recirculation air, through the cleanup filters. For a complete description of the Control Room Envelope HVAC System and its operation, refer to Section 9.4.1. Section 6.4 provides an analysis of control room envelope habitability. Section 11.5 provides a description of the radiation monitors.

7.3.2.1.1 System Description:

1. Actuating Circuits

The gaseous radioactivity level of the control room/EAB makeup air is monitored by two independent and separate radiation monitors. Each monitor transmits a signal to the ESFAS if acceptable radioactivity levels are exceeded. The sensitivity and response times of these monitors are listed in Table 7.3-16. Monitor failure is also sensed and transmitted to the ESFAS, resulting in HVAC system operation as if radiation levels were high.

The Westinghouse ESFAS transmits signals to this ESFAS when an SI signal is generated 43

The ESFAS may also be initiated manually.

2. Logic

The Control Room Envelope HVAC ESFAS logic is shown on Figure 7.3-24. As can be seen on this figure, the two redundant radiation monitors each have three separate and redundant outputs, one to each of the ESFAS trains. In this way, detection of high radiation (or monitor failure) in either monitor actuates all three trains of HVAC equipment.

For a safety injection signal generated by the Westinghouse ESFAS, the signal is sent to the ESF load sequencers and then to the HVAC ESFAS. In this way, all of the control room envelope HVAC components are actuated to the emergency mode at the same time. (Safety injection corresponds to ESF load sequencer mode I. Refer to Section 8.3.)

Manual initiation capability is provided by actuate switches, one for each actuation train. Reset capability is also provided on a per-train basis.

The actuation signal is transmitted to each actuated device, causing each device to assume its safe state for these emergency conditions.

3. Bypass

There is no bypass. Manual reset of the actuation signal may be performed, thus allowing the operator to assume manual control of the Control Room Envelope HVAC System. This would be desirable for example for manual shutdown of one train following actuation of all three trains of HVAC. It is noted that reset of the actuation signal does not reverse the actuation of ESF equipment. The equipment remains in its emergency mode until the operator takes manual action on a component-by-component basis. Q032.43

7.3.3 Fuel Handling Building HVAC ESFAS

The ESFAS for the Fuel Handling Building HVAC System uses the spent fuel pool ventilation radiation monitors to sense whether predetermined setpoints have been exceeded. If they are, or if the Westinghouse ESFAS has generated a safety injection signal, the ESFAS sends actuation signals to the appropriate FHB HVAC components. The ESFAS meets the requirements of GDC 13, 20, 21 and 22.

7.3.3.1 Description. The ESFAS for the FHB HVAC System receives high radiation signals from the redundant spent fuel pool ventilation radiation monitors and the safety injection signal from the NSSS ESFAS. Upon receipt of any of these signals, the building exhaust air is diverted through filters and the supply system is tripped. For a complete description of the Fuel Handling Building HVAC System and its operation, refer to Section 9.4.2. Section 11.5 provides a description of the radiation monitors.

7.3.3.1.1 System Description:

1. Actuating Circuits

The gaseous radioactivity level of the spent fuel pool exhaust air is monitored by two independent and separate radiation monitors. Each monitor transmits a signal to the ESFAS if acceptable radioactivity levels are exceeded. The sensitivity and response times of these monitors are listed in Table 7.3-16. Monitor failure is also sensed and transmitted to the ESFAS, resulting in HVAC operation as if radiation levels were high. 43 53

The Westinghouse ESFAS transmits signals to this ESFAS when an SI signal is generated.

The ESFAS may also be initiated manually.

2. Logic

The Fuel Handling Building HVAC ESFAS logic is shown on Figure 7.3-27. As can be seen in this figure, the two redundant radiation monitors each have three separate and redundant outputs, one to each of the ESFAS trains. In this way, detection of high radiation (or monitor failure) actuates all three trains of HVAC equipment.

A safety injection signal, one from each of the Westinghouse ESFAS actuation trains, is also sent to each ESFAS train.

Manual actuation capability is provided by actuate switches, one for each actuation train. Reset capability is also provided on a per-train basis.

The actuation signal is transmitted to each actuated device, causing each device to assume its safe state for these emergency conditions.

effluents for iodines and particulates and for noble gas effluents from the plant vent.

