Activation of both trip paths is required to initiate a reactor trip. Once the trip is actuated, it is sealed until manually reset at the DSS panel.

B. DIVERSITY

Hardware/component diversity is required for all diverse scram system (DSS) equipment from sensor outputs to, and including, the components used to interrupt control rod power. The use of circuit breakers from different manufacturers is not, by itself, sufficient to provide the required diversity for interruption of control rod power. The DSS sensors are not required to be diverse from the RTS sensors. However, separate sensors are preferred to prevent interconnections between the DSS and the existing reactor protection system (RPS or RTS).

The ANO-2 DSS design consists of four non-safety-related instrument channels, each of which provides an input to two, separate, two-out-of-four, energize-to-actuate logic matrices. The output of each logic is used to open one of the two RPS motor-generator (MG) set output contractors. Both contractors must open to remove power from the control element assemblies (CEA), causing a reactor scram. The instrument channels consist of sensors, bistables, bistable relays, and actuation relays.

The sensors used in the DSS are separate from the existing RPS pressure transmitters. They do, however, share existing pressure sensing lines through instrument valves. The DSS transmitter circuits are completely independent from the existing RPS instrument loops. Additionally, the DSS transmitters are qualified for Class 1E application and are Seismic Category I in design. This sensor design exceeds the requirements of the ATWS Rule.

The ANO-2 DSS design does not specifically use bistables or bistable relays in its design. The functions are performed by the Foxboro Spec. 200 Micro Control Module. For this function, the RPS uses

bistables manufactured by Gould and Electro-Mechanics and bistable relays manufactured by Electro-Mechanics. The DSS actuation devices are Foxboro output relay modules and MG set trip relays, which open the MG set output load contactors. The actuation devices are powered from a non-Class 1E instrument AC-power panel. The parallel device in the RPS is a mechanical circuit breaker powered by a Class 1E vital bus.

Based on the above, the staff concludes that the level of hardware/component diversity provided between the DSS circuits and the existing RPS circuits at ANO-2 is sufficient to comply with the requirements of 10 CFR 50.62 (the ATWS Rule) and is, therefore, acceptable.

C. DSS ELECTRICAL INDEPENDENCE/POWER SUPPLIES

The purpose of the electrical independence requirements of the ATWS Rule is to prevent interconnections between the DSS and RPS (thereby reducing the potential for CMFs that could affect both systems) and to ensure that faults within DSS circuits cannot degrade the RPS. Electrical independence of DSS circuits from RPS circuits should be maintained from sensor outputs up to the final actuation devices. The use of a common power source for the DSS and RPS sensors is acceptable because, in accordance with the ATWS Rule, the sensors can be shared between these two systems.

The DSS at ANO-2 receives power from two, separate, non-Class 1E instrument AC power sources which is operating in parallel with four Foxboro power supplies. Dual power supplies, manufactured by Computer Products, Inc. (CPI), supply power to the multiplexer. The RPS power source is a Power Mate 12 VDC power supply that takes its power from the Class 1E AC vital bus. In addition to power

3. The DSS will have provisions for manual initiation of the system.

4. Once initiated, the DSS will seal-in and require deliberate manual operator action to reset the system.

5. The DSS alarms will be consistent with the plant's Control Room Design Review and good human-engineering practices. As a minimum the following will be annunicated:

   o DSS Trip

   o DSS System Trouble Alarm

F. CONCLUSION

Based on the above evaluation, the staff concludes that the proposed design of the Diverse Scram System for Arkansas Nuclear One, Unit 2, conforms to the requirements of 10 CFR 50.62 (the ATWS Rule) and is, therefore acceptable.

4.2 DIVERSE TURBINE TRIP

A. GENERAL

The DTT design for ANO-2 consists of four, control-grade instrument channels that sense control element drive mechanism (CEDM) power bus undervoltage in a selective two-out-of-four logic. When the DSS causes a reactor scram, power is interrupted to the CEDM coils upstream of the rod power bus undervoltage relays. The de-energizing of these undervoltage relays actuates the turbine trip circuitry.