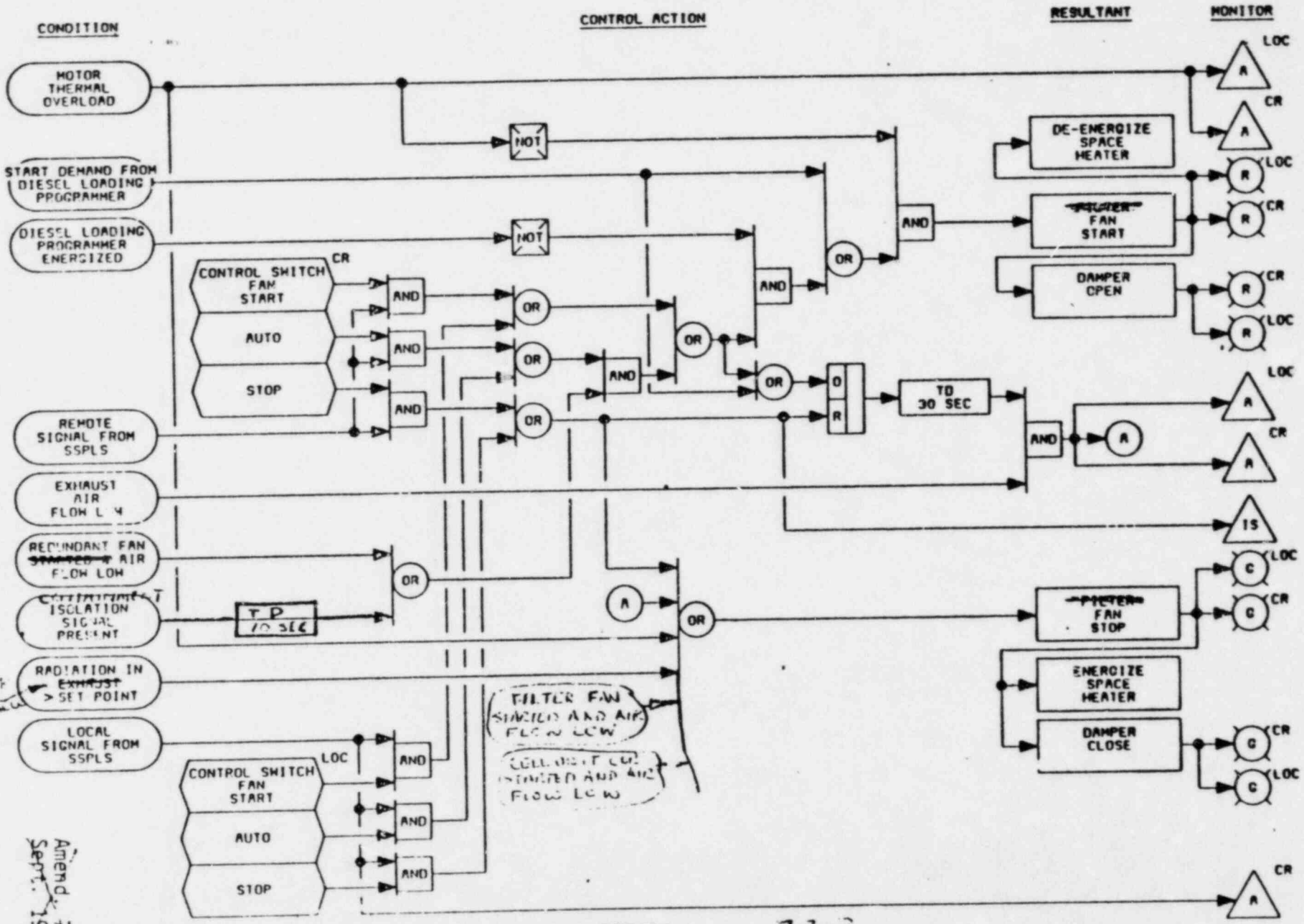


FIGURE 7.3-3
FUNCTIONAL CONTROL DIAGRAM ~~TYPICAL FILTER~~ - ANNULUS
~~UNIT SUPPLY FAN~~
PRESSURE MAINTENANCE FAN

Amend. 71
Sept. 1982

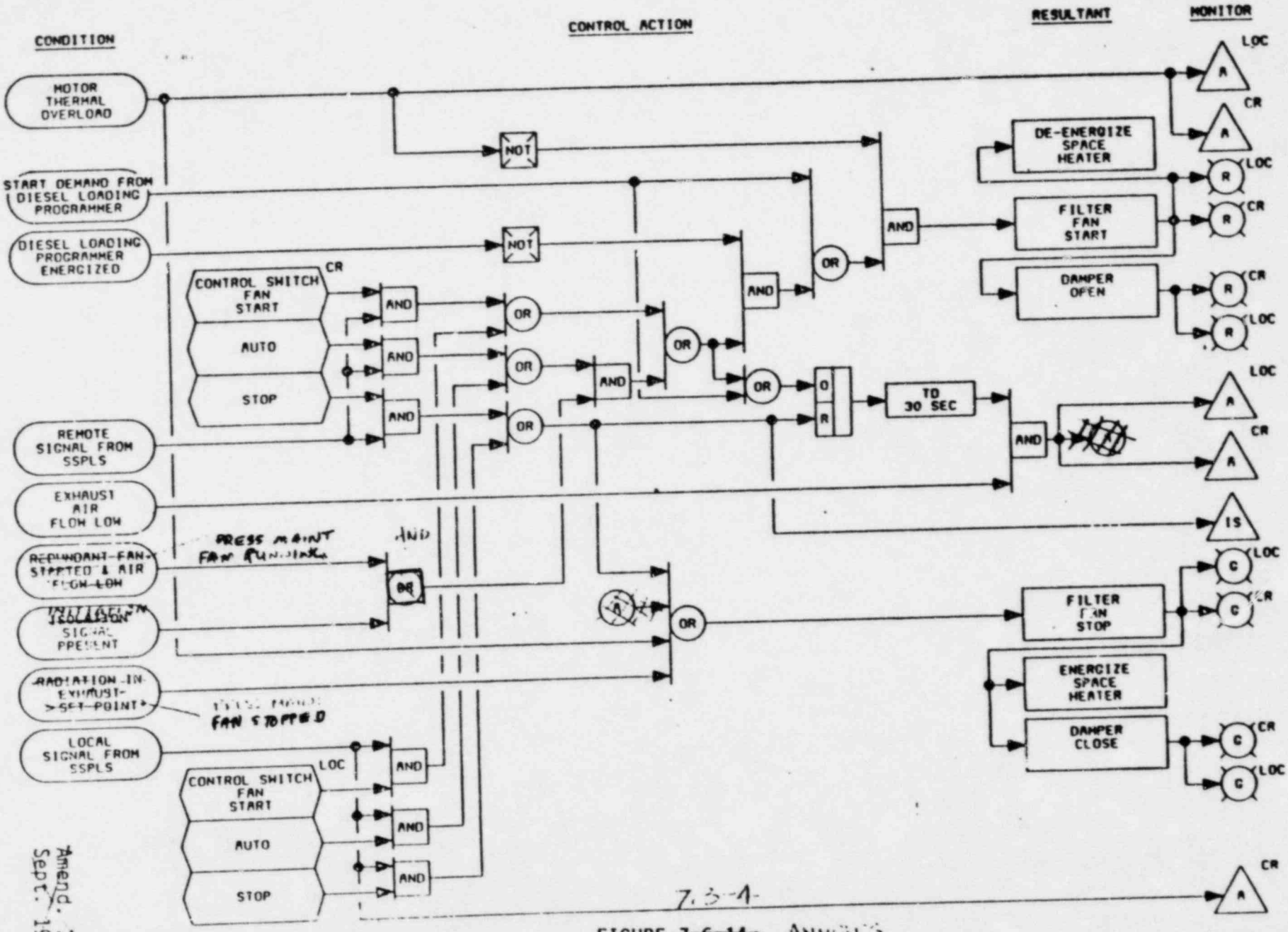
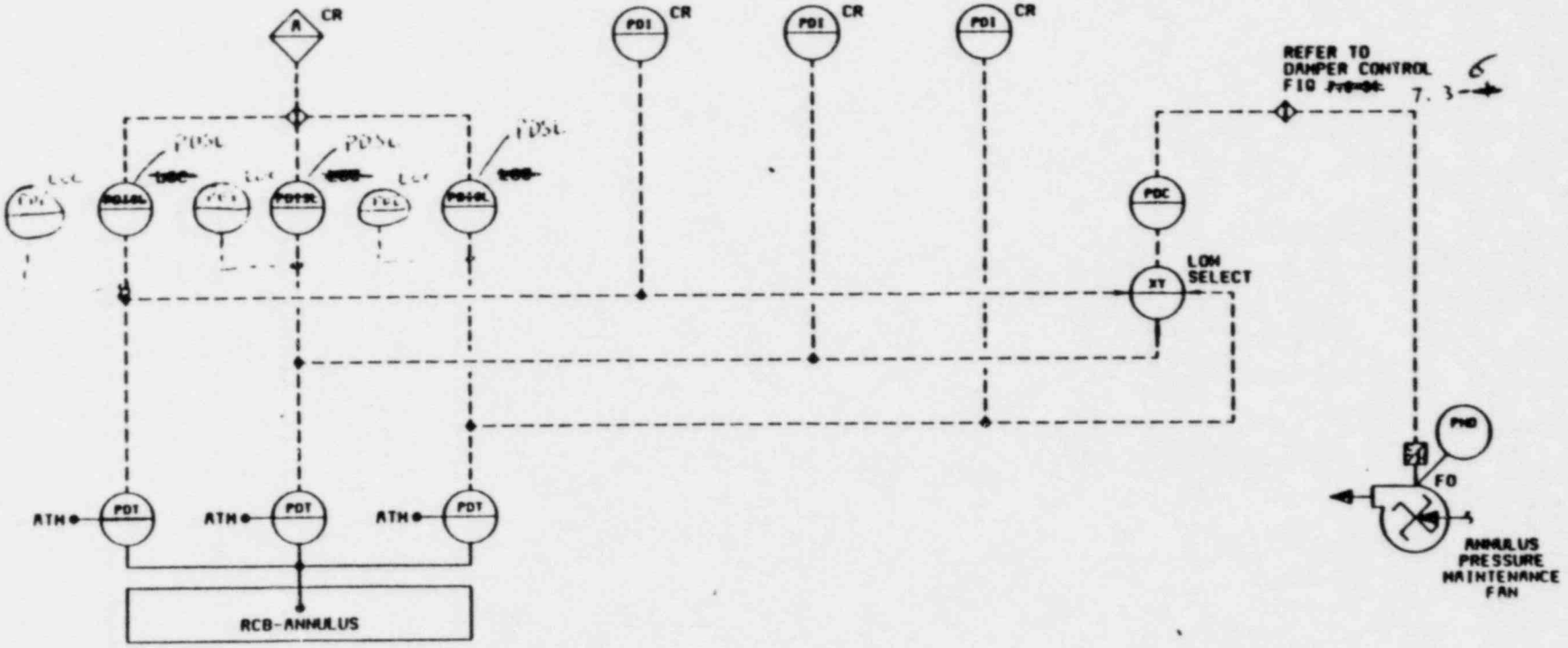


FIGURE ~~7.6-14~~ ANNOTATED
FUNCTIONAL CONTROL DIAGRAM ~~TYPICAL~~ FILTER
~~UNIT~~ SUPPLY FAN A

~~7.6-32~~

Amend. 71
Sept. 1982

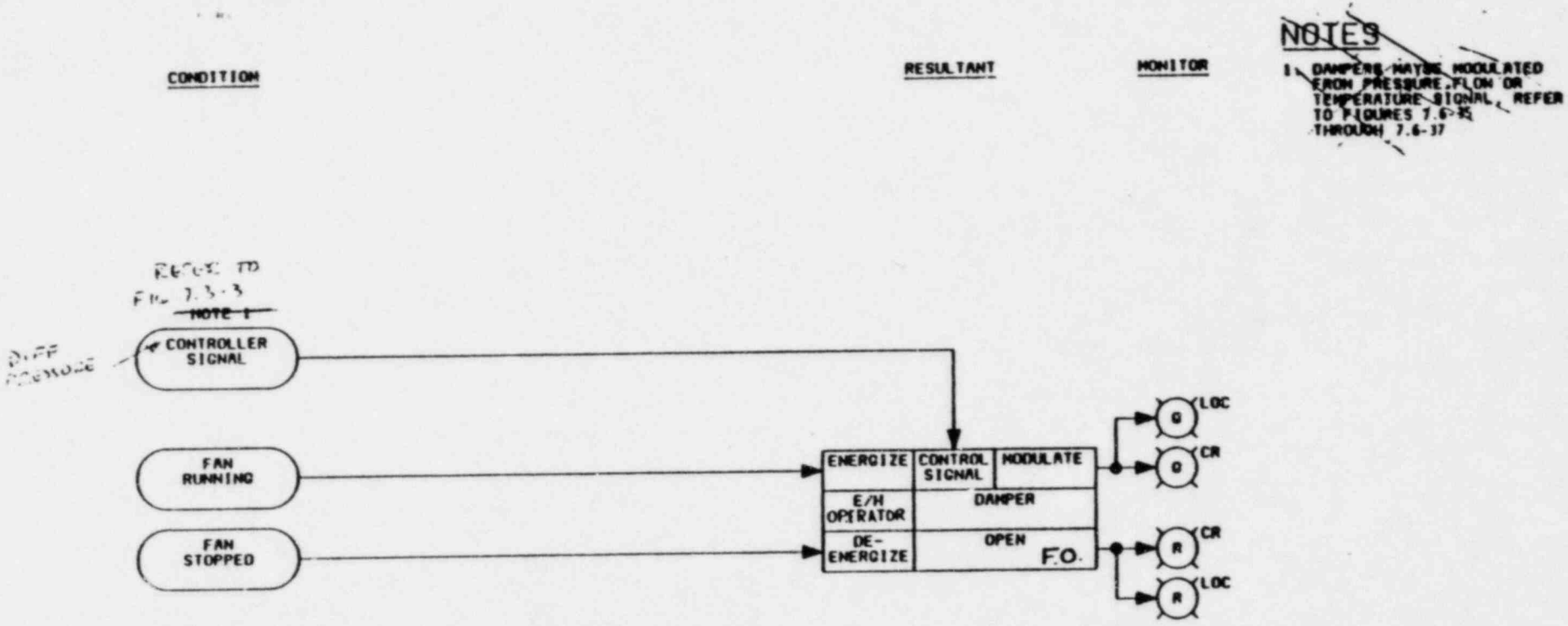


~~7.6-54~~

Amend. 71
Sept. 1982

7.3-5

FIGURE ~~7.6-36~~
FUNCTIONAL CONTROL DIAGRAM ANNULUS
PRESSURE MAINTENANCE FAN ~~PRESSURE~~ INLET VANE MODULATION
~~MODULATED DAMPER~~



7.6-52

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7.3-6

FIGURE ~~7.6-34~~ ANNULUS PRESSURE MAINTENANCE
~~FUNCTIONAL CONTROL DIAGRAM TYPICAL PROCESS PARAMETER CONTROL OF DAMPER~~ FAN INLET VANE MODULATION

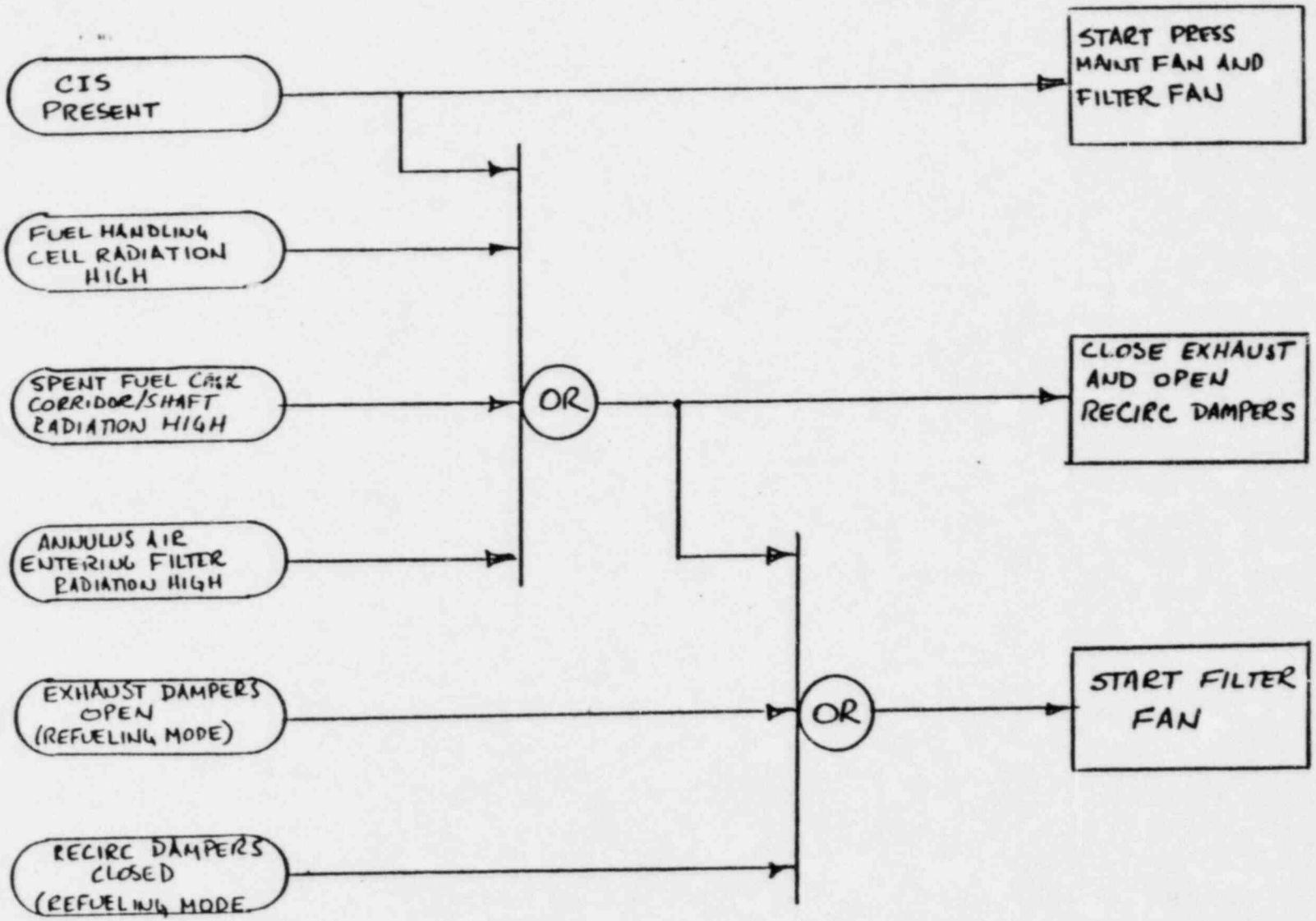
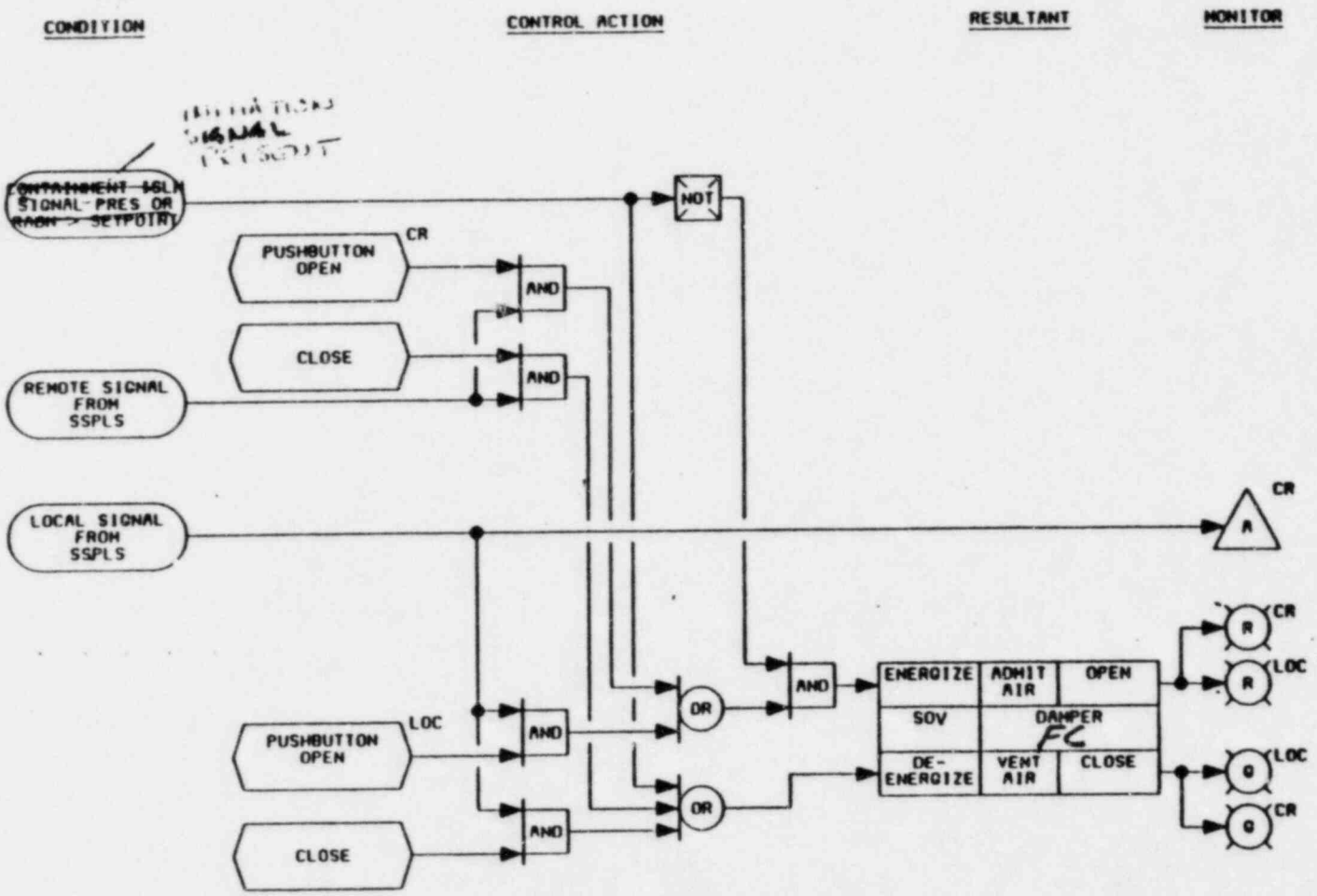