11.5.2.3.4 Control Room Electrical Auxiliary Building (CR/EAB) Ventilation Monitors: The CR/EAB ventilation monitors are Class 1E monitors which continuously assess the intake air to the CR for indication of abnormal airborne radioactivity concentration. Each monitor assembly is powered from a separate electrical power source. In the event of high radiation or monitor failure, CR emergency ventilation operation is initiated (see Section 7.3.2). Monitor failure is alarmed in the control room. Each monitor assembly is comprised of a recirculation pump, beta-sensitive scintillation detector, four-pi lead shielding, check source, stainless steel sample gas receiving chamber, and associated electronics.

11.5.2.3.5 Condenser Vacuum Pump Monitor: Gaseous samples are drawn through an off-line system by a pump from the discharge of the vacuum pump exhaust header of the condenser. This channel monitors the gaseous sample for radioactivity which would be indicative of a SG tube leak, allowing reactor coolant to enter the secondary side fluid; this monitor complements the SGBD monitors in indication of a SG tube leak. The gaseous radioactivity levels are monitored by three detectors, in a manner similar to the unit vent wide range gas monitor. This monitor also satisfies the requirements of NUREG-0737, Item II.F.1 for provisions for sampling plant effluents for iodines and particulates and for noble gas effluents from the condenser. 44

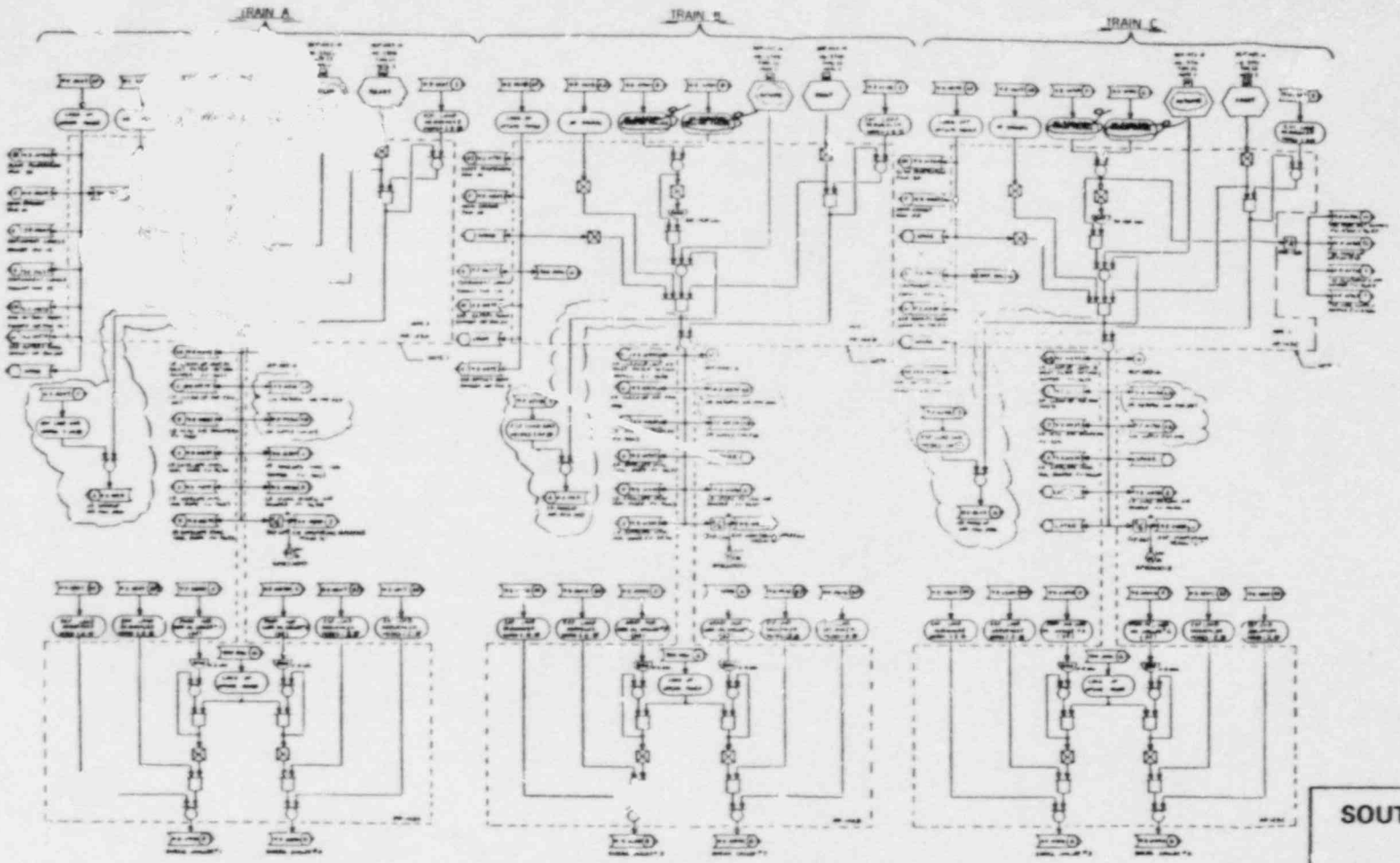
11.5.2.3.6 Spent Fuel Pool Exhaust (SFPE) Monitors: The SFPE monitors are Class 1E monitors and are identical to the CR/EAB ventilation monitors described in Section 11.5.2.3.4 except that they sample the exhaust from the FHB. In the event of high radiation or monitor failure, the monitors initiate emergency operation of the FHB heating ventilating and air conditioning (HVAC), causing the exhaust air to be filtered prior to release (see Section 7.3.3). Monitor failure is alarmed in the control room.

