

3.7 AUXILIARY ELECTRICAL SYSTEMS

Applicability

Applies to the availability of electrical power for the operation of plant auxiliaries.

Objective

To define those conditions of electrical power availability necessary (1) to provide for safe reactor operation, and (2) to provide for the continuing availability of engineered safeguards.

Specification

3.7.1 The reactor shall not be maintained critical without:

- a. The 110 KV-4160 Volt start-up transformer in service;
- b. 480-Volt buses E1 and E2 energized;
- c. 4160-Volt buses 2 and 3 energized;
- d. Two diesel generators OPERABLE with a minimum supply of 19,000 gallons of fuel oil available to the diesel generators from the Unit 2 diesel generator fuel oil storage tank and an additional 13,000 gallons available to the diesel generators from either the Unit 1 I-C turbine fuel oil storage tanks or a combination of the Unit 1 I-C turbine fuel oil storage tanks and the Unit 2 diesel generator fuel oil storage tank, and with the following protective trips for each diesel generator bypassed:
 - 1) Low lube oil pressure
 - 2) Low coolant pressure
 - 3) High coolant temperature
 - 4) High crankcase pressure
 - 5) Start failure trip of fuel racks

Two diesel generators have sufficient capacity to start and run all of the engineered safety features equipment at design load. The safety features operated from one diesel can adequately cool the core for any loss-of-coolant incident and maintain the containment pressure within the design value. The minimum diesel fuel oil inventory available to the diesel generators from the Unit 2 diesel generator fuel oil storage tank (Unit 2 tank) is maintained at all times to assure the operation of either 1) both diesel generators at rated design capacity for at least 48 hours⁽¹⁾, or 2) one diesel generator at rated design capacity for at least 96 hours. Diesel fuel is also available to the Unit 2 tank from four Unit 1 I-C turbine fuel oil storage tanks (Unit 1 tanks). This additional storage is comprised of three I-C turbine fuel oil storage tanks at approximately 23,900 gallons capacity each, and one I-C turbine vertical light-off fuel oil storage tank at approximately 23,900 gallons capacity, for a total Unit 1 fuel oil storage capacity of approximately 95,600 gallons. (The Unit 1 I-C turbine horizontal light-off fuel oil storage tank capacity is not available to the Unit 2 tank.) Connections are provided for fuel oil transfer from the four Unit 1 tanks to the Unit 2 tank. Therefore, the minimum diesel fuel oil inventory available to the diesel generators from the total on-site diesel fuel oil storage capacity is maintained at all times to assure the operation of one diesel generator at its rated design capacity for seven days. "Rated design capacity" for this specification is defined as operation at 2500 kW for 22 hours and 2750 kW for 2 hours in any 24-hour period.

Additional supplies of diesel oil are available in the Hartsville area and from port terminals at Charleston, S.C. and Wilmington, N.C., and inland terminals at Columbia, S.C., Charlotte, N.C., Greensboro, N.C., Fayetteville, N.C., and Raleigh, N.C. Ample trucking facilities exist to assure deliveries to the site within eight hours.

One battery charger shall be in service so that the batteries will always be at full charge in anticipation of loss-of-A.C. power incident. This ensures that adequate D.C. power will be available for emergency uses.

The plant can be safely shut down without the use of offsite power since all vital loads (safety systems, instruments, etc.) can be supplied from the emergency diesel generators.

The two diesel generators, each capable of supplying safeguards loads, and the start-up transformer provide three separate sources of power immediately available for operation of these loads.

bypasses listed in Specification 3.7.1.d shall be demonstrated to be operable by simulating a trip signal to each of the trip devices that is bypassed and observing that the diesel does not trip.

4.6.1.3 Each diesel generator shall be inspected at each refueling.

4.6.1.4 Diesel generator electric loads shall not be increased beyond the long term rating of 2500 kW.

4.6.2 Diesel Fuel Tanks

A minimum fuel oil inventory sufficient to ensure 19,000 gallons available to the diesel generators shall be maintained at all times in the Unit 2 diesel generator fuel oil storage tank and an additional 13,000 gallons available to the diesel generators shall be maintained at all times in either the Unit 1 I-C turbine fuel oil storage tanks or a combination of the Unit 1 I-C turbine fuel oil storage tanks and the Unit 2 diesel generator fuel oil storage tank.

4.6.3 Station Batteries

4.6.3.1 The voltage and temperature of a pilot cell in each battery shall be measured and recorded daily, 5 days/week.

4.6.3.2 The specific gravity and voltage to the nearest 0.01 volt, the temperature reading of every fifth cell, the height of electrolyte and the amount of water added to each cell shall be measured and recorded monthly.

4.6.3.3 Each battery shall be subjected to an equalizing charge annually. The requirements in 4.6.3.2 above shall be performed after each equalizing charge.

4.6.3.4 At each time data is recorded, new data shall be compared with old to detect signs of abuse or deterioration.

Each unit as a backup to the normal standby AC power supply is capable of sequentially starting and supplying the power requirement of one complete set of safety features equipment. It can accept full load within 35 seconds after the initial starting signal,⁽¹⁾ and will sequentially start and supply the power requirements of one complete set of safety features equipment in 50 seconds.⁽²⁾

A supply of 19,000 gallons of fuel will ensure the operation of both diesels carrying rated design capacity for at least 48 hours or one diesel for at least 96 hours. An additional 13,000 gallons will be available to assure an adequate fuel supply for at least seven days of operation of a single diesel generator at its rated design capacity. Rated design capacity for this specification is defined as operation at 2500 kW for 22 hours and at 2750 kW for two hours in any 24-hour period.

Station batteries will deteriorate with time, but precipitous failure is extremely unlikely. The surveillance specified is that which has been demonstrated over the years to provide an indication of a cell becoming unserviceable long before it fails.

The equalizing charge, as recommended by the manufacturer, is vital to maintaining the ampere-hour capability of the battery. As a check upon the effectiveness of the equalizing charge the battery should be loaded rather heavily and the voltage monitored as a function of time. Experience has shown that this test should be repeated at intervals to detect deterioration of cells.⁽³⁾ If a cell has deteriorated or if a connection is loose, the voltage under load will drop excessively indicating replacing or maintenance.

References

- (1) FSAR Section 8.2
- (2) FSAR Table 8.2-4
- (3) AEC Information Letter ROE: 67-1, January 31, 1967.