FIGURE 7.3-7

FUNCTIONAL CONTROL DIAGRAM - ANNULUS FILTRATION SYSTEM, FILTRATION AND/OR RECIRCULATION INITIATION



7.6-50

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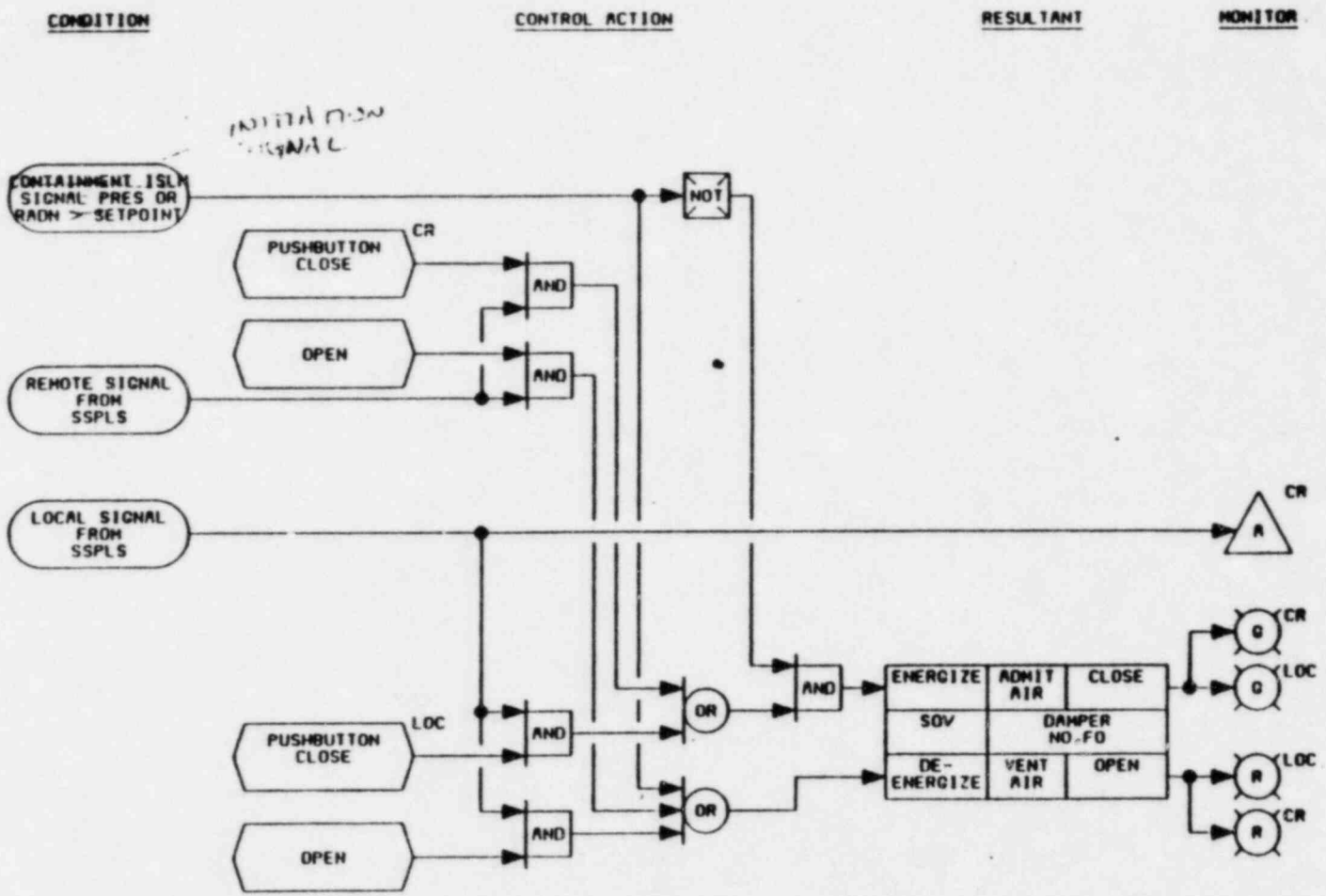
7.3-8

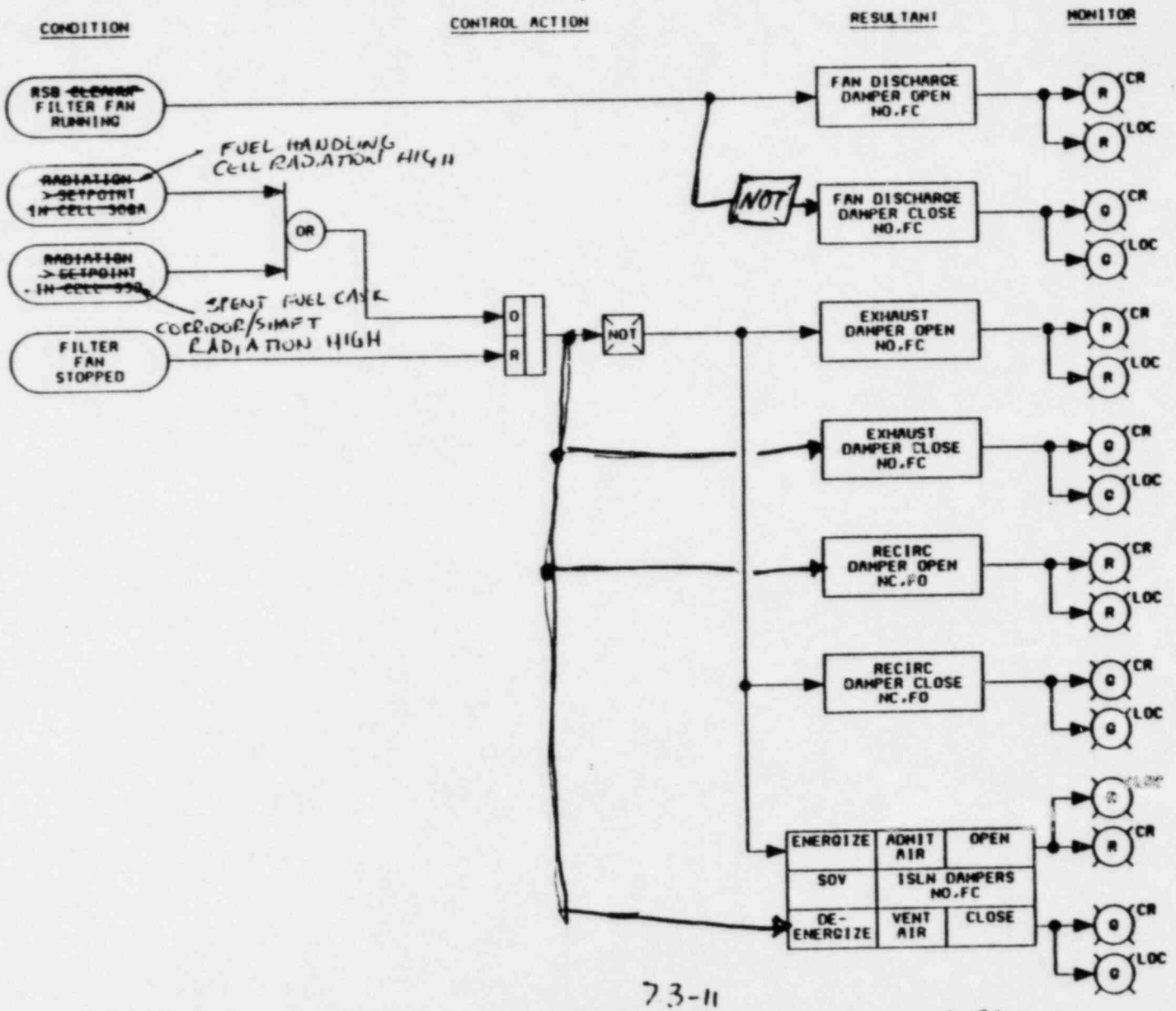
FIGURE ~~7.6-32~~
FUNCTIONAL CONTROL DIAGRAM-ANNULUS
FILTRATION EXHAUST DAMPERS



1.2.9

FIGURE ~~7.6-31~~
FUNCTIONAL CONTROL DIAGRAM ANNULUS
FILTRATION RECIRCULATION DAMPERS

Amend. 71
Sept. 1982



~~7.6-51~~

Amend. 71 Sept. 1982

73-11

FIGURE ~~7.6-33~~ FILTRATION SYSTEM
FUNCTIONAL CONTROL DIAGRAM RSB ~~CLEANUP~~
DISCHARGE, EXHAUST, RECIRCULATION &
CELL ISOLATION DAMPERS

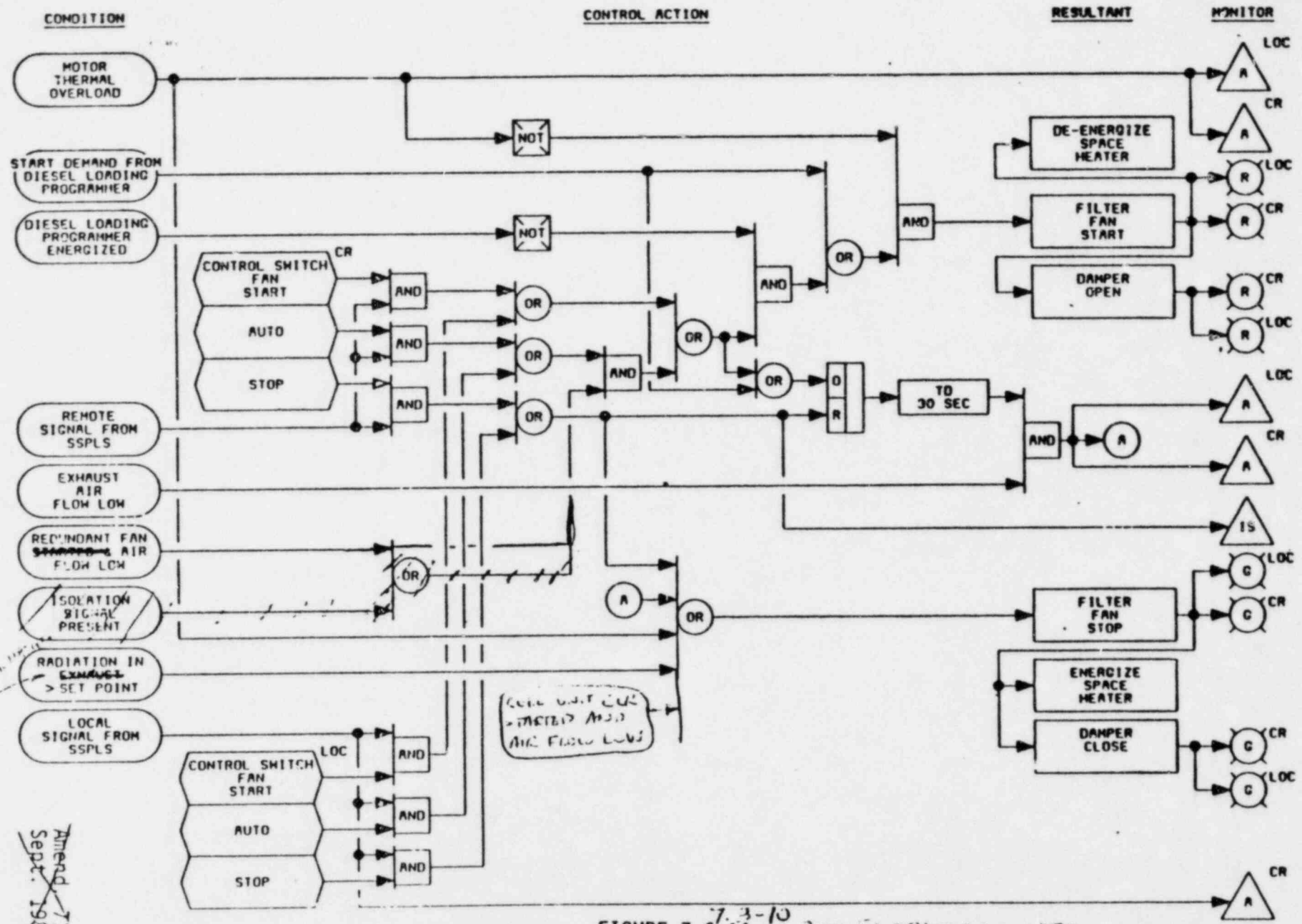
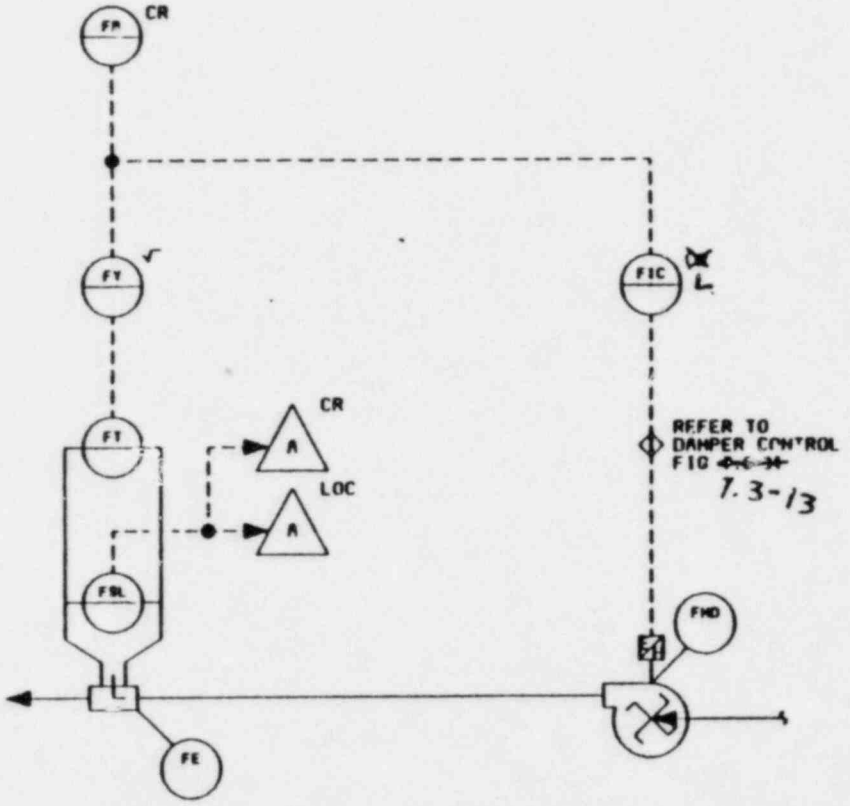


FIGURE ~~7.6-14~~ 7.3-10 RSB FILTRATION SYSTEM
FUNCTIONAL CONTROL DIAGRAM ~~TYPICAL~~ FILTER ~~UNIT~~ SUPPLY FAN

~~7.6-32~~

Amend. 71 Sept. 1982



7.3-12

FIGURE ~~7.6-37~~ RSB FILTER FAN INLET VANE MODULATION
FUNCTIONAL CONTROL DIAGRAM ~~TYPICAL FLOW MODULATED VORTEX DAMPER~~

