

BASES: 3.3 & 4.3 (Cont'd)

7. Periodic verification that the Scram Discharge Volume (SDV) drain and vent valves are maintained in the open position provides assurance that the SDV will be available to accept the water displaced from the control rod drives in the event of a scram.

C. Scram Insertion Times

The Control Rod System is designed to bring the reactor subcritical at a rate fast enough to prevent fuel damage. Each operating cycle, the limiting power transient delta CPR is determined based on the average response of all the drives given in the above specification to ensure that the MPCR remains greater than the fuel cladding integrity safety limit.

The scram times for all control rods shall be determined during each operating cycle. The weekly control rod exercise test serves as a periodic check against deterioration of the Control Rod System and also verifies the ability of the control rod drive to scram. The frequency of exercising the control rods under the conditions of two or more control rods valved out of service provides even further assurance of the reliability of the remaining control rods.

D. Control Rod Accumulators

Requiring no more than one inoperable accumulator in any nine-rod (3x3) square array is based on a series of XY PDQ-4 quarter core calculations of a cold, clean core. The worst case in a nine-rod withdrawal sequence resulted in a $K_{eff} < 1.0$. Other repeating rod sequences with more rods withdrawn resulted in $K_{eff} > 1.0$. At reactor pressures in excess of 800 psig, even those control rods with inoperable accumulators will be able to meet required scram insertion times due to the action of reactor pressure. In addition, they may be normally inserted using the Control-Rod-Drive Hydraulic System. Procedural control will assure that control rods with inoperable accumulators will be spaced in a one-in-nine array rather than grouped together.

E. Reactivity Anomalies

During each fuel cycle, excess operating reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern selected base states to the predicted rod inventory at that state. Power operation base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons. Reactivity anomaly is used as a measure of the predicted versus measured core reactivity during power operation. If the measured and predicted rod density for identical core conditions at BOC do not reasonably agree, then the assumptions used in the reload cycle design analysis or the calculation models used to predict rod density may not be accurate. If reasonable agreement between measured and predicted core reactivity exists at BOC, then the prediction may be normalized to the measured value. Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds 1% $\Delta k/k$. Deviations in core reactivity greater than 1% $\Delta k/k$ are not expected and require thorough evaluation. One percent reactivity limit is considered safe since an insertion of the reactivity into the core would not lead to transients exceeding design conditions of the Reactor System.

VYNPS

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In the event that one off-site power source and one emergency diesel generator are unavailable, adequate power is available to operate both emergency safeguards buses from the operable off-site power source and to operate 100% of the minimum emergency safeguards loads from the operable diesel generator. In addition, the station blackout alternate ac source of power is capable of supplying power to the bus with the inoperable diesel generator. Therefore, continued operation is permitted for up to 24 hours with one off-site power source and one emergency diesel generator unavailable.

Either of the two main station batteries is sized to supply its assigned emergency load for 8 hours without recharging, which provides margin relative to design requirements.

The main station battery duty cycle is defined as 2 hours based upon plant design which postulates the time required to restore AC power to the auxiliary systems, including the battery chargers.

Due to the high reliability of battery systems, one of the two batteries may be out of service for up to three days. This minimizes the probability of unwarranted shutdown by providing adequate time for reasonable repairs. A station battery or an Uninterruptible Power System battery is considered inoperable if one cell is out of service. A cell will be considered out of service if its float voltage is below 2.13 volts and the specific gravity is below 1.190 at 77°F.

The Battery Room is ventilated to prevent accumulation of hydrogen gas. With a complete loss of the ventilation system, the accumulation of hydrogen would not exceed 4 percent concentration in 2 1/2 days. Therefore, on loss of Battery Room ventilation, the use of portable ventilation equipment and daily sampling provide assurance that potentially hazardous quantities of hydrogen gas will not accumulate.

- C. The minimum diesel fuel supply of 36,000 gallons will supply one diesel generator for a minimum of seven days of operation at its continuous duty rating of 2750kW. Additional fuel can be obtained and delivered to the site from nearby sources within the seven-day period.

BASES:4.10 AUXILIARY ELECTRICAL POWER SYSTEMS

- A. The monthly tests of the diesel generators are conducted to check for equipment failures and deterioration. The test of the undervoltage automatic starting circuits will prove that each diesel will receive a start signal if a loss of voltage should occur on its emergency bus. The loading of each diesel generator is conducted to demonstrate proper operation at less than the continuous rating and at equilibrium operating conditions. Generator experience at other generator stations indicates that the testing frequency is adequate to assure a high reliability of operation should the system be required.

Both diesel generators have air compressors and air receivers tanks for starting. It is expected that the air compressors will run only infrequently. During the monthly check of the units, each receiver will be drawn down below the point at which the compressor automatically starts to check operation and the ability of the compressors to recharge the receivers.

Following the tests of the units and at least weekly, the fuel volume remaining will be checked. At the end of the monthly load test of the diesel generators, the fuel oil transfer pump will be operated to refill the day tank. The day tank level indicator and alarm switches will be checked at this time. Fuel oil transfer pump operability testing is in accordance with Specification 4.6.E.

The test of the diesels and Uninterruptible Power Systems during each refueling interval will be more comprehensive in that it will functionally test the system; i.e., it will check starting and closure of breakers and sequencing of loads. The units will be started by simulation of a loss of coolant accident. In addition, a loss of normal power condition will be imposed to simulate a loss of off-site power. The timing sequence will be checked to assure proper loading in the time required. Periodic tests between refueling intervals check the capability of the diesels to start in the required time and to deliver the expected emergency load requirements. Periodic testing of the various components plus a functional test at a refueling interval are sufficient to maintain adequate reliability.

The purpose of establishing the delayed access source once per operating cycle is to demonstrate that the delayed access source can be established within the required time of one hour and to demonstrate proper operation of the generator no load disconnect switch. The test demonstrates that power can be transferred to the delayed access source in a timely fashion. The test is not intended to simulate an actual loss of the immediate access source, failure of both diesel generators and consequent loss of power to the station buses.

- B. Although the Main Station, AS-2, and UPS batteries will deteriorate with time, utility experience indicates there is almost no possibility of precipitous failure. The type of surveillance described in this specification is that which has been demonstrated over the years to provide an indication of a cell becoming irregular or unserviceable long before it becomes a failure.

The Performance Discharge Test (4.10.A.2.d), performed in the "as-found" condition after the battery has been in service, provides adequate indication and assurance that the batteries have the specified ampere hour capacity. The rate of discharge during this test shall be in accordance with the manufacturer's discharge characteristic curves

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for the associated batteries. The results of these tests will be logged and compared with the manufacturer's recommendations of acceptability.

The Service Discharge Test (4.10.A.2.c) is a test of the batteries ability to satisfy the design requirements of the associated dc system. This test will be performed using simulated or actual loads at the rates and for the durations specified in the design load profile (battery duty cycle).

Verification of operability of an off-site power source and Low Pressure Core and Containment Cooling Systems within one hour and once per eight hours thereafter as required by 4.10.B.3.b.1 may be performed as an administrative check by examining logs and other information to determine that required equipment is available and not out of service for maintenance or other reasons. It does not require performing the surveillance needed to demonstrate the operability of the equipment.

- C. Logging the diesel fuel supply weekly and after each operation assures that the minimum fuel supply requirements will be maintained. During the monthly test for quality of the diesel fuel oil, a viscosity test and water and sediment test will be performed as described in ASTM D975-68. The quality of the diesel fuel oil will be acceptable if the results of the tests are within the limiting requirements for diesel fuel oils shown on Table 1 of ASTM D975-68.