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April 23, 1993

Docket No. STN 52-001

Chet Poslusny, Senior Project Manager
Standardization Project Directorate
Associate Directorate for Advanced Reactors
and License Renewal
Office of the Nuclear Reactor Regulation

Subject: Submittal Supporting Accelerated ABWR Review Schedule - DFSE
Confirmatory Items 7.2.5-1 and 7.2.5-2

Dear Chet:

Enclosed is a SSAR markup addressing DFSE Confirmatory Items 7.2.1-5 and 7.2.5-2.

Please provide a copy of this transmittal to Jim Stewart.

Sincerely,

Jack Fox
Advanced Reactor Programs

cc: Norman Fletcher (DOE)
Bernie Genetti (GE)
Bob Strong (GE)

See attached list
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7.2 REACTOR PROTECTION (TRIP) SYSTEM - (RPS) INSTRUMENTATION AND CONTROLS

7.2.1 Description

7.2.1.1 System Description

7.2.1.1.1 RPS Identification

The reactor protection system (RPS) is the overall complex of instrument channels, trip logics, trip actuators and scram logic circuitry that initiate rapid insertion of control rods (scram) to shut down the reactor. The RPS also establishes reactor operating modes and provides status and control signals to other systems and annunciators. To accomplish its overall function, the RPS interfaces with the essential multiplexing system, neutron monitoring system, process radiation monitoring system, control rod drive system, rod control and information system, reactor recirculation control system, performance monitoring system, nuclear boiler system and other plant systems and equipment. These interfaces are discussed in detail in the following subsections. The RPS IED is provided as Figure 7.2-9. The RPS IBD is provided as Figure 7.2-10.

7.2.1.1.2 RPS Classification

The RPS is classified as Safety Class 2, Seismic Category 1, and Quality Group B (electric Safety Class 1E) per Regulatory Guide 1.26 and meets the requirements of 10CFR50.55a(h).

7.2.1.1.3 Power Sources

The RPS utilizes three types of power:

- (1) 120 VAC - taken from the four, divisional safety system logic and control (SSLC) power supply buses discussed Section 8.3. Each bus supplies power for one division of RPS logic. Two of the four buses also provide 120 VAC power through the two divisions of RPS scram logic circuitry to the "A" and "B" solenoids of the scram hydraulic control units (HCU's) of the Control Rod Drive System.
- (2) 125 VDC - taken from two of the four, divisional SSLC battery buses discussed in Section 8.3. Each bus provides 125 VDC power through one

of the two divisions of RPS scram logic circuitry to the solenoid of one of the two air header dump valves of the Control Rod Drive System.

SSLC power sources are shown in Figure 7.2-1.

Scram and air header dump power distribution is shown in Figure 7.2-8.

7.2.1.1.4 RPS Equipment Design

The RPS is designed to provide reliable single-failure-proof capability to automatically or manually initiate a reactor scram while maintaining protection against unnecessary scrams resulting from single failures. This is accomplished through the combination of fail-safe equipment design and redundant two-out-of-four logic arrangement. All equipment within the RPS is designed to fail into a trip initiating state on loss of power or input signal. In conjunction with this, trip initiating logic signals to and within the RPS are asserted low whereas trip bypass logic signals and trip bypass permissive logic signals are asserted high.

7.2.1.1.4.1 General RPS Equipment

The RPS equipment is divided into four redundant divisions of sensor (instrument) channels, trip logics and trip actuators, and two divisions of manual scram controls and scram logic circuitry. The sensor channels, divisions of trip logics, divisions of trip actuators and associated portions of the divisions of scram logic circuitry together constitute the RPS scram and air header dump (back-up scram) automatic initiation logic. The divisions of manual scram controls and associated portions of the divisions of scram logic circuitry together constitute the RPS scram and air header dump manual initiation logic. The automatic and manual scram initiation logics are independent of each other. RPS equipment arrangement is shown in Figure 7.2-2.