~~7.6-99~~

Amend. 11
Sept. 1982

CONDITION

RESULTANT

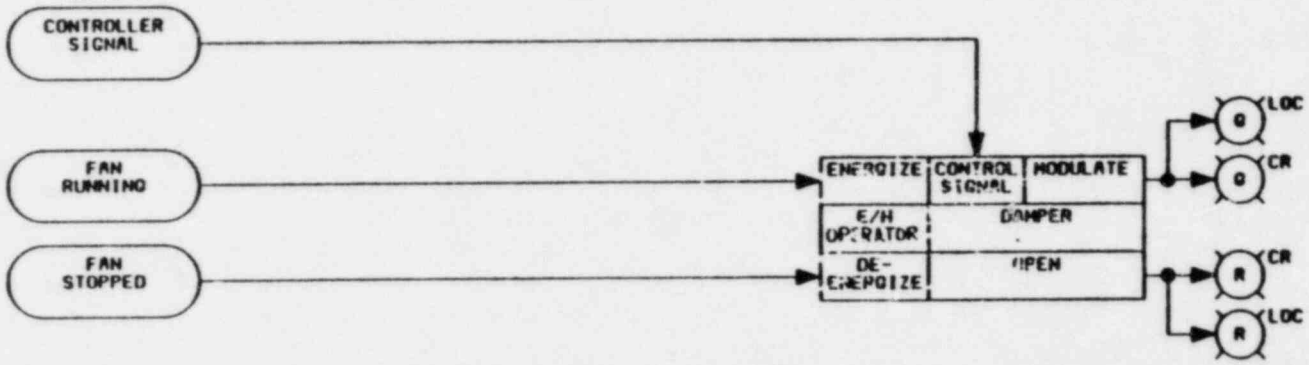
MONITOR

~~NOTES~~

1. ~~DAMPERS MAYBE MODULATED FROM PRESSURE/FLOW OR TEMPERATURE SIGNAL. REFER TO FIGURES 7.6-35 THROUGH 7.6-37~~

REFER TO FIG 7.3-12

~~NOTE 1~~



7.6-52

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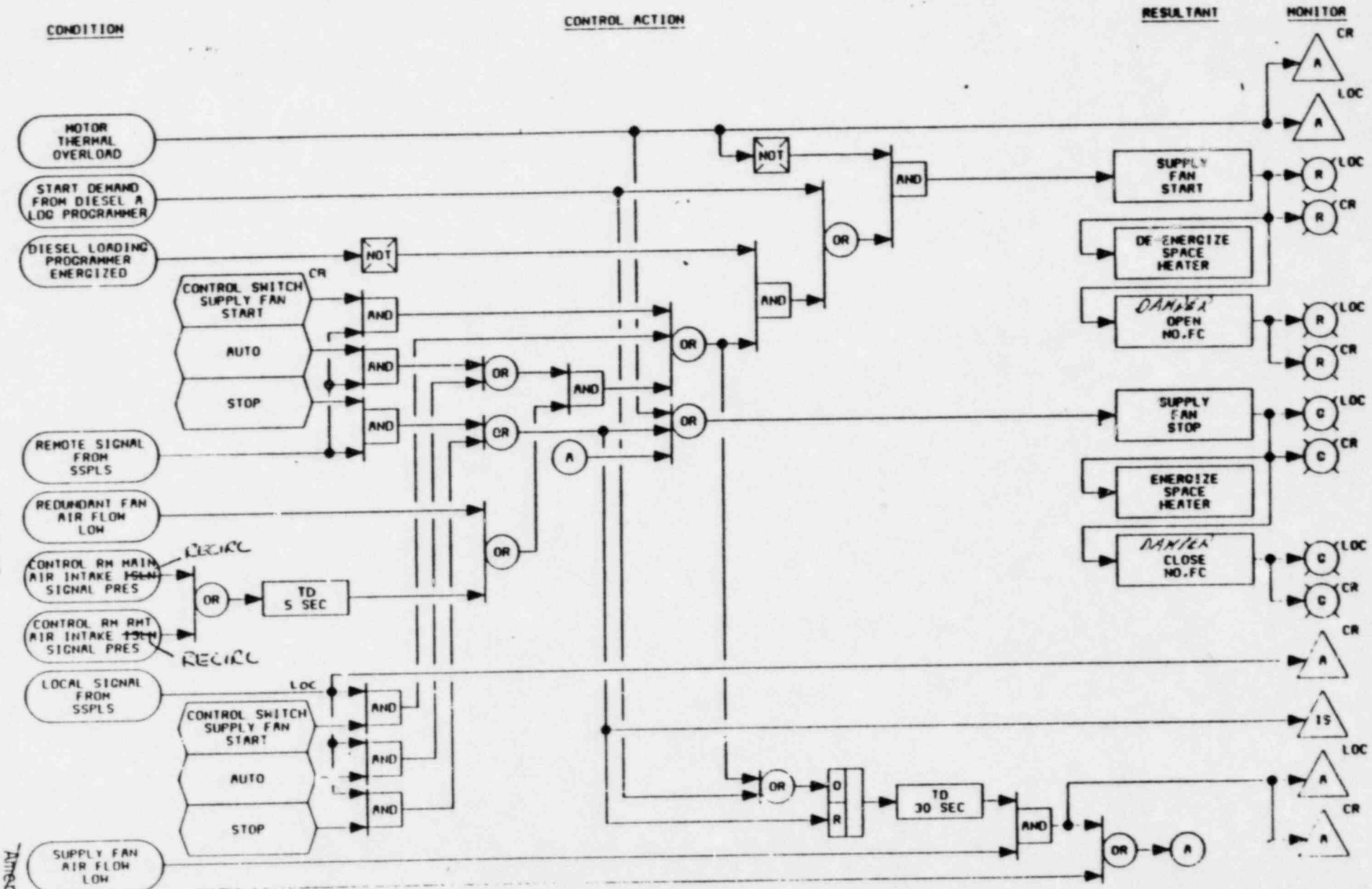
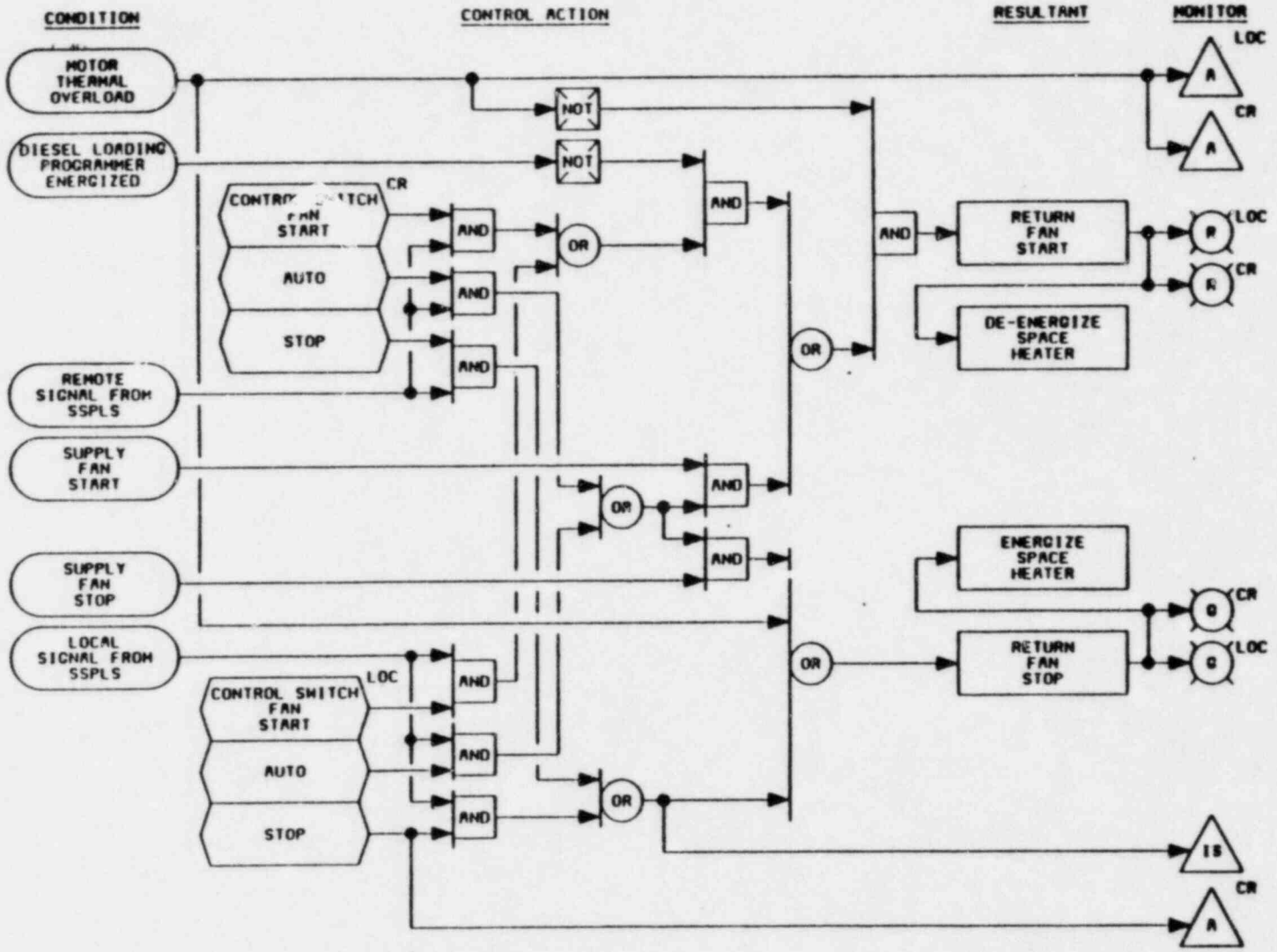
7.3-13

FIGURE ~~7.6-34~~ RSB FILTER FAN
FUNCTIONAL CONTROL DIAGRAM ~~TYPICAL~~ INLET VANE MODULATION
~~PROCESS PARAMETER CONTROL OF DAMPER~~



7.3-14

FIGURE ~~7.6-17~~
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
HVAC UNIT SUPPLY FAN



7.3-15 CONTROL ROOM

FIGURE ~~7.6-13~~
FUNCTIONAL CONTROL DIAGRAM ~~TYPICAL~~ HVAC
UNIT RETURN FAN

~~7.6-21~~

Amend. 71
Sept. 1982

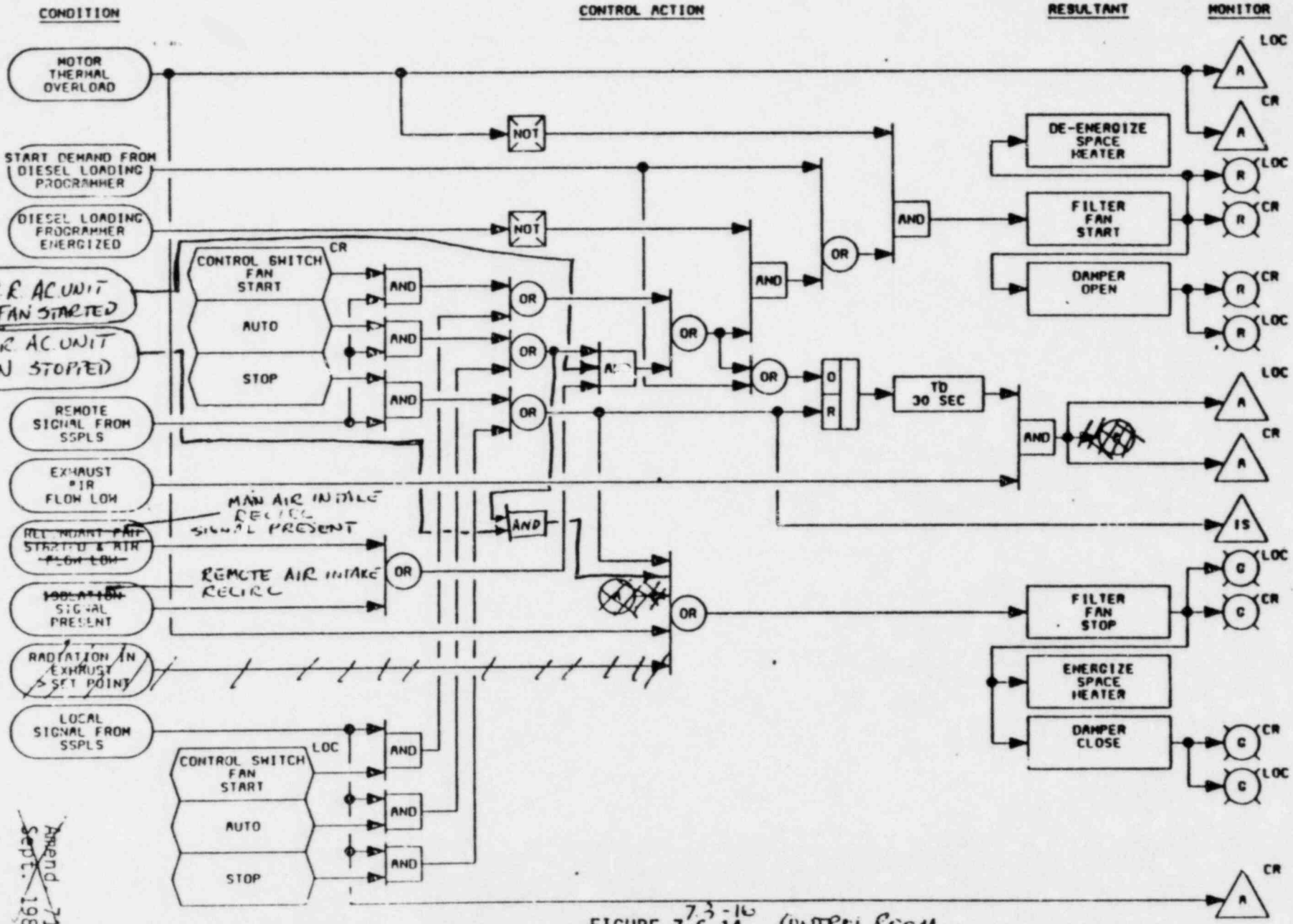
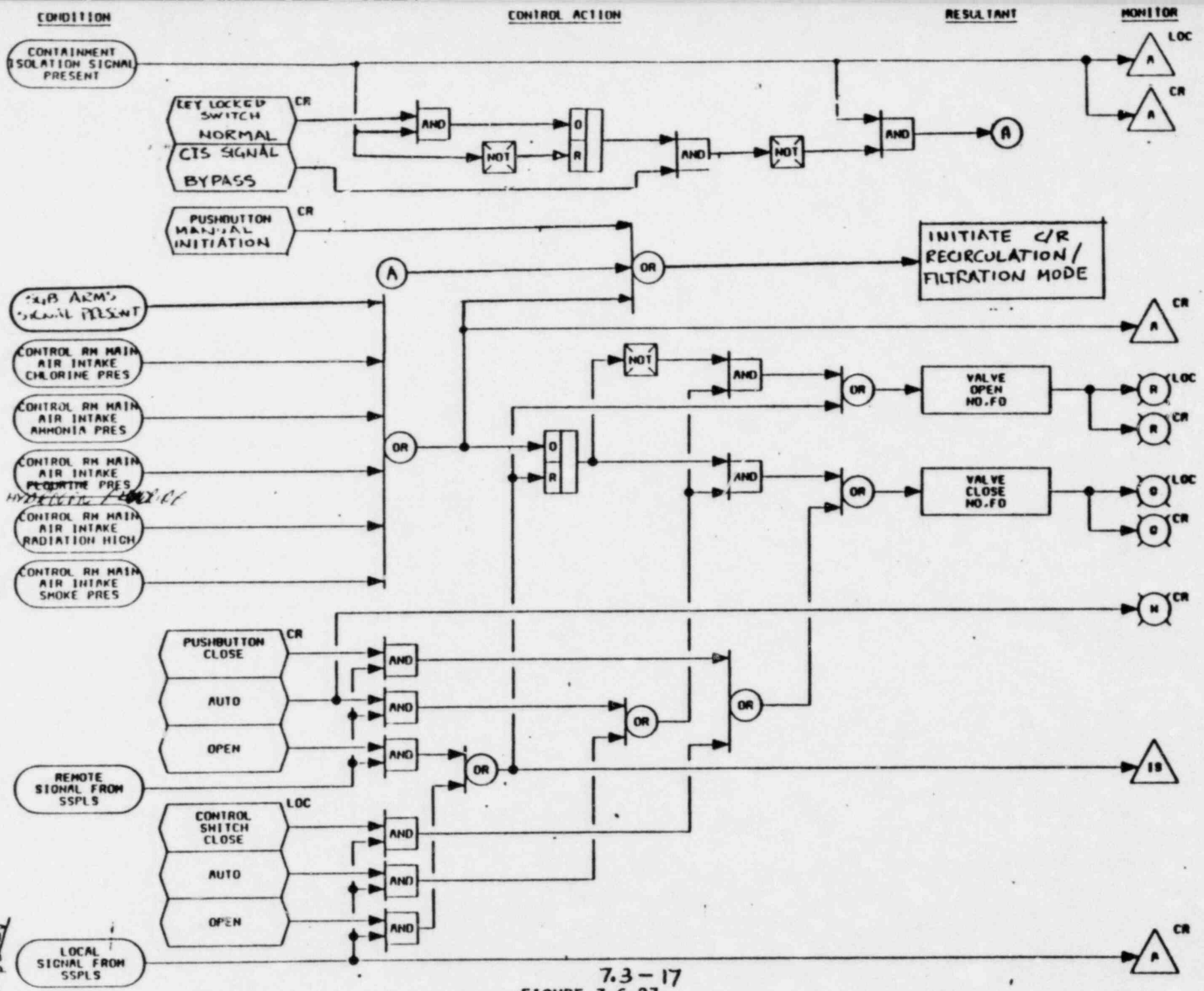


FIGURE ~~7.6-14~~ 7.3-16 CONTROL ROOM
FUNCTIONAL CONTROL DIAGRAM, ~~TYPICAL~~ FILTER UNIT SUPPLY FAN

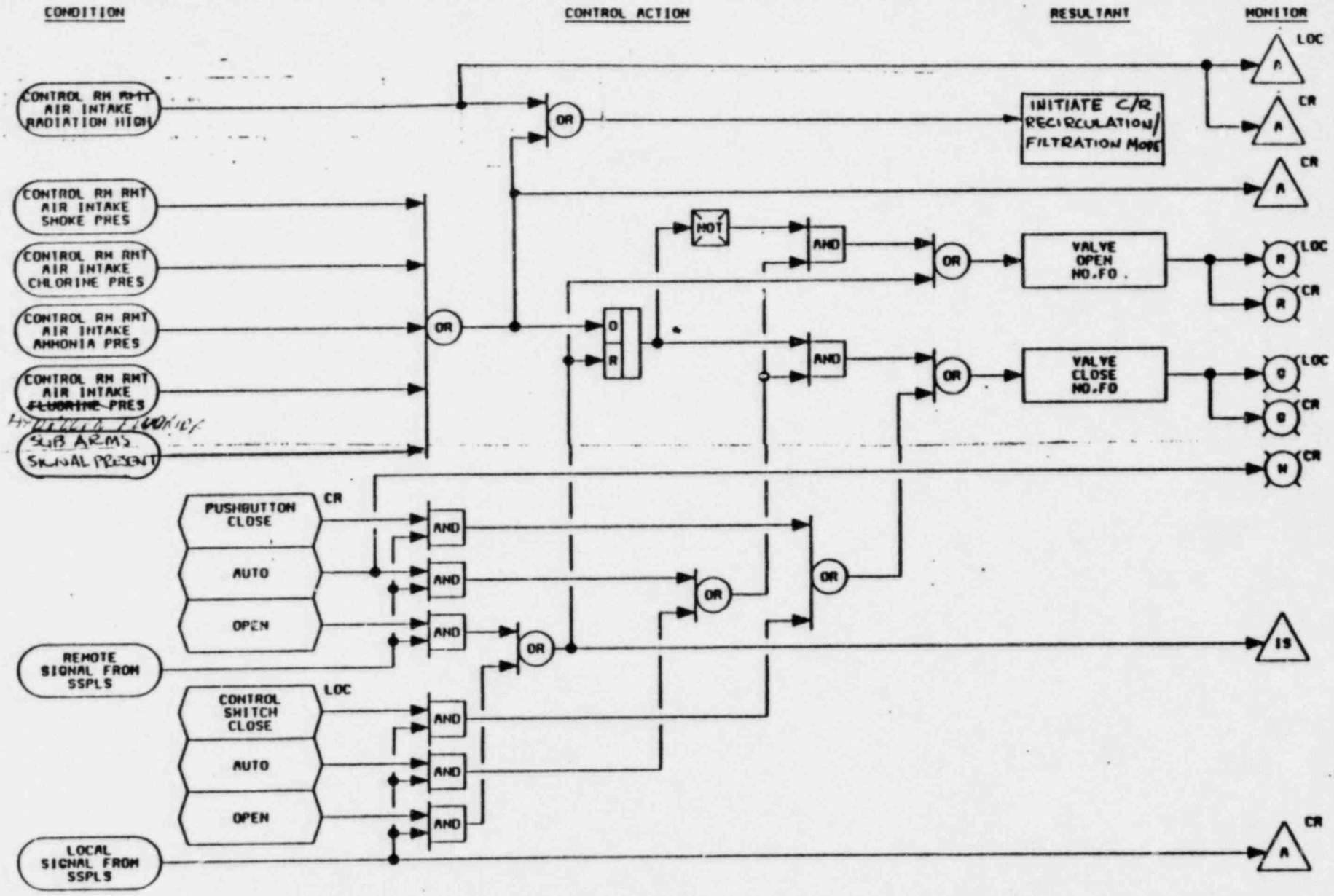


7.3 – 17

FIGURE ~~7.6-27~~

FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
MAIN AIR INTAKE ISOLATION VALVES