11.5.2.3.7 RCB Purge Isolation Monitors: The RCB/purge isolation monitors are Class 1E monitors that sample the Containment Normal Purge System or the Supplementary Purge System and are identical to the CR/EAB ventilation monitors described in Section 11.5.2.3.4. In the event of high radiation or monitor failure, the monitors send signals to the Solid-State Protection System (SSPS) for containment ventilation isolation (see Section 7.3.1). Monitor failure is alarmed in the control room. 61

11.5.2.4 Liquid Monitors. Fixed, off-line monitors are provided for continuous detection and measurement of radioactivity for liquid process streams. The design parameters for these monitors are summarized in Table 11.5-1. Each monitor is provided with demineralized water for flushing.

11.5.2.4.1 Sampling Devices: For each monitor, a sample is drawn from the process line, passed through a shielded sample chamber, through the sample pump and then returned to the system. Each sample pump is capable of drawing at least one gal/min of liquid through the monitor. The sample flow rate is controlled by means of a manual valve.

Each monitor has a low-sample-flow alarm.



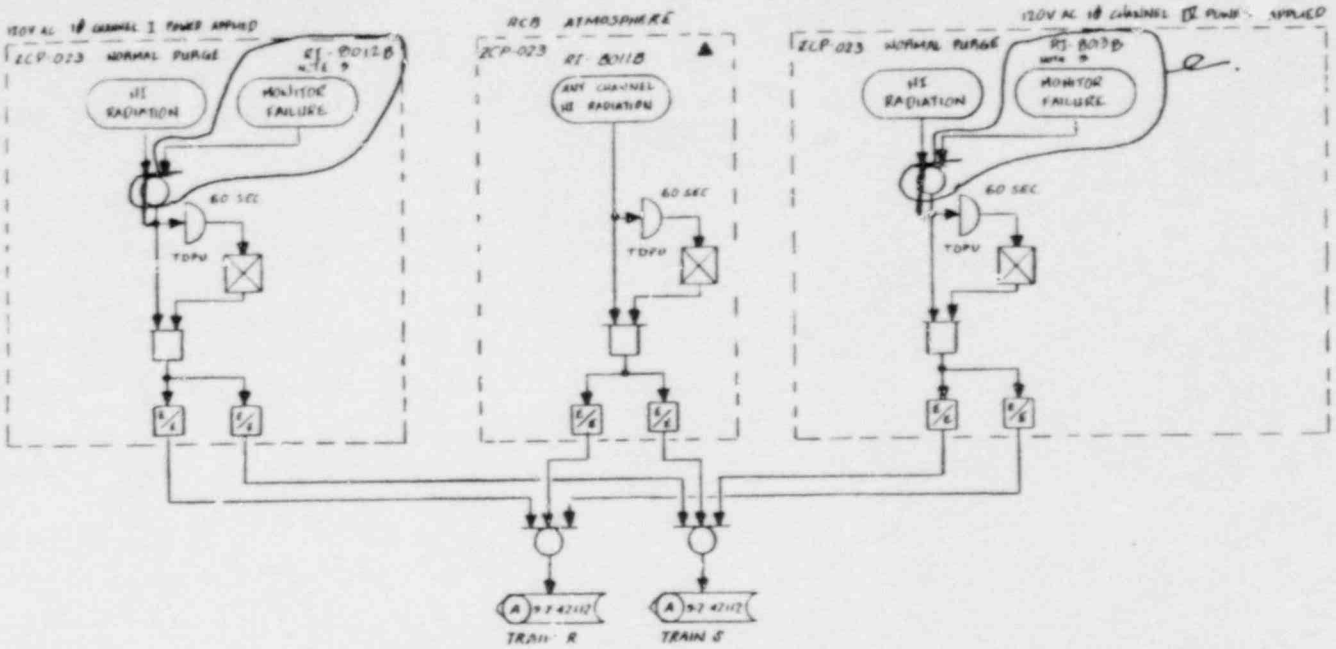
ATTACHMENT 3
ST-HL-AE-2533
PAGE 4 OF 6

SOUTH TEXAS PROJECT
UNITS 1 & 2

CONTROL ROOM ENVELOPE
HVAC ESFAS
LOGIC DIAGRAM

Dwg. No. 5Z-10-9-Z-42124 Rev. 3

Figure 7.3-24 Amendment 46



REFERENCE DWGS:
P&ID: 7 V 0001 @ 9 V / 001T
LOGIC SYMBOLS: 7 Z 4038 [illegible]
7 Z 4044 A
ELECT DWG: NA

GENERAL NOTE:
THIS LOGIC REPRESENTS FUNCTIONAL REQUIREMENTS ONLY.

NOTES:
1. DELETED
2. POWER PROVIDED TO MONITORS MUST BE INDEPENDENT. SEPARATION & ISOLATION OF POWER TRAINS MUST BE MAINTAINED.
3. RT-8012B IS THE REMOTE CONTROL UNIT FOR IE RT'S. THEY ARE MOUNTED IN THE RMS CONTROL ROOM CABINETS.

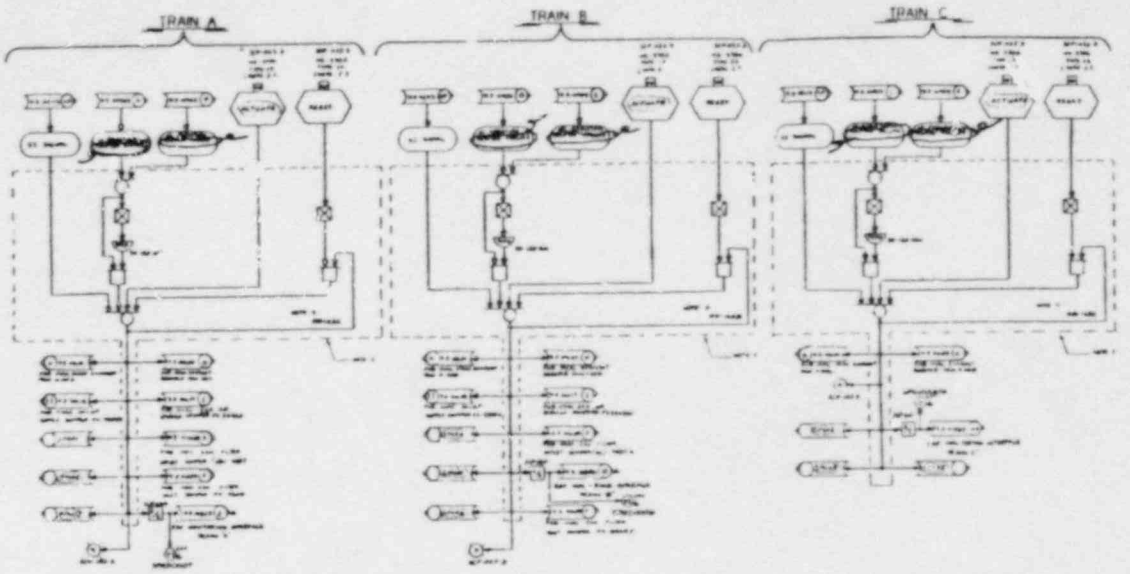
SOUTH TEXAS PROJECT UNITS 1 & 2

RCB PURGE ISOLATION RMS LOGIC DIAGRAM SYSTEM: RA

Dwg. No. SZ14-9-Z-41906 Rev. 4

Figure 7.3-2A

Amendment 60



SOUTH TEXAS PROJECT
UNITS 1 & 2

INSTRUMENTATION
FUEL HANDLING BUILDING
HVAC EMERGENCY OPERATION
LOGIC DIAGRAM
SYSTEM: SP

Dwg. No. 5Z10-9-Z-42125 Rev. 3