(1) Sensor Channels

Equipment within a sensor channel includes primarily sensors (transducers or switches), multiplexers and digital trip modules (DTM's). The sensors within each channel monitor plant variables discussed in Section 7.2.1.1.4.2 and send either analog or discrete output to remote multiplexer units (RMS's) within the associated division of essential multiplexing system (EMS). Each division of EMS performs analog to digital

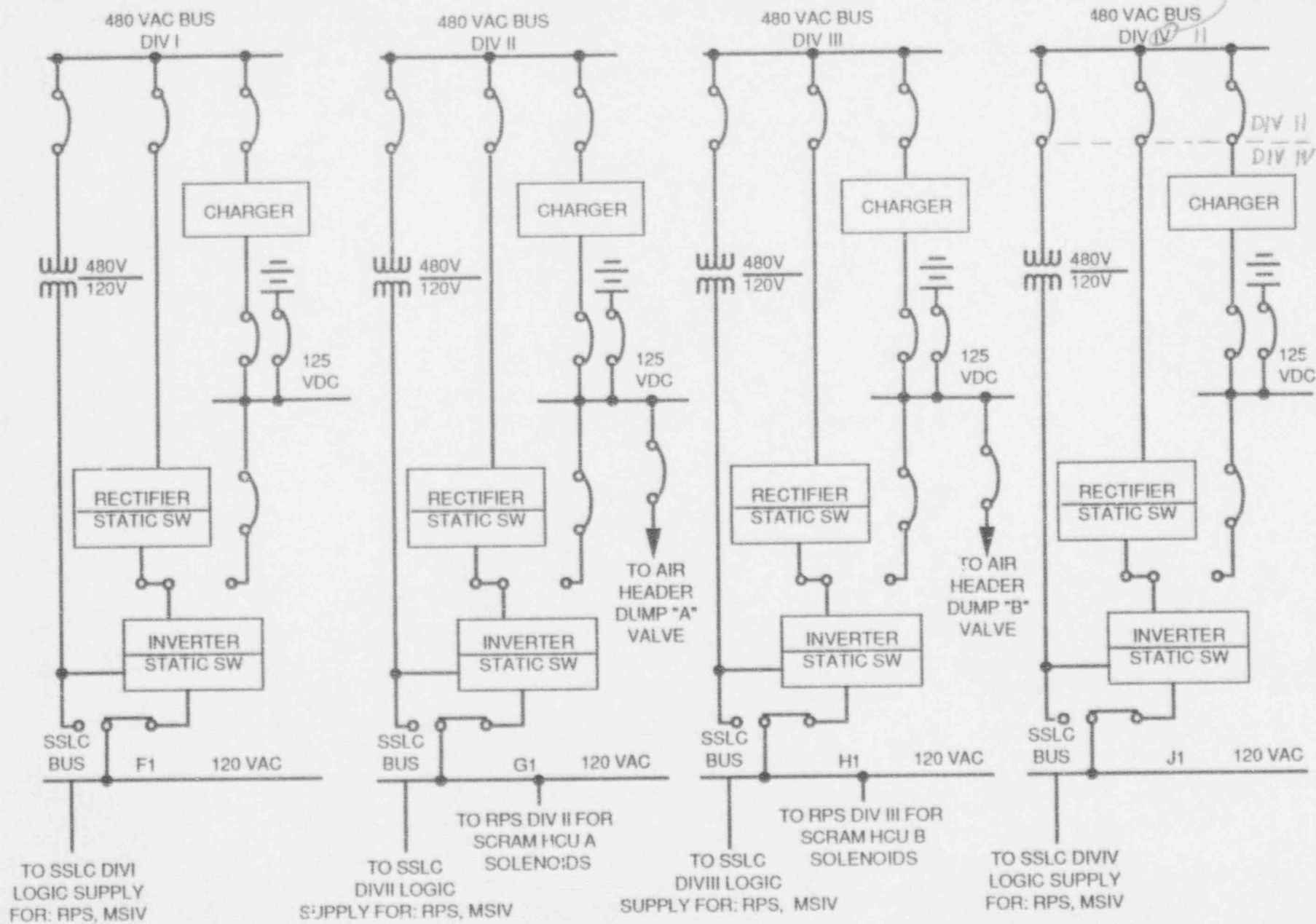
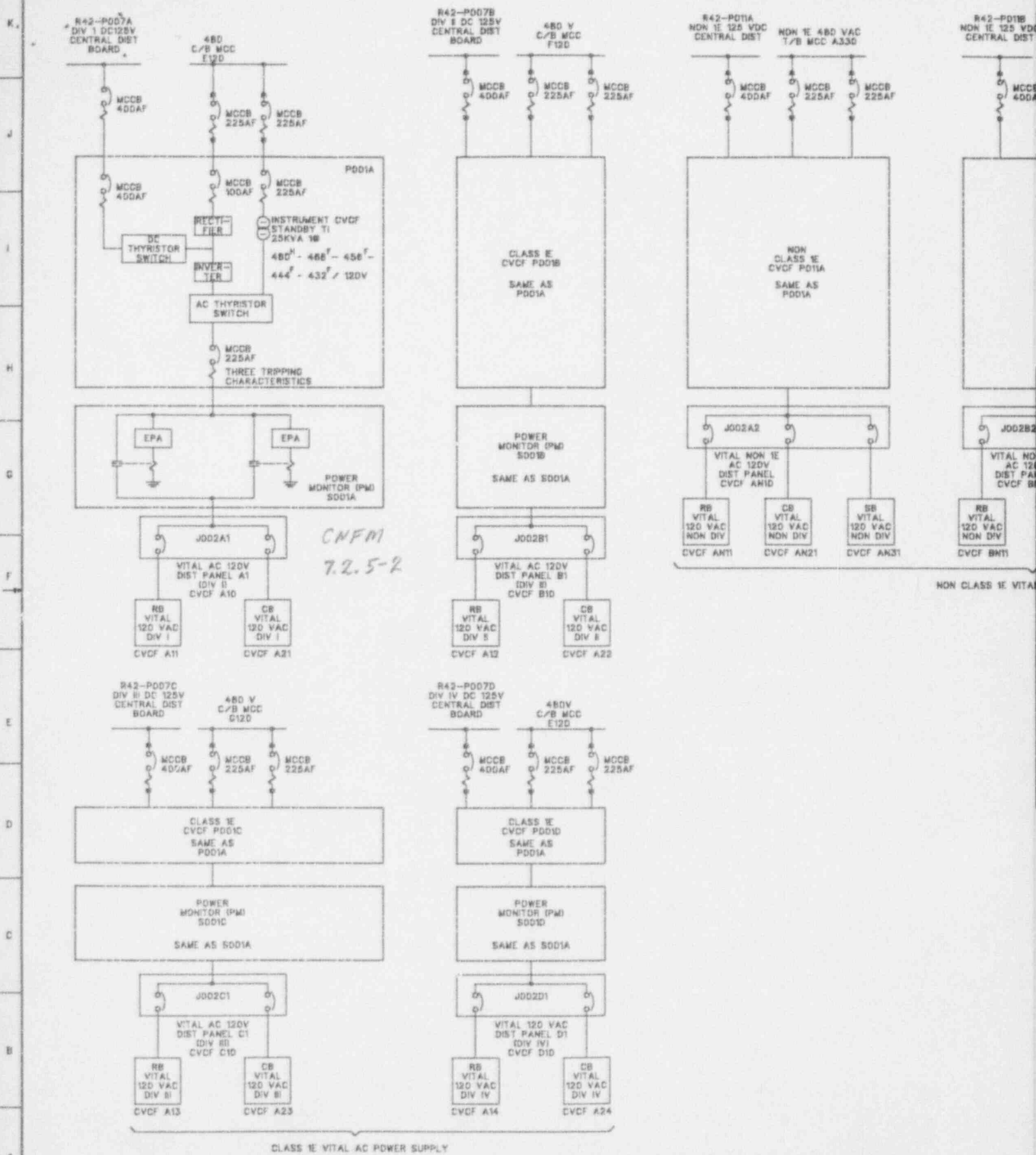


Figure 7.2-1 ABWR SSLC CONTROL POWER SCHEME (SEE ALSO FIGURE 8.3-1)



CLASS 1E VITAL AC POWER SUPPLY

CONSTANT VOLTAGE CONSTANT FREQUENCY POWER SUPPLY

Figure 8.3-3