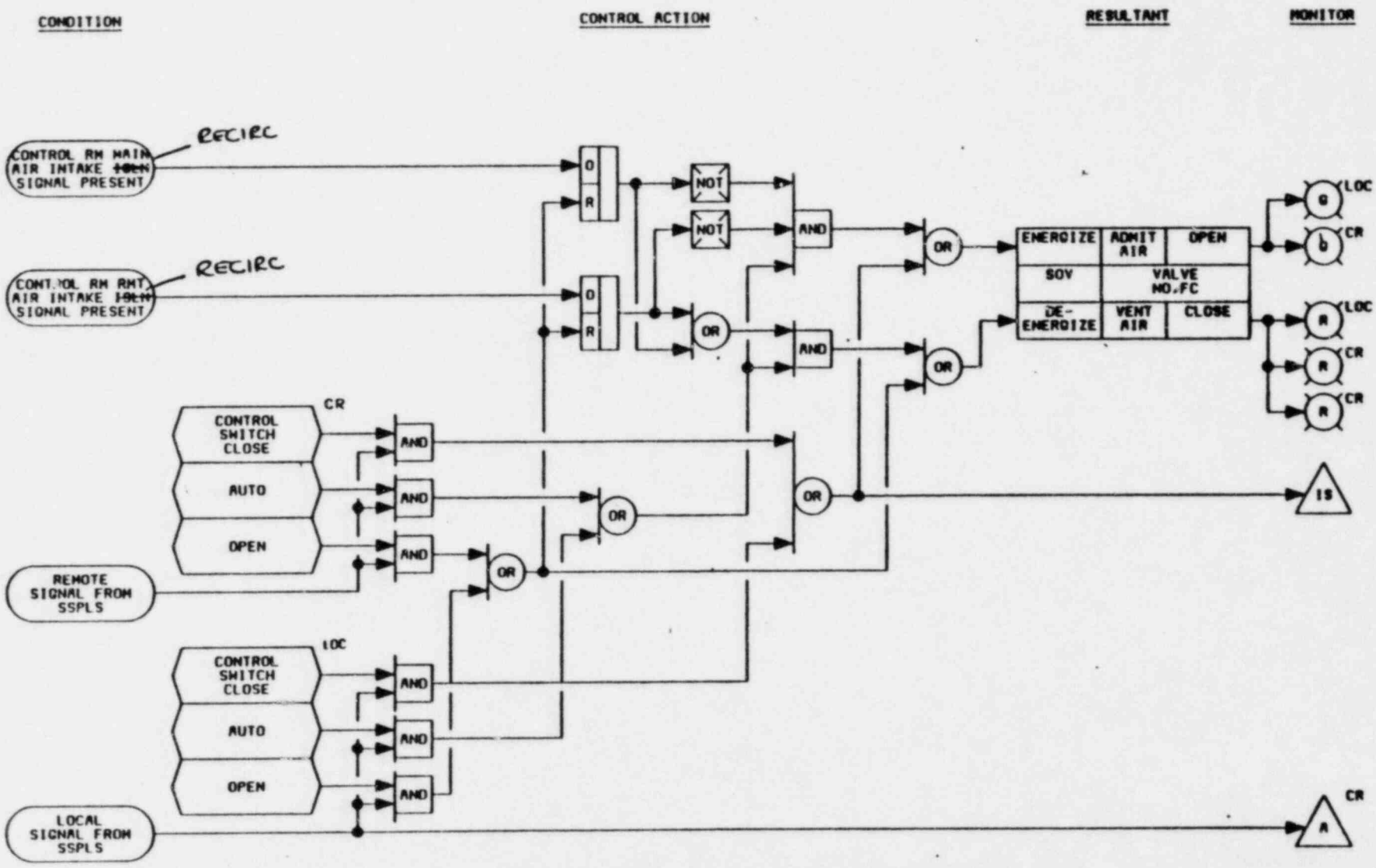
Amend. 11 Sept. 1982



7.3-18

FIGURE ~~7.6-28~~
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
REMOTE AIR INTAKE ISOLATION VALVES

Amend. 71
Sept. 1982

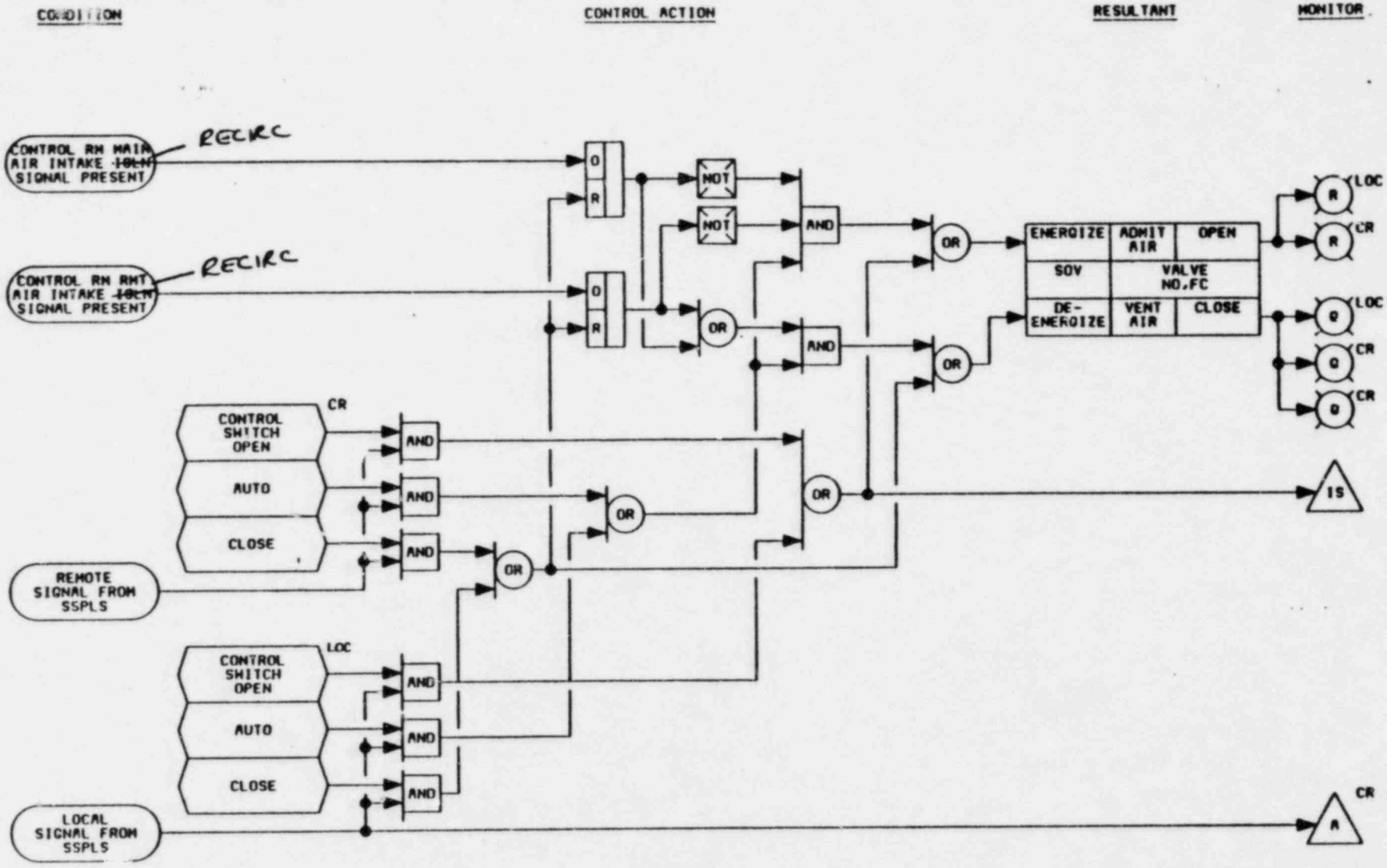


7.6-44

Amend. 71
Sept. 1982

7.3-19

FIGURE ~~7.6-20~~
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
FILTER UNIT AIR INTAKE VALVES



7.3-20

FIGURE ~~7.6-25~~
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM OUTSIDE AIR EXHAUST & HVAC UNIT OUTSIDE AIR INTAKE VALVES

Amend 11 Sept. 1982

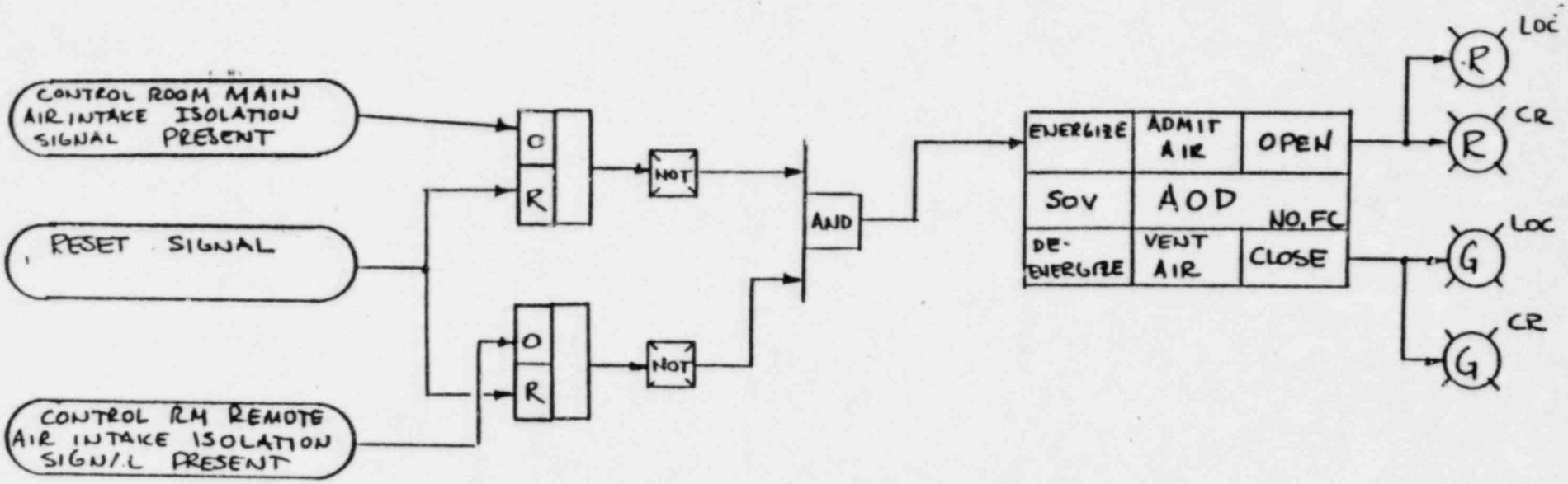


FIGURE 7.3-21

FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM TOILET AND KITCHED EXHAUST DAMPERS

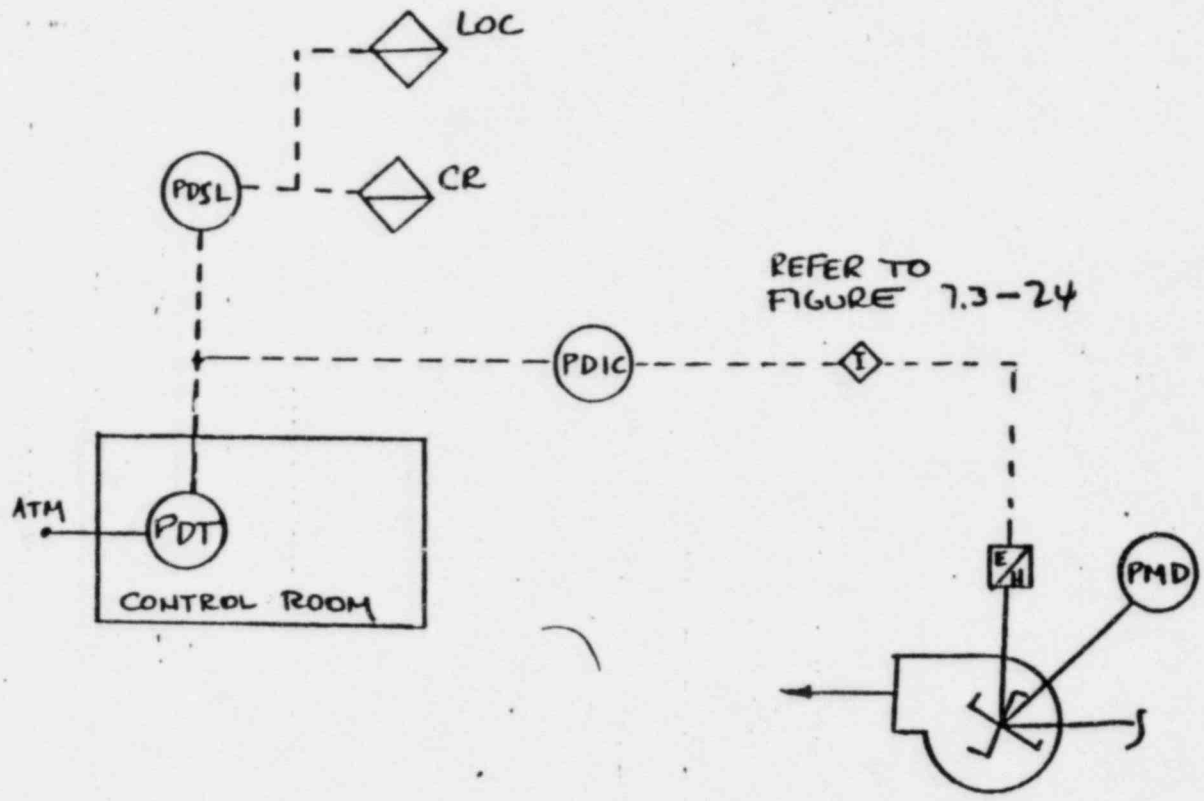


FIGURE 7.3-22 FUNCTIONAL CONTROL DIAGRAM
CONTROL ROOM HVAC UNIT FAN INLET VANE MODULATION

I. Capabilities for remote shutdown are provided, should the Control Room become uninhabitable.

J. Capabilities are provided to monitor the bypass or inoperable status of components in accordance with NRC Regulatory Guide 1.47.

K. Capabilities are provided to assess plant and environs conditions during and following an accident.

7.6.4.2 Design Description

Instrumentation and controls are provided for the safety-related HVAC Systems as described in this section. For a complete description, including process and instrumentation diagrams, refer to Section 9.6. Functional Control Diagrams for Heating, Ventilating and Air Conditioning Instrumentation and Control System are identified in Figures 7.6-12 through 7.6-34.

7.6.4.2.1 Control System

A. Fans

1. All fans in safety-related HVAC Systems are provided with remote manual controls in the Control Room.

2. All fans~~, with the exception of the Annulus Cooling Fans, Containment Clean up Scrubber Fans, and Unit Cooler Fans serving the areas containing these fans~~, are provided with local manual controls on Local Panels.

3. Automatic control of fans is illustrated in the Functional Control Diagrams. Typically, fans will start automatically under any of the following conditions:

I. Start demand from the Diesel Generator Load Sequencer will start fans;

II. Low air flow sensed in the discharge of a fan will start the redundant fan;

III. Starting of supply fans will start return fans;

~~iv. Control Room isolation signal will start Control Room HVAC and Filter Fans;~~

~~v. Containment isolation signal or high annulus radioactivity will start Annulus Filter Fans;~~

IV. ~~vi.~~ Unit cooler fans will start when the safety equipment in the cell starts or when the temperature of the cell exceeds the setpoint;

V. ~~vii.~~ Diesel Generator emergency supply fans will start when the respective Diesel Generator starts.

B. Valves

~~1. All valves in the HVAC System are provided with remote manual controls in the Control Room.~~

~~2. All valves with the exception of containment purge, vent, supply, discharge and bypass are provided with local manual controls on Local Panels.~~

~~1.~~ 1. ~~Containment purge and vent valves are provided with a key operated enable/disable switch in the Control Room.~~

. 1. Containment supply and discharge valves will automatically close on a Containment Isolation Signal from the Plant Protection System.

~~5. Control Room isolation and recirculation will be initiated by any one of the following conditions:~~

~~i. Containment isolation;~~

~~ii. Smoke present at intake;~~

~~iii. Toxic gas at intake;~~

~~iv. High radiation present at intake;~~

~~v. Manual initiation from Control Room.~~

C. Dampers

1. Dampers used to control a system parameter (i.e., temperature, pressure or flow) are energized by starting of the supply fan. Control of the damper is accomplished by measurement of the system parameter, comparison of the measurement to a required setpoint and transmission of a control signal by a controller, and modulation of the damper to maintain the required setpoint.

~~2. Exhaust and recirculation air dampers for the Annulus Filter System are provided with remote manual controls in the Control Room and local manual controls on Local Panels. These dampers will automatically assume the recirculation mode (i.e., exhaust dampers closed and recirculation dampers open) under either of the following conditions:~~

~~i. Containment isolation signal present;~~

~~ii. Airborne radiation detected in Annulus, RSB Operating Area or the Fuel Handling Cell.~~

~~3. RSB cleanup filter and isolation dampers will automatically assume the RSB confinement mode upon airborne radiation detected in the RSB Operating Area or the Fuel Handling Cell.~~

2. ~~X~~. Dampers serving supply or exhaust fans are interlocked with the operation of the fans they serve and will open when fan starts and close when fan stops.

7.6.4.2.2 Monitoring instrumentation

A. Typically, process variables are monitored and indication is provided in the Control Room and locally as follows:

1. All valve and damper positions.

2. All fan operation status.

~~3. Filter unit humidity.~~

~~4. Filter unit discharge air flow (also recorded in the Control Room).~~

~~5. Filter unit adsorbent filter entering air and leaving air temperature (local only).~~

~~6. Filter unit differential pressure across each filter bank and across entire unit (local only).~~

~~7. Annulus differential pressure.~~

~~8. RSB confinement differential pressure.~~

~~9. Control Room HVAC unit supply air flow (also recorded in the Control Room).~~

~~10. Control Room HVAC unit discharge air, mixed air and return air temperatures.~~

3. ~~11.~~ Outside air temperature.

~~12. Control Room main and remote air intake radioactivity level for radioactive gases, iodines and particulates.~~

4. ~~13. Containment clean up system quench tank and scrubber, inlet and outlet temperatures.~~

5. ~~14. Scrubber differential pressure.~~

6. ~~15. Containment clean up discharge flow.~~

B. Typically, process variables are monitored and alarm annunciation is provided in the Control Room and locally as follows:

1. Motor thermal overload, high vibration or air flow low for each fan.

~~2. Differential pressure high across each filter bank and across entire filter unit.~~

2. ~~5~~. Unit cooler or HVAC unit supply air temperature high or air temperature entering cooling coil low.

~~4. Smoke, ammonia, chlorine, fluorine or radiation present in Control Room main or remote air intake.~~

3. ~~6~~. Control switch in the local mode (Control Room only alarm only).

C. Typically, process variables are provided as inputs to the Plant Data Handling & Display System as follows:

1. Control Room and computer room humidity.
2. Containment differential pressure.
3. Annulus differential pressure.
4. RSB confinement differential pressure (four different cells).
5. Control Room differential pressure.
6. Air temperature entering and leaving each filter unit.
7. Air temperature entering and leaving each HVAC unit.
8. Cell temperature of each area being serviced by a unit cooler or HVAC unit.
9. Inoperable or bypass status of components.

D. The following process variables are classified as Accident Monitoring variables and are used to assess plant and environs conditions during and following an accident:

1. Annulus to atmosphere differential pressure.
2. RSB confinement to atmosphere differential pressure.
3. HVAC units discharge air temperature.
4. Filter units adsorbent filter leaving air temperature.
5. HVAC and filter units air flow low.
6. Damper and valve position indication.
7. Fan operation status indication.

7.6.4.3 Design Analysis

The HVAC Instrumentation and Control System is designed to perform the functions described in Section 7.6.4 while meeting the criteria listed in Section 7.6.4.1. All HVAC I&C circuits shall meet the requirements of Section 7.1 with the exception of alarm circuits and inputs to the PDH&DS which are

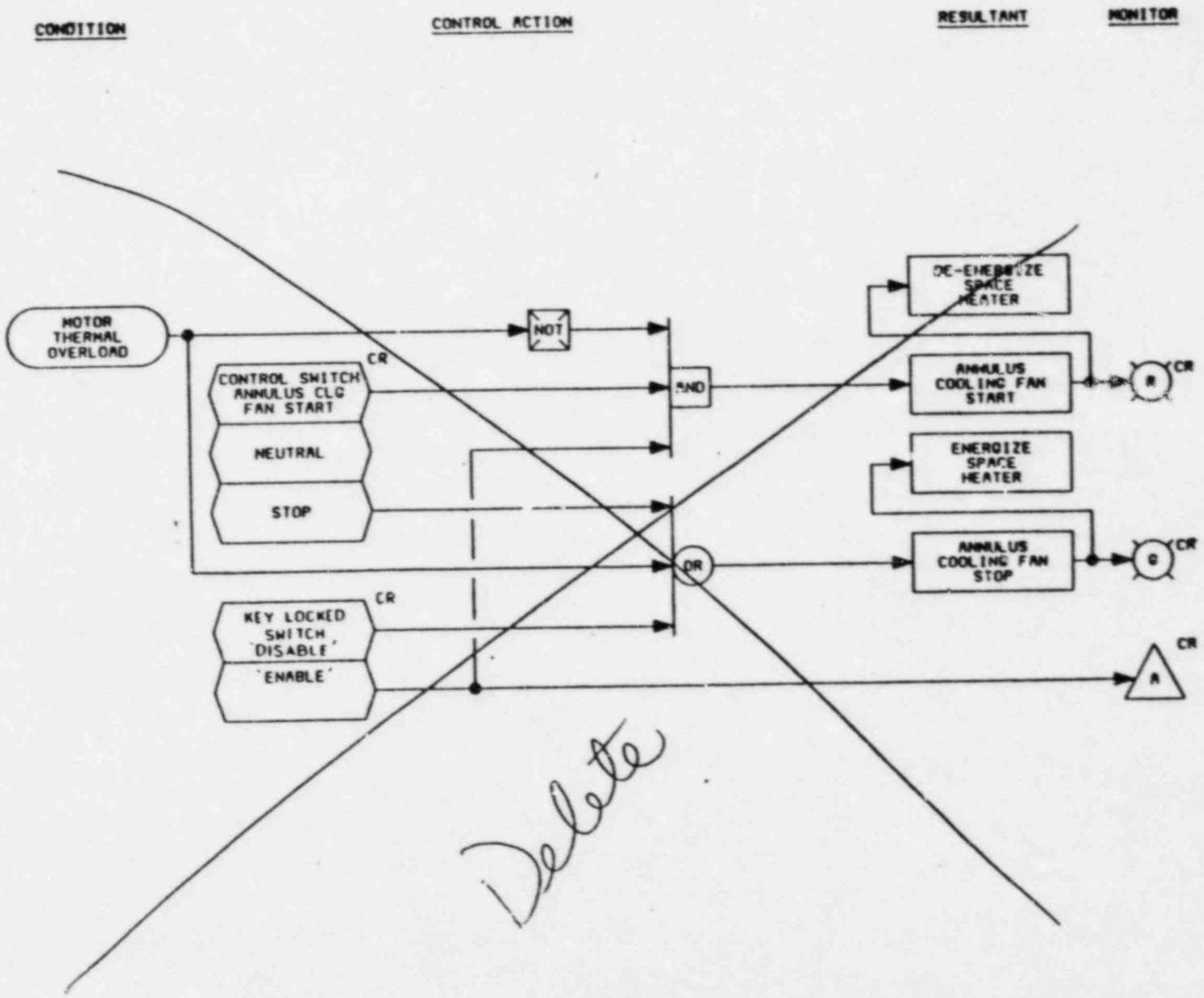


FIGURE 7.6-15
FUNCTIONAL CONTROL DIAGRAM ANNULUS
COOLING FANS

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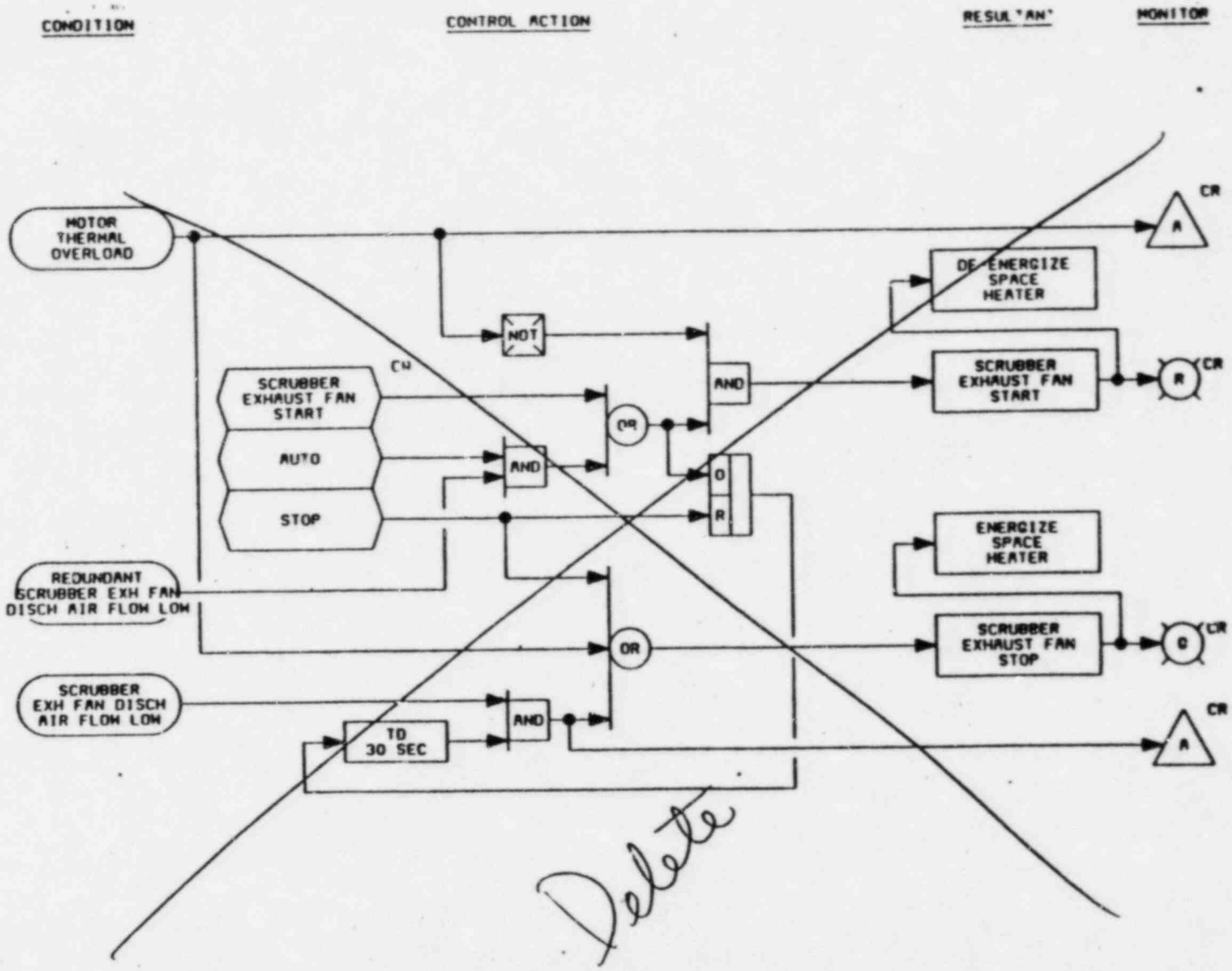

FIGURE 7.6-16
FUNCTIONAL CONTROL DIAGRAM CONTAINMENT
CLEANUP SCRUBBER EXHAUST FAN

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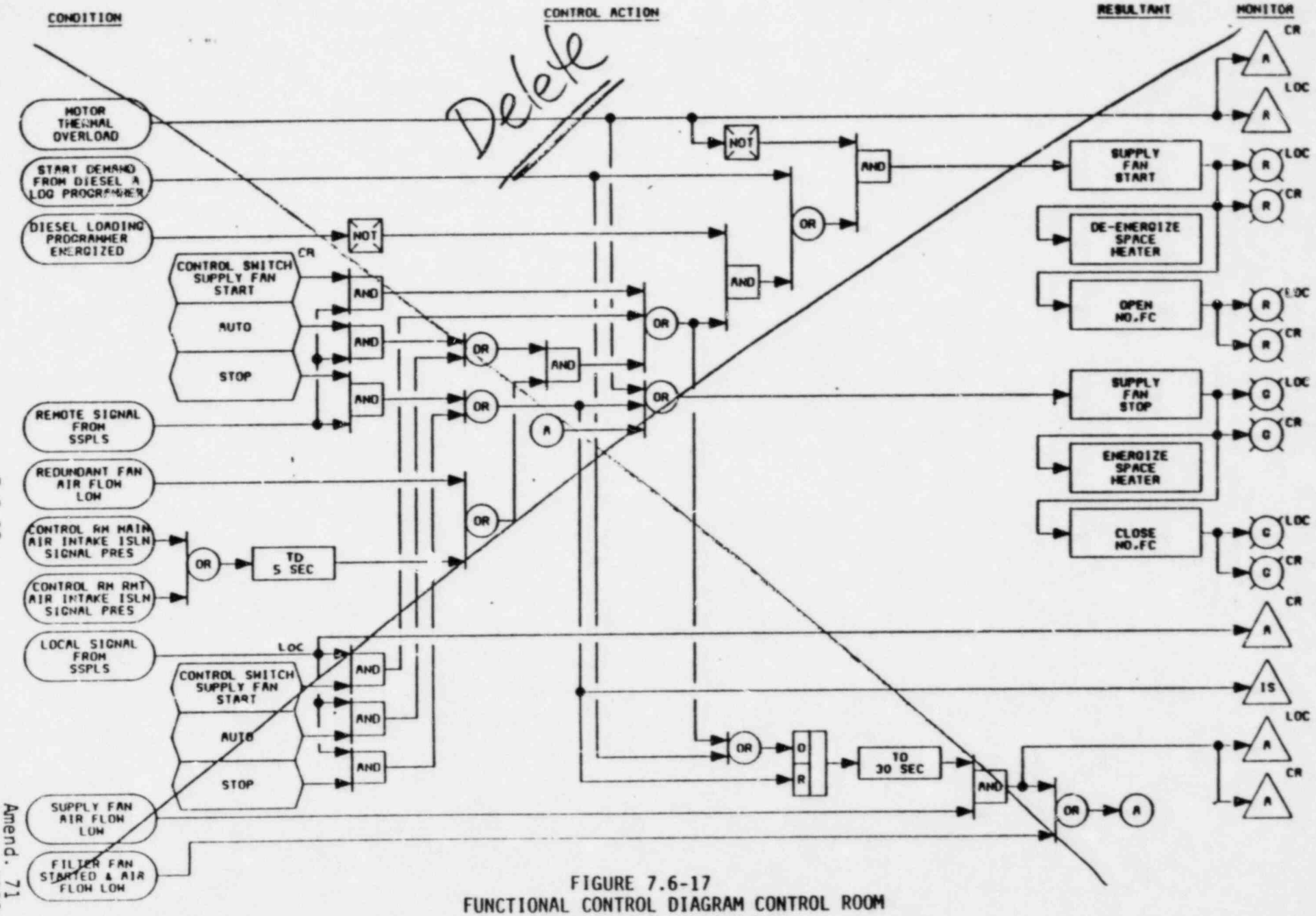

FIGURE 7.6-17
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
HVAC UNIT SUPPLY FAN

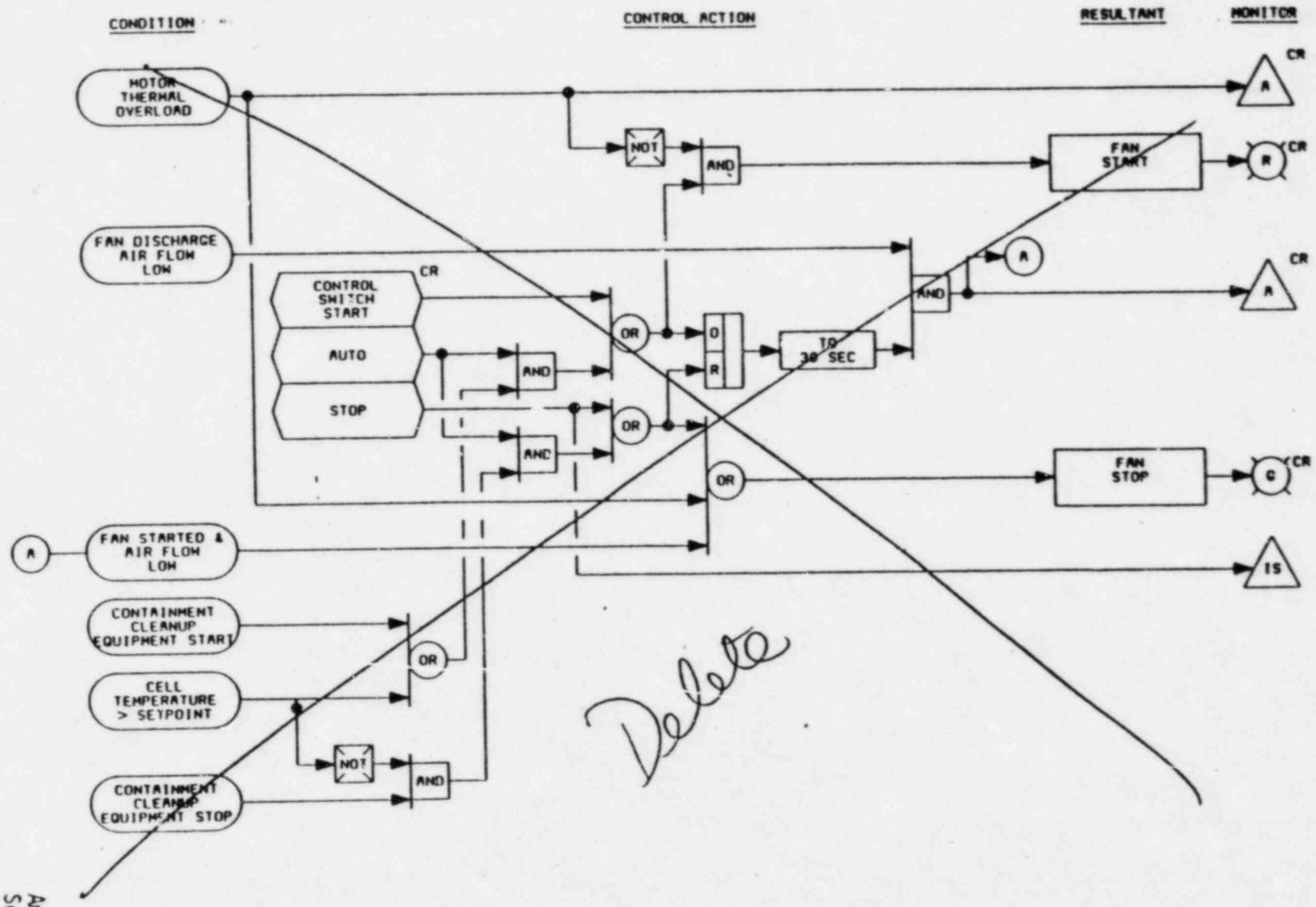

FIGURE 7.6-22
FUNCTIONAL CONTROL DIAGRAM TYPICAL UNIT
COOLER FAN SERVING CELL CONTAINING
CONTAINMENT CLEANUP EQUIPMENT

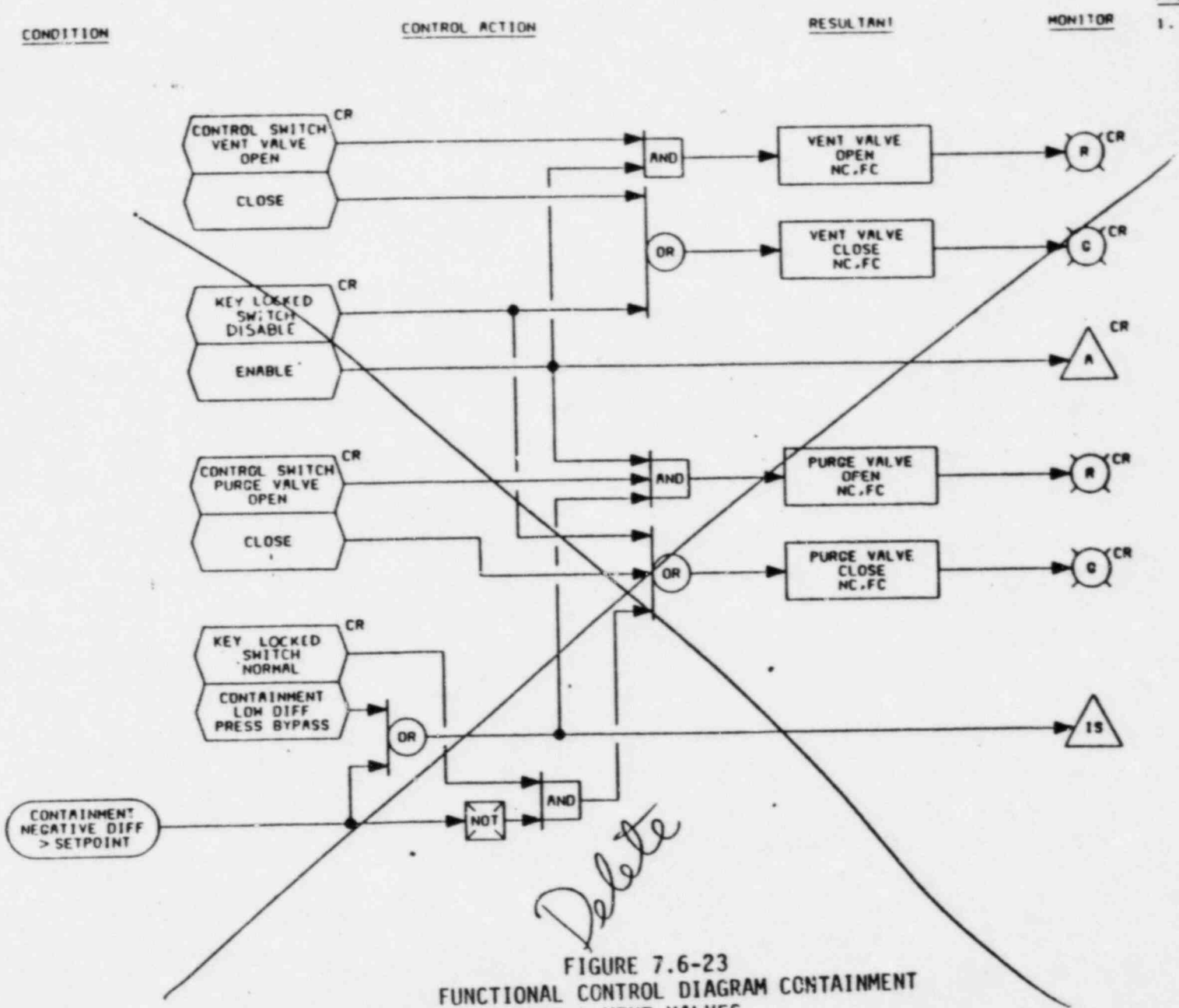

FIGURE 7.6-23
FUNCTIONAL CONTROL DIAGRAM CONTAINMENT
PURGE & VENT VALVES

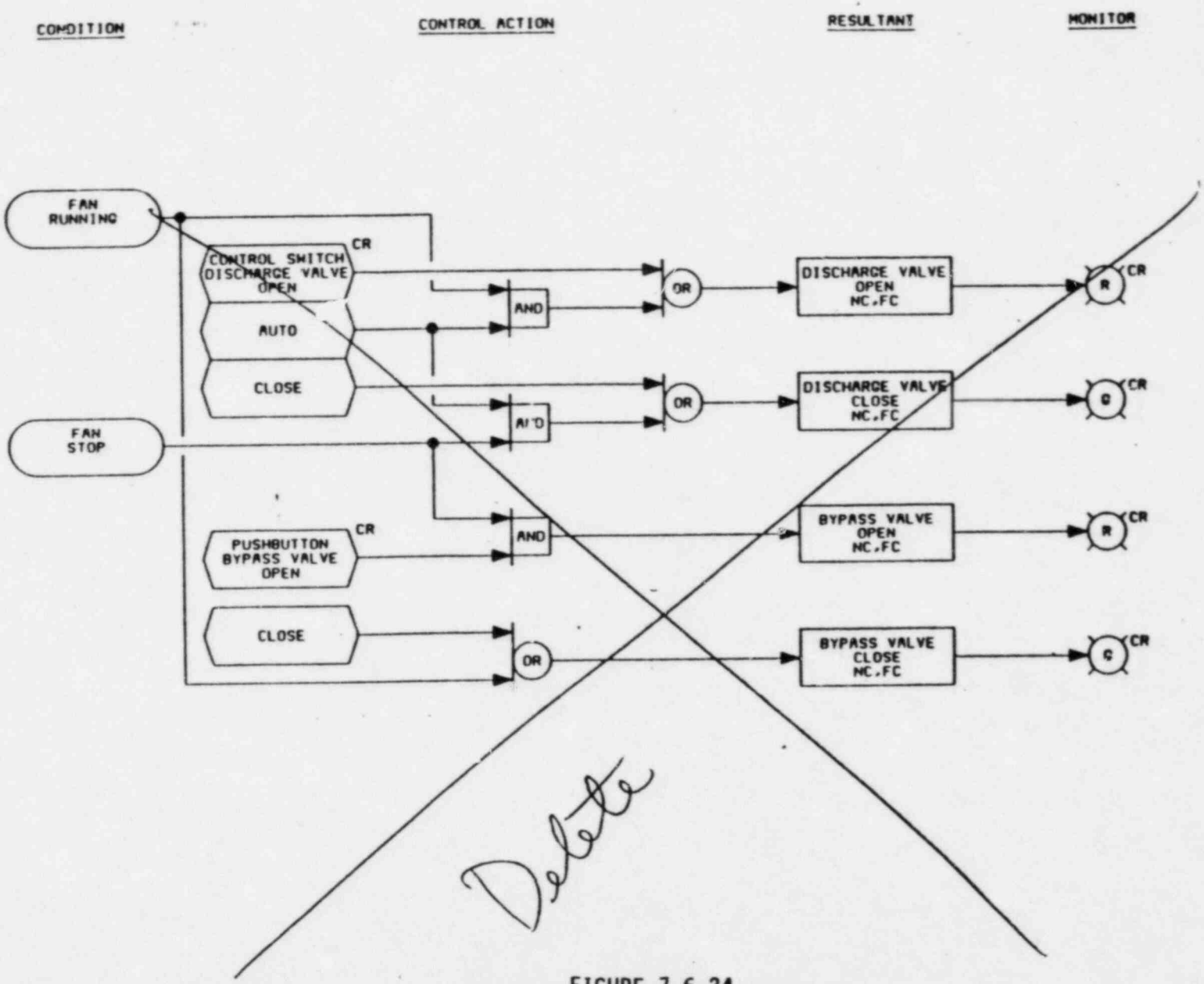

FIGURE 7.6-24
FUNCTIONAL CONTROL DIAGRAM CONTAINMENT
CLEANUP SCRUBBER FAN DISCHARGE & BYPASS
VALVES

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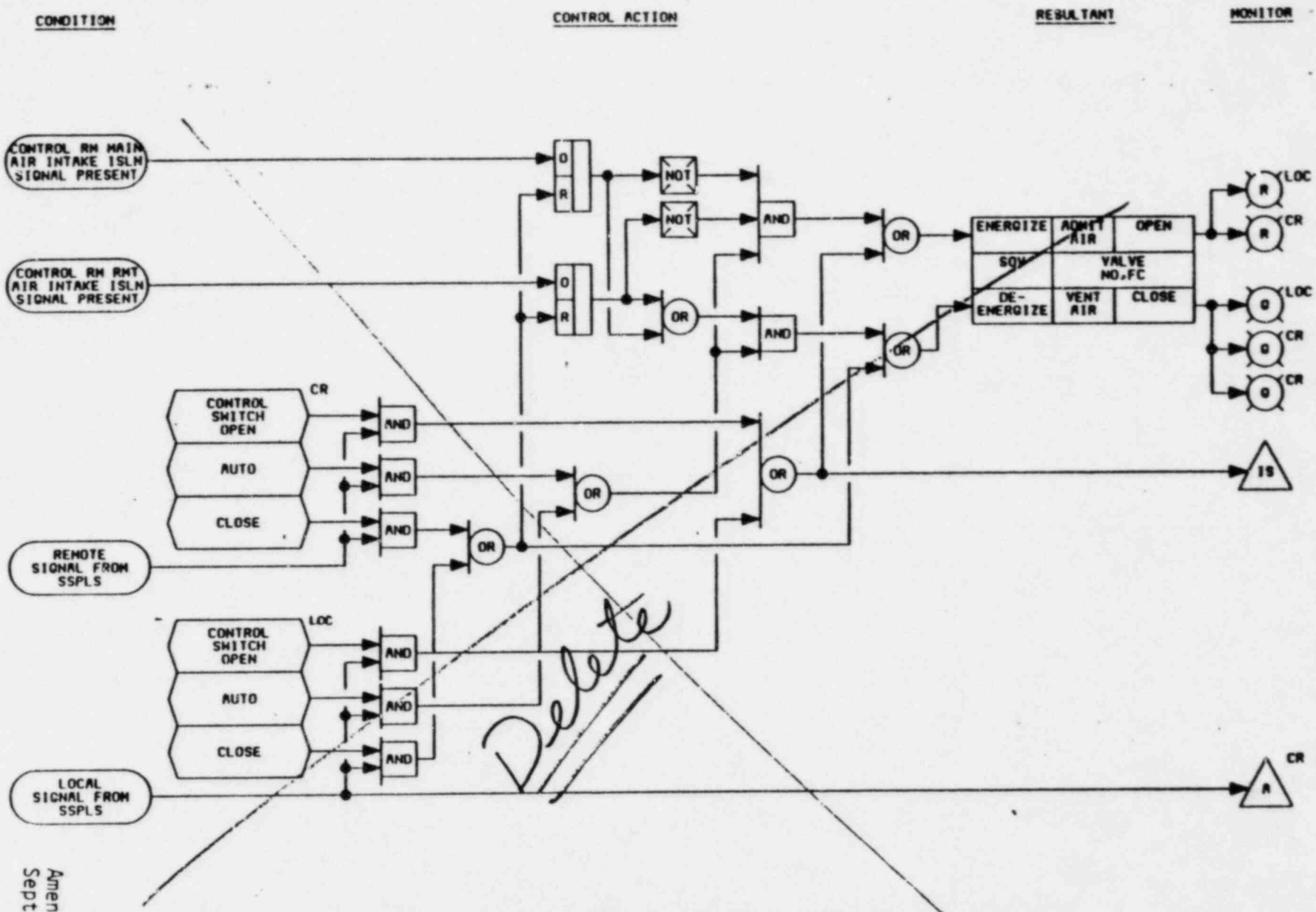

FIGURE 7.6-25
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
OUTSIDE AIR EXHAUST & HVAC UNIT OUTSIDE
AIR INTAKE VALVES

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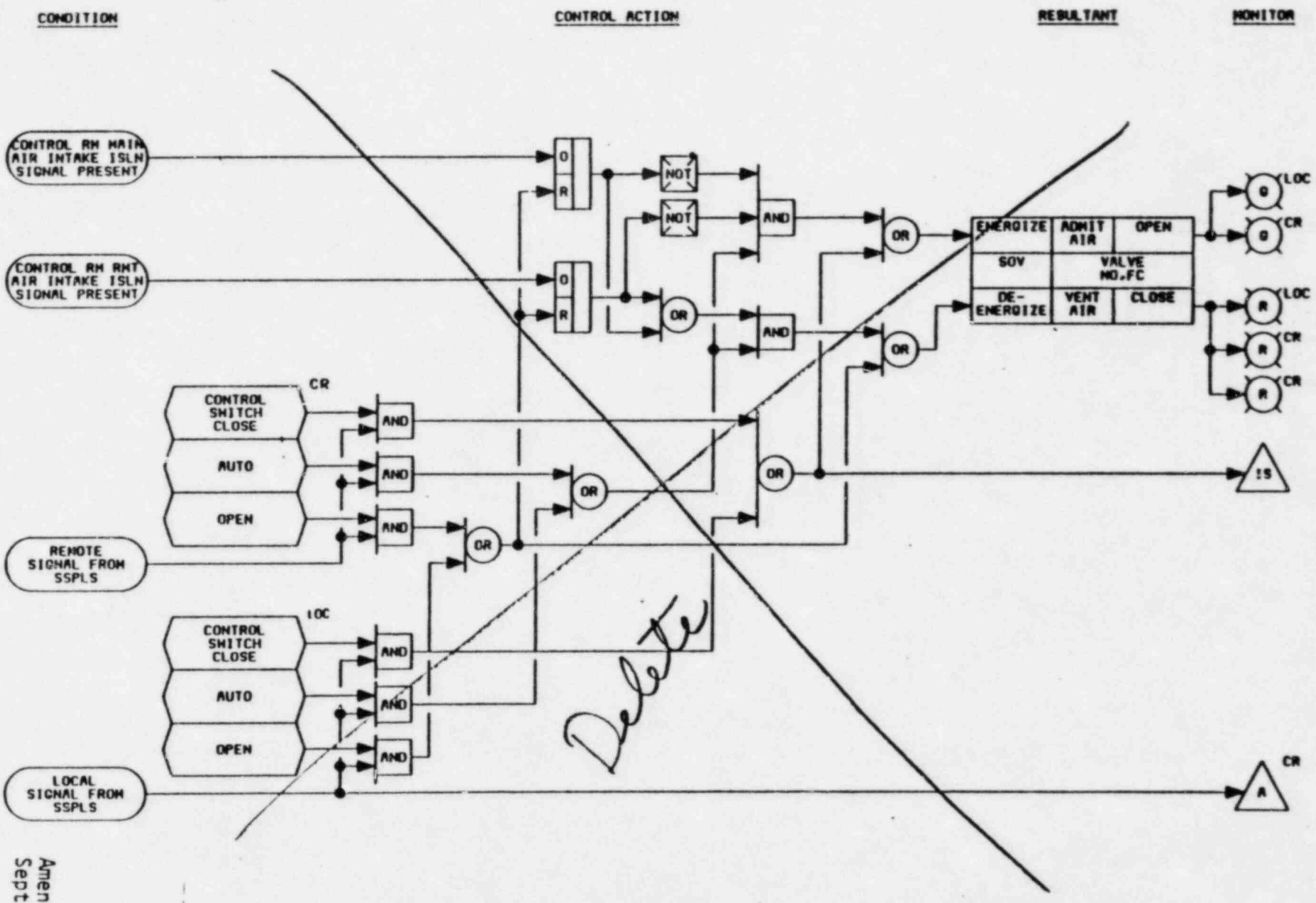

FIGURE 7.6-26
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
FILTER UNIT AIR INTAKE VALVES

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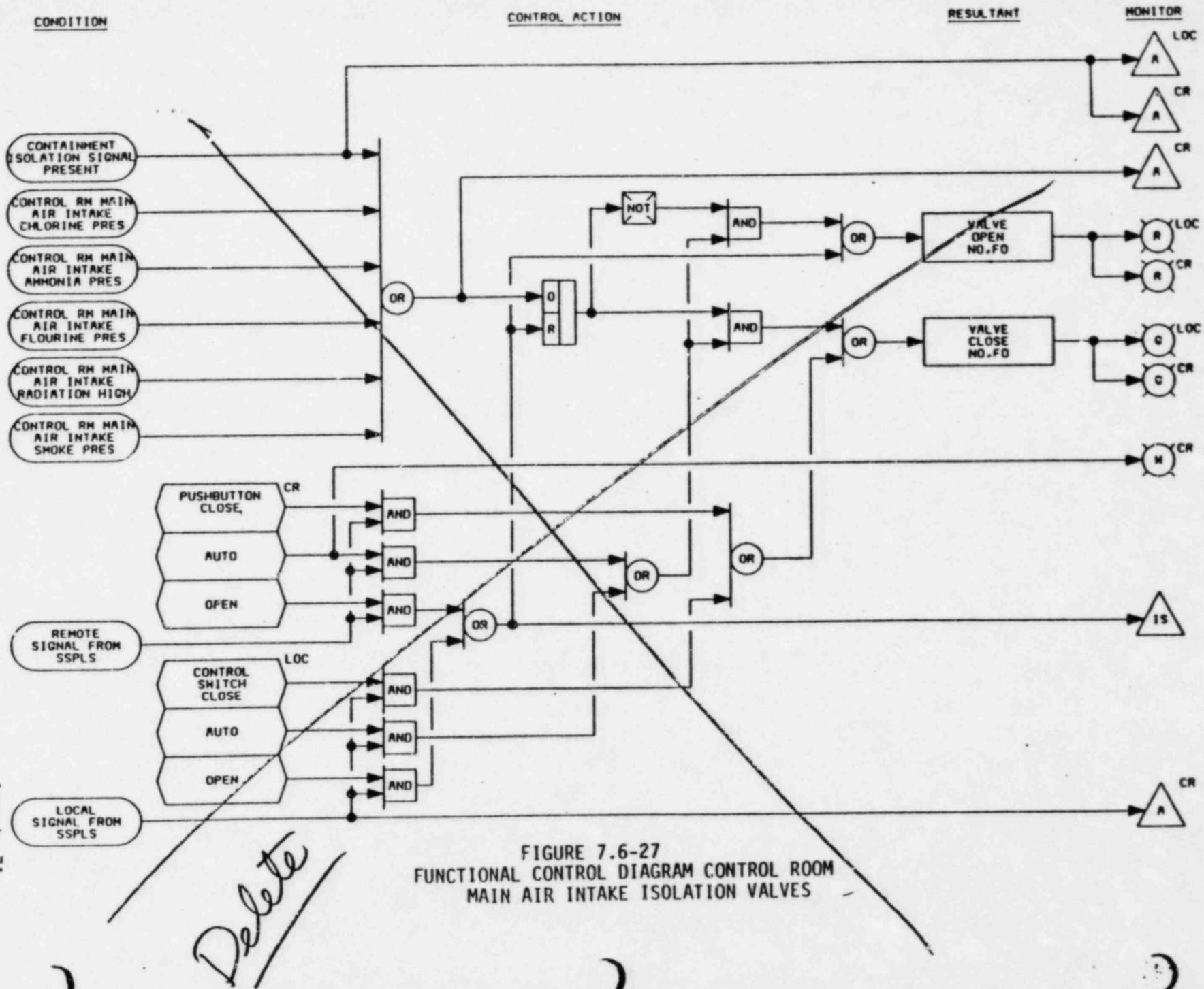

FIGURE 7.6-27
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
MAIN AIR INTAKE ISOLATION VALVES

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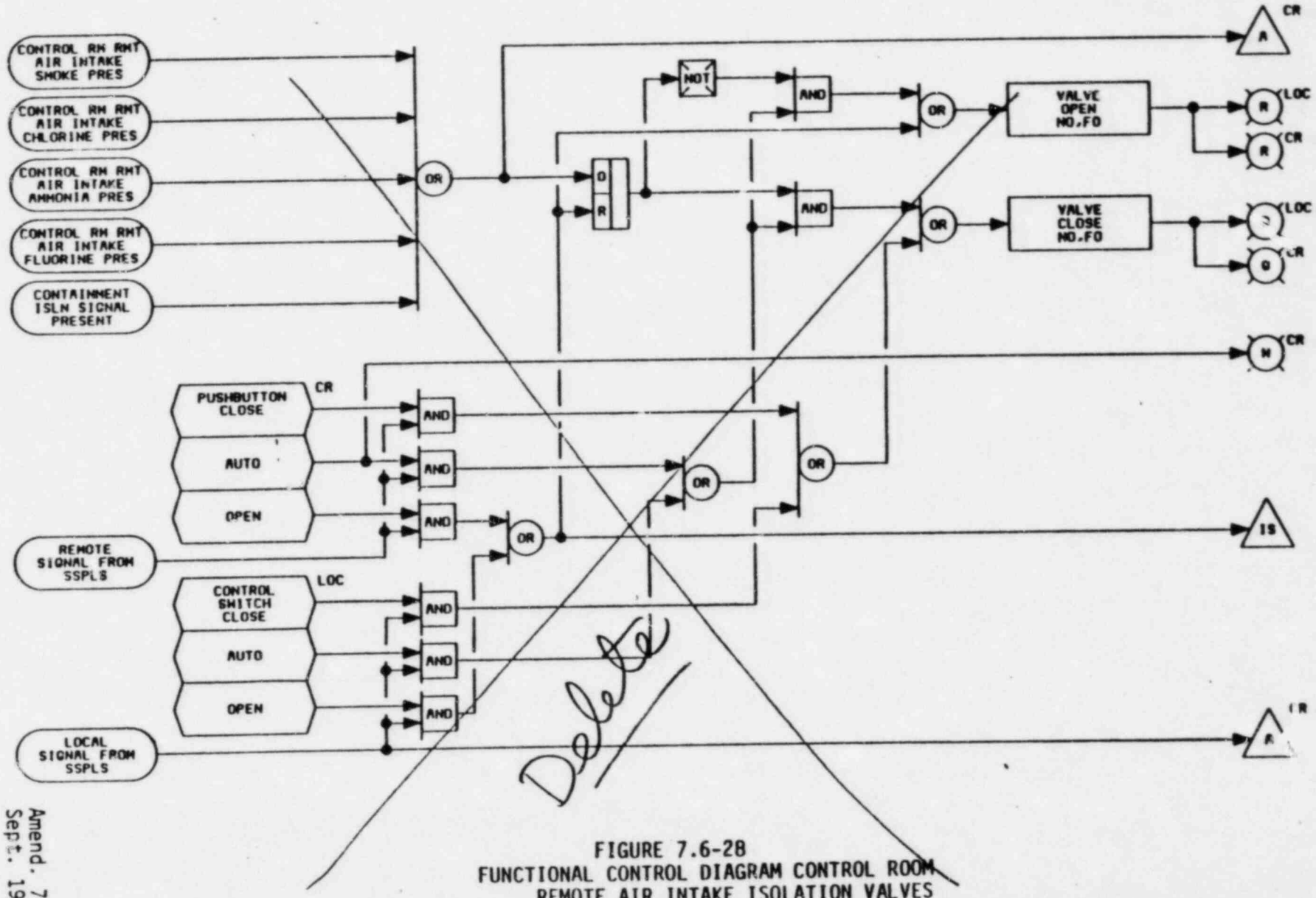

FIGURE 7.6-28
FUNCTIONAL CONTROL DIAGRAM CONTROL ROOM
REMOTE AIR INTAKE ISOLATION VALVES

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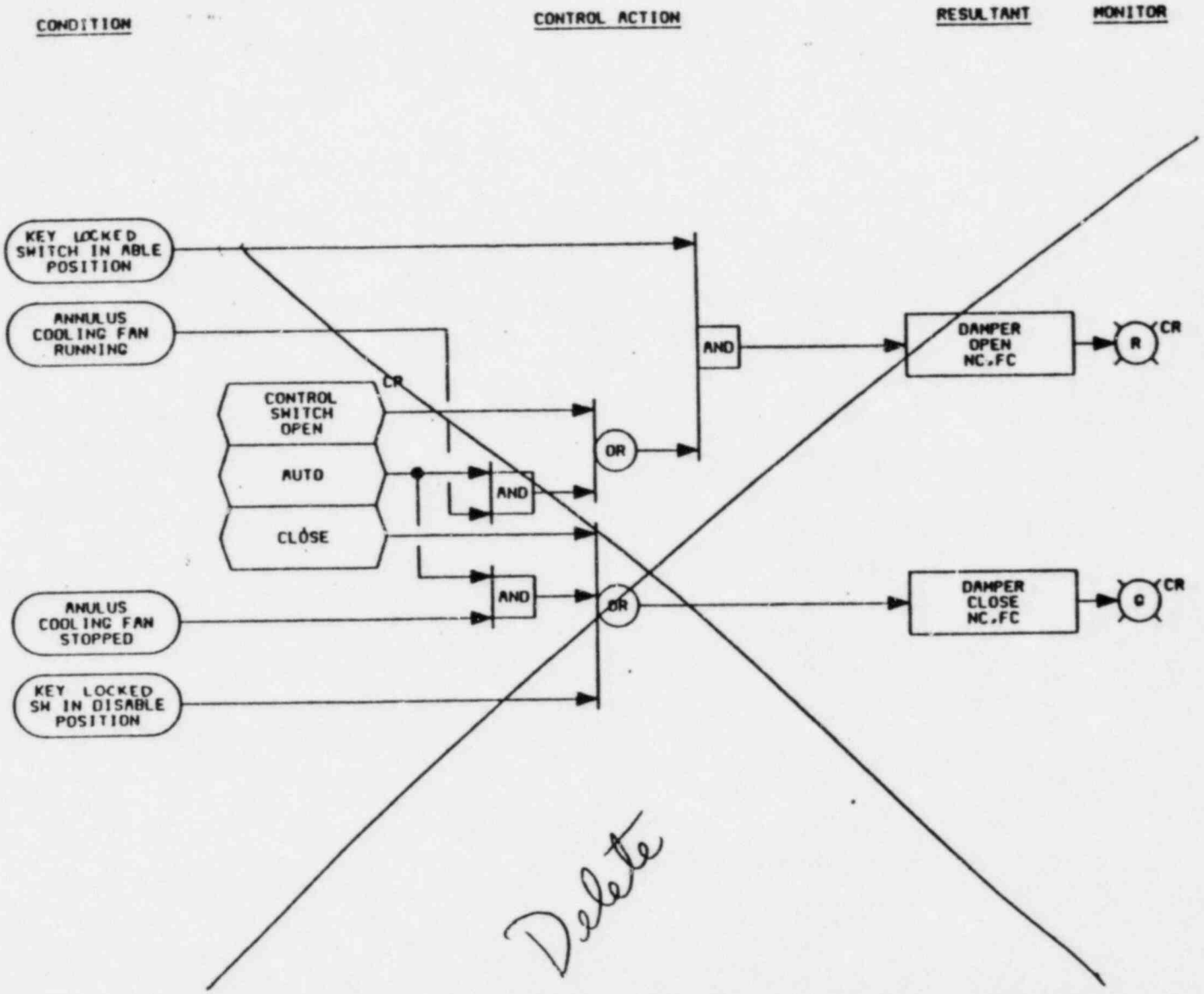

FIGURE 7.6-30
FUNCTIONAL CONTROL DIAGRAM ANNULUS
COOLING EXHAUST & FAN DISCHARGE DAMPERS

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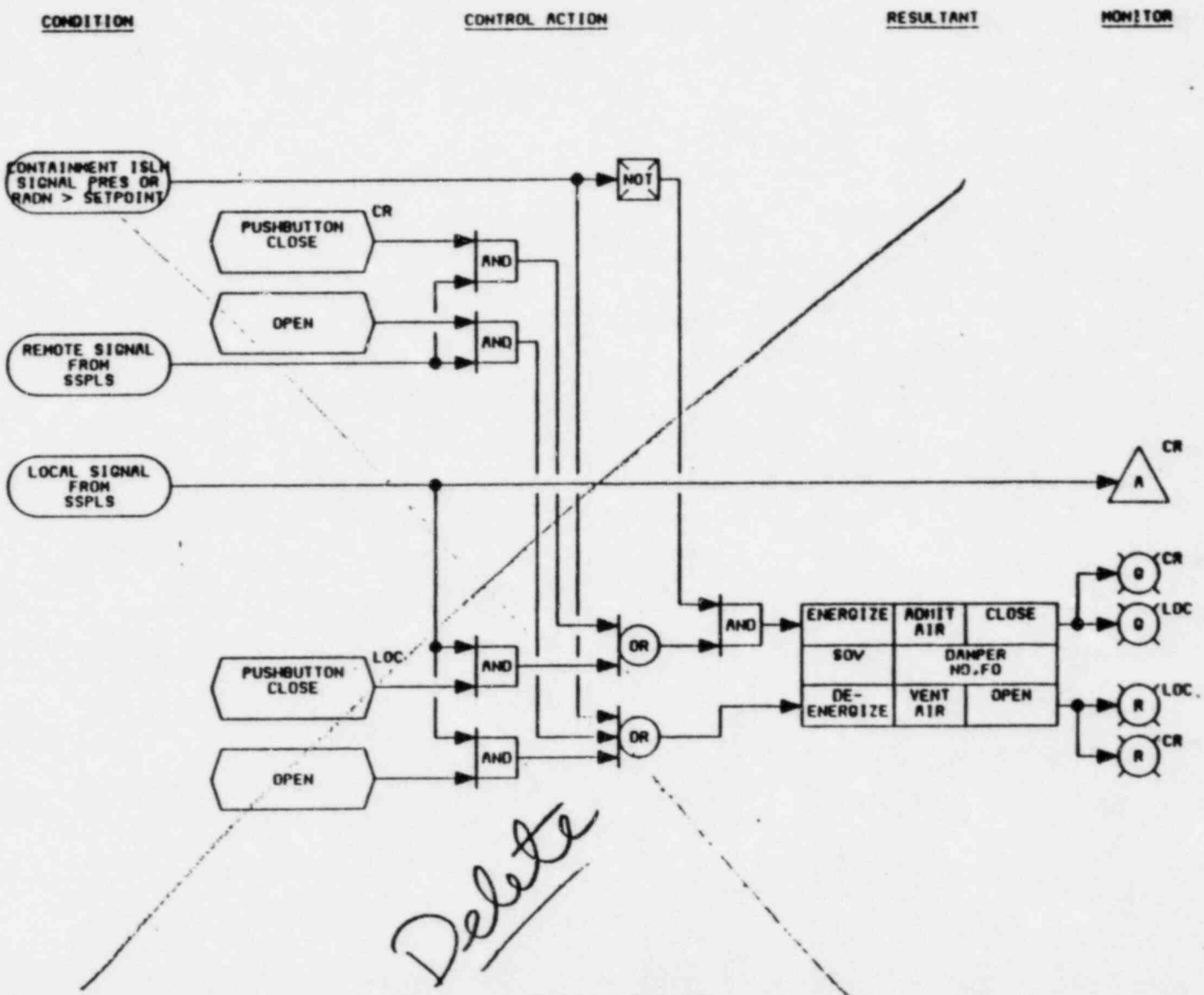

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FIGURE 7.6-31
FUNCTIONAL CONTROL DIAGRAM ANNULUS
FILTRATION RECIRCULATION DAMPERS

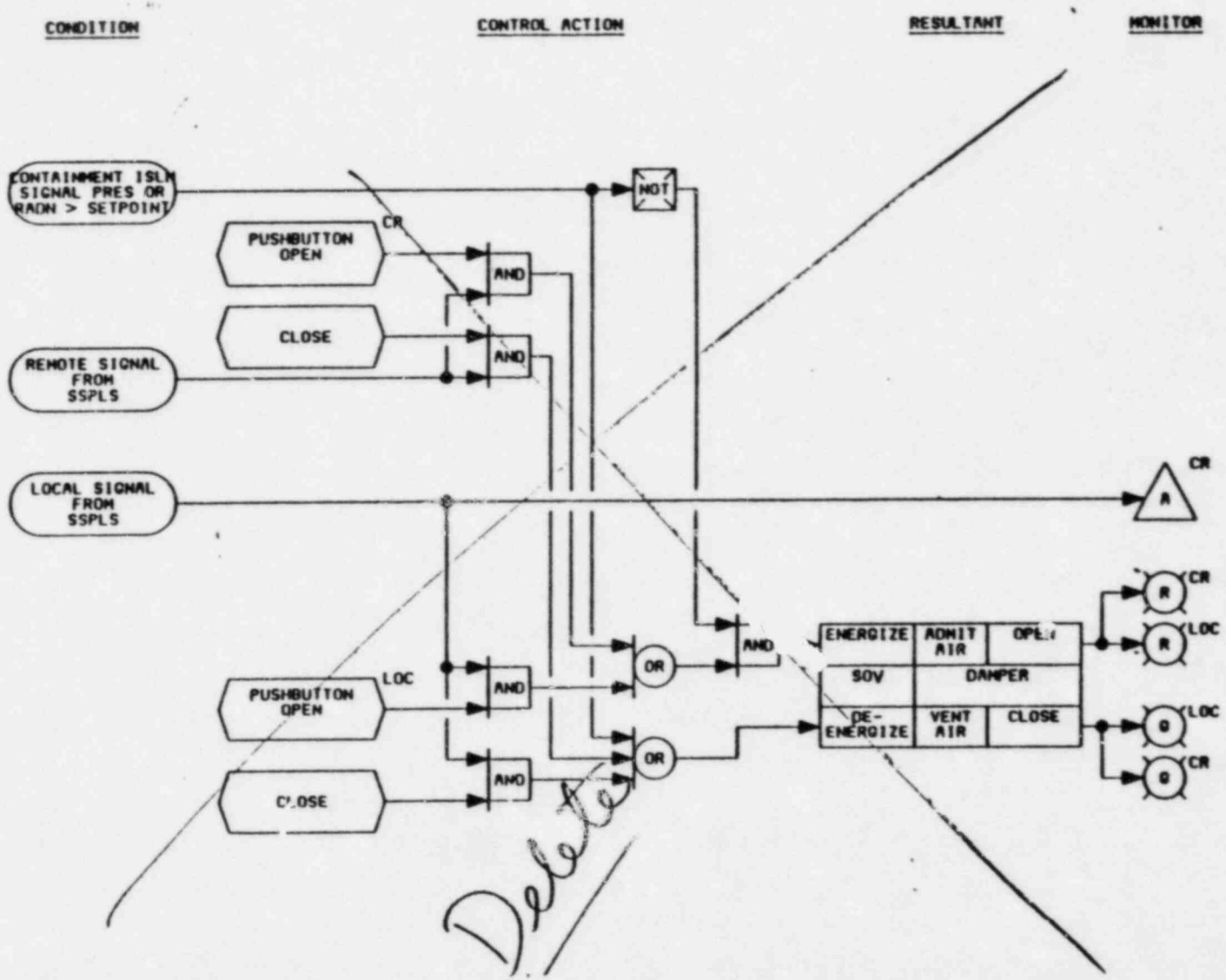

FIGURE 7.6-32
FUNCTIONAL CONTROL DIAGRAM ANNULUS
FILTRATION EXHAUST DAMPERS

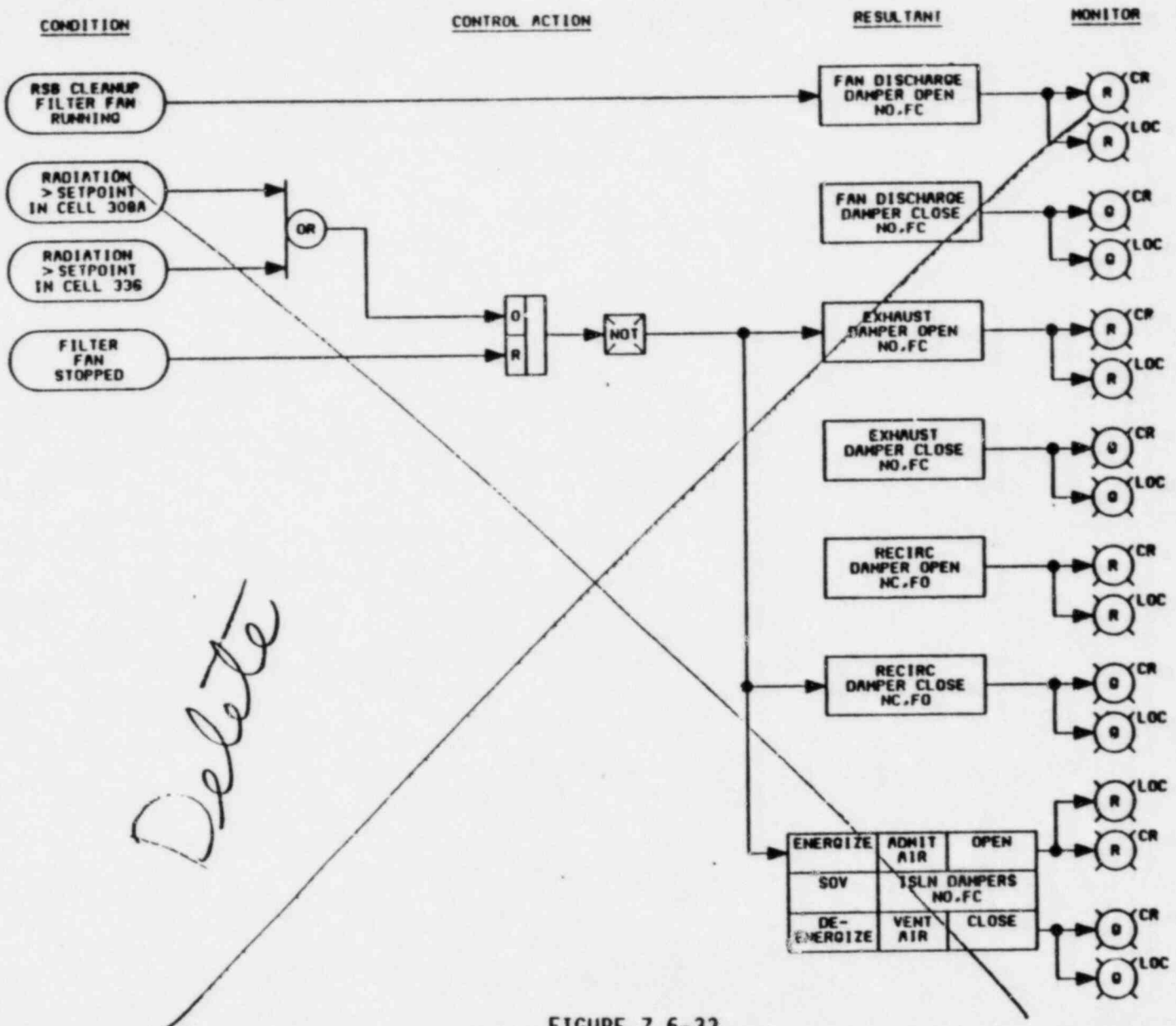

FIGURE 7.6-33
FUNCTIONAL CONTROL DIAGRAM RSB CLEANUP
DISCHARGE, EXHAUST, RECIRCULATION &
CELL ISOLATION DAMPERS

NOTES

1. DAMPERS MAYBE MODULATED FROM PRESSURE, FLOW OR TEMPERATURE SIGNAL, REFER TO FIGURES 7.6-35 AND ~~THROUGH~~ 7.6-37

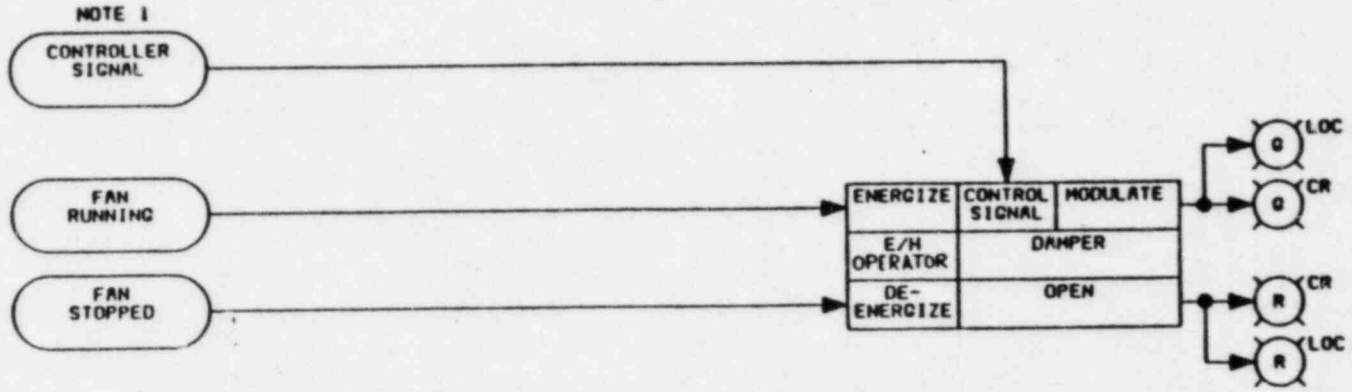

FIGURE 7.6-34
FUNCTIONAL CONTROL DIAGRAM TYPICAL
PROCESS PARAMETER CONTROL OF DAMPER

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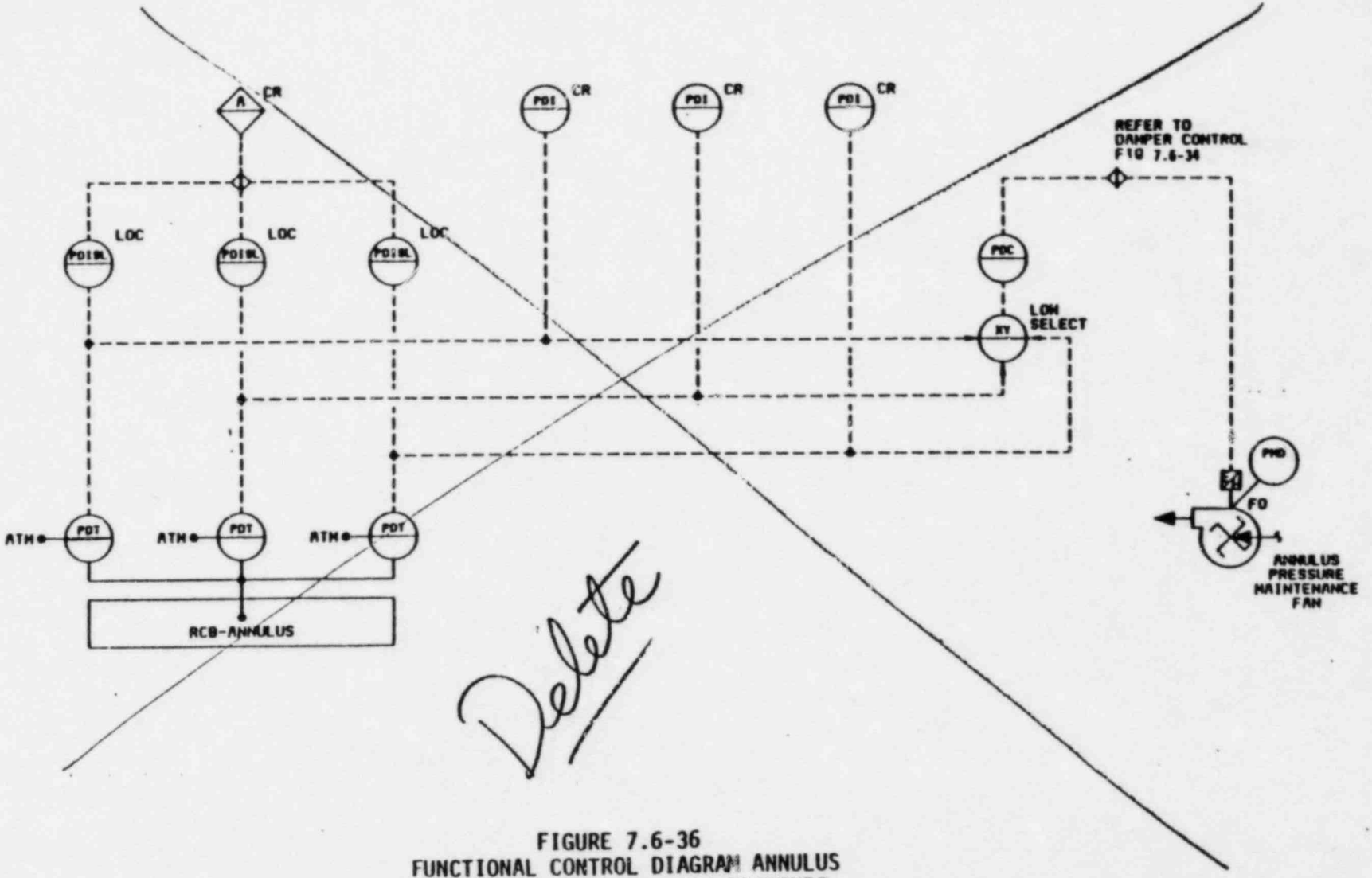

FIGURE 7.6-36
FUNCTIONAL CONTROL DIAGRAM ANNULUS
PRESSURE MAINTENANCE FAN PRESSURE
MODULATED DAMPER

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Item 52: Discuss Remote Shutdown
(2)

Comments: Provide item by item response to NRC positions on RMS. Revise QR 421.17.

Resolution: The itemized responses to NRC positions on RMS are attached. The amended QR 421.17 is attached.

CRBRP REMOTE SHUTDOWN DESIGN COMPATIBILITY WITH ISCB STATEMENTS OF GUIDANCE FOR INTERPRETING CRITERION 19 of 10CFR50, APPENDIX A

1. Statement:

The design should provide redundant safety grade capability to achieve and maintain hot shutdown from a location or locations remote from the control room, assuming no fire damage to any required systems and equipment and assuming no accident has occurred. The remote shutdown station equipment should be capable of maintaining functional operability under all service conditions postulated to occur (including abnormal environments such as loss of ventilation), but need not be environmentally qualified for accident conditions unless environmental qualification is required for reasons other than remote shutdown. The remote shutdown station equipment, including indicators, should be seismically qualified.

Reply:

Safety grade controls are provided for each of the SGAHRS loops A, B and C. These redundant sets of controls are located in separate cells on the 836 foot level of the SGB-IB. Fire or other damage in one cell will not affect the equipment in the other cells, thus redundancy for heat removal is provided.

The redundant SGAHRS instrumentation, the RSMP equipment and other I&C equipment involved in remote shutdown will be designed to operate continuously in an ambient temperature of 120°F. The instrumentation and control cabinets do not require forced ventilation. So long as the ambient temperature of the equipment cell does not exceed 120°F, loss of ventilation to the cell will not affect the operation of the equipment.

The SGAHRS I&C cabinets, controls and indicators will be qualified to 1E requirements. Other control equipment will be 1E or non-1E in accordance with the requirements of their normal plant function.

The remote shutdown monitoring panel will be seismically qualified.

2. Statement:

Redundant instrumentation (indicators) should be provided to display to the operator(s) at the remote shutdown location(s) those parameters which are relied upon to achieve and verify that a safe shutdown condition has been attained.

Reply:

Redundancy is provided by separating the A, B and C loop SGAHRS I&C electrically and physically such that failures in the equipment for one loop will not affect the other loops or the capability to remove heat from the plant. Parameters displayed on the SGAHRS panels that are relied upon to achieve and verify a safe shutdown condition are listed in PSAR Section 7.4.4.1.4. Similarly, the RSMP will provide separate indications for the A, B and C loops for the PHTS, IHTS and superheated steam parameters. Separate indications will also be provided on the RSMP for the electrical parameters of the Division 1, 2 and 3 diesel generators. Parameters displayed on the RSMP are also provided in Section 7.4.4.1.4.

3. Statement:

Credit may be taken for manual actions (exclusive of continuous control) of systems from locations that are reasonably accessible from the Remote Shutdown Stations. Credit may not be taken for manual actions involving jumpering, rewiring, or disconnecting circuits.

Reply:

Remote shutdown operations on CRBRP do not rely on jumpering, rewiring or disconnecting the wiring of circuits. All of the I&C equipment used for remote shutdown operation can be switched between the normal mode and the local mode of operation by built-in transfer switching capability.

Operations to achieve remote shutdown are centered in cells 272A, 272B, and 272C and nearby in cell 271 on the 836 foot level of the SGB-1B. Local surveillance of control rod drive mechanism (CRDM) controls, position

indicators and scram breakers can be performed on the 765 foot level of the control building (CB). Surveillance of other plant systems, when required, will be accomplished at their local I&C panels.

4. Statement:

The design should provide redundant safety grade capability for attaining subsequent cold shutdown through the use of suitable procedures.

Reply:

The SGAHRS is a safety grade system designed to remove decay heat from the reactor plant. The SGAHRS will be used to achieve and maintain hot shutdown conditions or, if desired, to cool the plant to the refueling conditions and maintain those conditions. Operating procedures for the SGAHRS will permit achieving and maintaining the desired plant conditions during remote shutdown operations.

5. Statement:

Loss of offsite power should not negate shutdown capability from the remote shutdown stations. The design and procedures should be such that following activation of control from the remote shutdown location, a loss of offsite power will not result in subsequent overloading of essential buses or the diesel generator. Manual restoration of power to shutdown loads is acceptable provided that sufficient information is available such that it can be performed in a safe manner.

Reply:

The CRBRP design for remote shutdown will permit achieving and maintaining plant shutdown conditions if loss of offsite power occurs coincident with remote shutdown operations. This is accomplished by remote shutdown employing the use of normal plant safety related equipment which is designed totally for all design base events including loss of off-site power.

6. Statement:

The design should be such that if manual transfer of control to the remote location(s) disables any automatic actuation of ESF equipment, this equipment can be manually placed in service from the remote shutdown station(s). Transfer to the remote location(s) should not change the operating status of equipment.

Reply:

The SGAHRS is the principal engineered safety system used during the remote shutdown. The system is designed to be operated in the local mode (e.g., remote shutdown) or the remote mode (from the control room). The system design for SGAHRS instrumentation and control system should be consulted for detailed information concerning operating in the local mode (PSAR 7.4.1).

Transfer of control from remote to local operation for Nuclear Island HVAC, recirculating gas cooling, emergency plant service water and emergency chilled water systems will not change the operating status of the equipment nor disable automatic operation of ESF. Transfer is accomplished by operation of a switch in the Solid State Programmable Logic System local cabinets. This transfer isolates the control room and transfers to local control.

7. Statement:

Where either access to the remote shutdown station(s) or the operation of equipment at the station(s) is dependent upon the use of keys (e.g., key lock switches), access to these keys shall be administratively controlled and shall not be precluded by the event necessitating evacuation of the control room.

Reply:

The industrial security system will provide facilities and procedures to permit operating personnel to move within the plant to perform remote shutdown operations. The industrial security system should be consulted if details are required by NRC.

8. Statement:

The design should comply with the requirements of Appendix R to 10CFR50.

Reply:

The design for remote shutdown in CRBRP is such that a single fire will not prevent operations to achieve and maintain hot or cold shutdown conditions.

Question CS421.17

The information supplied for remote shutdown (PSAR Section 7.4.4) from outside the control room is insufficient. Therefore, provide further discussion to describe the capability of achieving hot or cold shutdown from outside the control room. As a minimum, provide the following information:

a) A table listing the controls and display instrumentation required for hot and cold shutdown from outside the control room. Identify the train assignments for the safety-related equipment.

b) Design basis for selection of instrumentation and control equipment on the hot shutdown panel.

c) Location of transfer switches and the remote control station.

d) Description of transfer switches and the remote control station.

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

f) Description of control room annunciation of remote control or overridden status of devices under local control.

g) Description of compliance with the staff's Remote Shutdown Panel position.

Response

The response to this question is provided in the amended text for Section 7.4.4.

3

7.4.4 Remote Shutdown System

7.4.4.1 Design Description

7.4.4.1.1 Function

The Remote Shutdown System provides the means by which (1) safe shutdown conditions of the reactor plant can be established and maintained from locations outside of the Control Room in the event that the Control Room must be vacated; (2) hot shutdown conditions can be achieved and maintained; and, (3) if desired, the plant can be cooled to and maintained at the refueling temperature.

7.4.4.1.2 Design Basis

The Remote Shutdown system is designed to use equipment located outside of the Control Room to place the reactor and plant into a safe shutdown condition under the following conditions:

(a) The evacuation of the Control Room is not coincident with any other abnormal plant condition with the one exception that loss of offsite power may occur.

(b) No severe natural phenomena such as ~~earthquakes~~, tornadoes, hurricanes, floods, tsunami and seiches (from 10CFR50, Appendix A, Criterion 2) with the exception of earthquake occur coincidently with the ~~excavation~~ evacuation of the Control Room.

(c) The plant remains in an orderly shutdown status from the initiation of the evacuation of the Control Room to the time that command of the shutdown is re-established outside of the Control Room.

(d) The remote shutdown operations will be commanded from one location and will use plant systems operated in their local mode to effect the shutdown and decay heat removal.

(e) Plant instrumentation and control systems required for remote shutdown operations will have transfer switches located at the local panels to permit the plant operating personnel to select to operate from the local panels while isolating the remote controls or, conversely, to operate from the control room while isolating the local controls. The transfer of control of a plant system from the remote to the local mode is annunciated in the control room.

(f) Communications between the Remote Shutdown Monitoring Panel (RSMP), the command location for remote shutdown operations, and the SGAHRS panels and other local panels durirg remote shutdown operations will be by the Maintenance Communication Jacking (MCJ) system utilizing a sound-powered telephone. Plant telephone, paging and radio communication systems will also be available.

7.4.4.1.3 Remote Shutdown Operations

The RSMP will be located in Cell 272B of the 836'-0" level of the SGB. The RSMP will have indications (see Section 7.4.4.1.4) from which an operator can assess the progress of the shutdown, and it will be the location from which that operator will command the operation of the plant systems being operated in their local mode to effect shutdown.

The Division 1, 11 and 111 SGAHRS (Section 7.4.1) local panels will be located in Cells 272A, B and C respectively, in close proximity to the RSMP, on the 836'-0" level of the SGB-1B. The SGAHRS, operated in its local mode, will be used to control the removal of heat from the reactor plant to achieve and stabilize the plant at the desired plant temperature (hot shutdown or refueling temperature). The local SGAHRS panels will have all of the controls and indications necessary to completely control the system. All signals from the Control Room to the SGAHRS panels are buffered to prevent faults occuring in the Control Room from propogating back to the SGAHRS panels. All SGAHRS component controls can be transferred to local at the local SGAHRS panels. Placing the transfer switches in "local" overrides all control functions in the Control Room.

The Division 1, 11 and 111 OSIS local panels are located in SGB Cells 272A, B and C with the SGAHRS panels, and will be operated in the local mode when required to control heat removal from the plant in conjunction with the operation of SGAHRS. Isolation of OSIS panel controls from the Control Room is incorporated in the design. Steam drum drain and superheater outlet isolation valve controls can be transferred to local at the local OSIS panels.

Whenever any SGAHRS component control transfer switch is placed in the "local" position an alarm is initiated in the Control Room to alert the Control Room operator. The same statement is true for the steam drum drain controls and superheat outlet isolation valve controls on the OSIS panels.

If offsite power is lost coincident with having to achieve a safe shutdown condition in the reactor plant from outside of the Control Room, the diesel generators will start and function in accordance with the design provided by the Building Electrical Power System. ~~Any operator actions required in conjunction with operating and loading the diesel generators will be done in the local operating mode at the DG local panels.~~

In the event that the Control Room must be vacated, reactor scram and SGAHRS operation will be initiated manually. The operating personnel will move to the 836'-0" level of the SGB where the SGAHRS in the local mode will effect heat removal and stabilization of the plant temperatures. ~~Operation of the SGAHRS in the local mode will effect heat removal and stabilization of the plant temperatures.~~ The plant shutdown will be directed by the operator at the RSMP who will also assign operating personnel not continuously occupied in operating SGAHRS to oversee or operate other systems as required.

INSERT

Movement of personnel within the plant and access to building cells and local panels will be controlled by the facilities and procedures of the Industrial Security System.

Manual isolation by use of transfer switches will be done at the DG local panels. Manual control of the DG, if necessary, can also be accomplished at the DG local panels.

(Insert to 7.4.4.1.3)

Primary sodium outlet temperature indication can be used for confirmation of reactor shutdown cooling.

7.4.4.1.4 Equipment Design

The RSMP is the only piece of equipment provided by the Remote Shutdown System. It will be a vertical sided, non-Class 1E cabinet assembly containing meters and a phone jack panel. The meters will receive buffered signals from the initiating systems and, thus, do not require transfer switches to isolate them from the Control Room. The phone jack panel will permit the operator at the RSMP to communicate with the five NSSS or Nuclear Island buildings by means of any of the three MCJ circuits provided in each of the buildings. In addition, communications among the buildings can be established through the phone jack panel on the RSMP.

The indications provided on the RSMP are as follows:

- For each primary heat transport system loop,

  1 - Pump outlet sodium temperature indicaton (3 total)
  1 - Reactor inlet sodium temperature indication (3 total)
  1 - Sodium pump shaft speed indication (3 total)

- For each intermediate heat transport system loop,

  1 - IHX outlet sodium temperature indication (3 total)
  1 - IHX inlet sodium temperature indication (3 total)
  1 - Sodium pump shaft speed indication (3 total)

- For each superheated steam loop,

  1 - Temperature indication (3 total)
  1 - Steam flow indication (3 total)

- One reactor vessel sodium level meter (long probe)

- For each Diesel Generator (3 total)

  1 - Wattmeter
  1 - Frequency meter
  1 - Varmeter
  1 - Voltmeter with phase selector switch
  1 - Ammeter with phase selector switch

In addition to the foregoing indications, other indications used during remote shutdown operations that are not on the RSMP will be available as follows:

- SGAHRS

  Controls and indicators used for the operation of each SGAHRS division are located on the three seperate SGAHRS panels in cells 272A, B, and C. Each SGAHRS division is separate and redundant from the other divisions. See the response to Question CS421.04 for additional information about SGAHRS division assignments.

The following controls, indicators and alarms are on each SGAHRS panel.*

Controllers

Auxiliary Feedwater Flow
AFW Steam Turbine Steam Inlet Pressure
PACC Inlet Louver Position
PACC Fan Blade Position
Steam Drum Level
Steam Drum Vent
Superheater Vent

Analog Indicators

Protected Water Storage Tank Level
Protected Water Storage Tank Temperature
Auxiliary Feedwater Flow
Auxiliary Feedwater Pump Discharge Pressure
Steam Driven Turbine Steam Inlet Pressure
Steam Driven Tubrine Speed
PACC Outlet Air Temperature
PACC Outlet Water Flow and Temperature
PACC Inlet Louver Position
PACC Fan Blade Pitch Position
Steam Drum Pressure and Water Level

Annunciators

Protected Water Storage Tank Level
PWST Temperature
AFW Supply Temperature
Steam Driven Turbine Speed
Driven Turbine Steam Inlet Pressure
Steam Driven Turbine Bearing and Lube Oil Temperature
High Motor Bearing Temperature
SGAHRS Initiation

- Diesel speed and fuel oil indications will be available at the diesel generator local control panels in the Diesel Generator Building, ~~Cells 511 and 512~~.

*Each indicator, alarm and controller is repeated on each of the SGAHRS panels except for those associated with the AFW pumps. Panels A and B have the controls, alarms and indicators for motor driven AFW pumps A and B; Panel B has those associated with the steam driven AFW pump.

7.4.4.2 Design Analysis

The Remote Shutdown System provides the RSMP from which an operator can assess the progress of the plant shutdown and command the local operation of the plant systems (primarily SGAHRS) to effect the shutdown. It should be noted that the PACC subsystem of SGAHRS is automatically initiated by all reactor trips, and it remains in operation for the duration of the plant shutdown or as long as the reactor generates significant decay heat.

The Remote Shutdown System imposes no special requirements on the plant systems, but takes advantage of the following system design features:

- The ability to operate in both local and remote modes with isolation from and annunciation in the Control Room when operating in the local mode.
- The redundancy diversity, separation, isolation and reliability of the safety grade systems.
- The design and location of safety grade systems equipment that minimize the probability and effect of fires and explosions on the ability of the systems to perform their safety function.
- The redundant safety grade SGAHRS provides the capability to achieve and maintain hot shutdown and, if desired, to cool the plant to and maintain the plant at refueling conditions.
- When transferring SGAHRS to the local mode, the operator manually starts SGAHRS. Once started, SGAHRS automatically controls those parameters used to remove decay heat.

The RSMP is a non-Class 1E Seismic Class III assembly and therefore, is not subject to the separation requirements of IEEE 384-1974, or to the seismic qualification requirements of IEEE 344-1974, or to any of the other IEEE Standards listed in Table 7.1-3.

ITEM 5b: PACCs Instrumentation and Control

Action: (5) Update response to Question CS 421.26 in order to identify which instrumentation and control is safety-related and which is important to safety.

Resolution: The amended response to Q421.26 is attached.

Question CS 421.26

In the PSAR, Section 7.4.1.1.2 discusses the Protected Air-Cooled Condenser (PACC) and how air flows through it is controlled by a combination of fan blade pitch and inlet louver position. The staff requires a detailed discussion of this instrumentation and in particular the method used for fan blade pitch indications.

Response

The outlet louvers have discrete open and closed position sensors. These provide indication at both the local control panel and main control panel in the control room.

The inlet louvers have both discrete open and closed position sensors and a continuous position sensor. The continuous position sensor provides feedback to the louver control. Both types provide indication at the local control panel and at the main control panel in the control room.

The fan blade pitch is sensed by continuous position sensors for both control and indication. The indication is provided at the local control panel and at the main control panel in the control room.

Both the discrete and continuous sensors are integral to the actuator. The discrete sensors are roller switches activated by a cam and the continuous is a potentiometer.

This instrumentation discussed above is Class 1E with the exception of the indicating lights.

All instrumentation and controls necessary for the PACCs to carry out their intended safety function is safety-related.

Item 65: (17) Reg. Guide 1.97

Comments: Chapter 7 should refer to QR 760.6 for Reg. Guide 1.97 response (Nov. 18-19 meeting notes, Item 17).

Resolution: Reference to QR 760.6 is included in amended Chapter 7 attached.

7.5.10 Containment Atmosphere Temperature

The objective of the Containment Atmosphere Temperature Monitoring System is to provide indication in the Control Room of the atmosphere temperature inside the containment building.

7.5.10.1 Design Description

The temperature instrumentation consists of two fully redundant and independent channels. Each channel consists of two thermocouples mounted on the RCB dome, with each thermocouple providing a signal to conditioning instrumentation in the SGB. The instrumentation sends a signal to the Control Room where individual readout is provided. This instrument is also required to perform functions for events which lie beyond the design basis for the plant. This instrument is further discussed in this capacity in Section 2.1 and 2.2 of Reference 10b of PSAR Section 1.6.

7.5.11 Accident Monitoring Instrumentation

The Accident Monitoring Instrumentation is an integrated set of instruments made available to assess plant and environs conditions during and following accidents.

(——— INSERT ———)

7.5.11.1 Description

Accident Monitoring parameters are monitored to perform the following functions:

- Provide primary information to permit manual actuation of safety systems. — Variable Type A

  Type A variables monitor the primary information required to permit the control room operator to take specific manually controlled actions for which no automatic control is provided and that are required for safety systems to accomplish their safety functions for Design Basis Accident events. Primary information is that which is essential for the direct accomplishment of the specified safety functions; it does not include those variables that are associated with contingency actions that may also be identified in written procedures.

- Indicate that safety functions are being accomplished (i.e., reactor shutdown, core cooling, containment integrity). — Variable Type B

  Type B variables provide information necessary to indicate whether plant safety functions are being accomplished.

(Insert to 7.5.11)

A discussion of the functional requirements and general design requirements is provided below. Additional preliminary description of the applicaton of Reg. Guide 1.97 is provided in Question Response CS760.06.

ITEM (20): Local Control of Auxiliary Feedwater System (AFWS)

Action: Provide update response to Question CS421.18 in order to describe the capability to turn off the AFWS manually at the local SGAHRS panels.

Resolution: The revised response to Q421.18 is attached.

Question CS421.18

Provide documentation that verifies that control provided for safe shutdown from outside the control room will include the capability for reset of any engineered safety features equipment having a high likelihood of being automatically initiated during the normal transient occurring following a manual reactor trip. For example, the auxiliary feedwater system may be in this category.

Response

The Auxiliary Feedwater (AFW) and Protected Air-Cooled Condenser (PACC) are subsystems of the Steam Generator Auxiliary Heat Removal System (SGAHRS). The AFW subsystem is not initiated during the normal transient occurring following a manual reactor trip. However, all AFW subsystem component control capability can be transferred from the main control panel to local panels by transfer switches located on the local panels as described in PSAR Sections 7.4.1.1.6 and 7.4.3.1.3. Therefore, the AFW subsystem can be reset from the local panels when steam venting ceases and decay heat is being removed in a closed-loop mode by the PACCs alone. Throughout the decay heat removal mission, the operator can manually start and stop the AFW subsystem at the local panels as necessary to maintain steam drum level.

The PACC subsystem is automatically initiated by all reactor trips, and it remains in operation for the duration of the plant shutdown or as long as the reactor generates significant decay heat. The PACC has the capability of being reset at the local panels. Then, the operator can manually start and stop the PACC units. Once started the PACC units will automatically control steam drum pressure the same as in the main control room.