

ATTACHMENT

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Technical Specifications for
RPS Power Supply Monitoring System

(Quad Cities Station Unit 2 Format)

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reactor shall be in the cold shutdown condition within 24 hours.

2. Specification 3.9.E.1 shall not apply when a diesel generator has been made inoperable for a period not to exceed 1-1/2 hours for the purpose of conducting preventative maintenance. Additionally, preventative maintenance shall not be undertaken unless two offsite lines are available and the alternate diesel generator has been demonstrated to be operable.
3. Whenever the reactor is in the Cold Shutdown or Refueling mode, a minimum of one diesel generator (either the Unit diesel generator or the Unit 1/2 diesel generator) shall be operable whenever any work is being done which has the potential for draining the vessel, secondary containment is required, or a core or containment cooling system is required.

F. Reactor Protection Bus Power Monitoring System

1. Two RPS electric power monitoring channels for each inservice RPS MG set or inservice alternate power source shall be OPERABLE except when the reactor is in the SHUTDOWN mode.
- 2a. With one RPS electric power monitoring channel for an inservice RPS MG set or inservice alternate power source inoperable, restore the inoperable channel to OPERABLE status within 72 hours or remove the associated RPS MG set or alternate power source from service.
- b. With both RPS electric power monitoring channels for an inservice RPS MG set or inservice alternate power source inoperable restore to OPERABLE status within 4 hours, or remove the associated RPS MG set or alternate power source from service.

F. Reactor Protection Bus Power Monitoring System

1. The RPS power monitoring system instrumentation shall be determined OPERABLE.
 - a. At least once per 12 months by performing a channel functional test, and
 - b. At least once per operating cycle by demonstrating the operability of overvoltage, undervoltage, and underfrequency protective instrumentation by performance of a channel calibration, including simulated automatic actuation of the protective relays, tripping logic, and output circuit.
 - (1) Overvoltage - $126.5V \pm 2.5\%$
Min. 123.3V
Max. 129.6V
 - (2) Undervoltage - $108V \pm 2.5\%$
Min. 105.3V
Max. 110.7V
- Underfrequency - $56.0HZ \pm 1\%$ of 60HZ
Min. 55.4HZ
Max. 54.6HZ

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3.9 LIMITING CONDITIONS FOR OPERATION BASES

- A. The general objective of this specification is to assure an adequate source of electrical power to operate the auxiliaries during plant operation, to operate facilities to cool and lubricate the plant during shutdown, and to operate the engineered safety features following an accident. There are two sources of electrical energy available, namely, the 345-kV transmission system and the diesel generators.
- B. The d-c supply is required for control and motive power for switchgear and engineered safety features. The electrical power required provides for the maximum availability of power, i.e., one active offsite source and one backup source of offsite power and the maximum numbers of onsite sources.

A battery charger is supplied with each of the 125-volt and 250-volt batteries, and in addition, a shared battery charger is supplied which can be used for Units 1 and 2. Thus, on the loss of the normal battery charger, the shared charger can be used. Since an alternate charging source is available, one battery charger can be allowed out of service for 30 days without loss of this source of power. The 125-volt battery system shall have a minimum of 105 volts at the battery terminals to be considered operable.

- C. Auxiliary power for the Unit is supplied from two sources, either the Unit auxiliary transformer or the Unit reserve auxiliary transformer. Both of these transformers are sized to carry 100% of the auxiliary load. If the reserve auxiliary transformer is lost, the unit can continue to run for 7 days, since the Unit auxiliary transformer is available and both diesel generators are operational. A 7-day period is provided if one source of offsite power is lost. This period is based on having two diesels operable which are adequate to handle an accident assuming a single failure. In addition, auxiliary power from the other unit can be obtained through the 4160-volt bus tie. If both offsite lines are lost, power is reduced to 40% of rated so that the turbine bypass system could accept the steam flow without reactor trip should the generator be separated from the system or a turbine trip occur. In this condition, the turbine-generator is capable of supplying house load and ECCS load if necessary through the unit auxiliary transformer. If the unit were shut down on loss of both lines, fewer sources of power would be available than for sustained operation at 40% power. Attention will be given to restoring normal offsite power to minimize the length of time operation is allowed in a condition where both sources are unavailable.

In the normal mode of operation, the 345-kV system is operable and two diesel generators are operable. One diesel generator may be allowed out of service for a short period of time to conduct preventative maintenance provided that power is available from the 345-kV system through a 4160-volt bus tie to supply the emergency buses, and the alternate diesel generator is proven operable. Offsite power is quite reliable, and in the last 25 years there has been only one instance in which all offsite power was lost at a Commonwealth Edison Generating Station. When the unit or shared diesel generator is made or found inoperable for reasons other than preventative maintenance, the remaining diesel generator and its associated low-pressure core cooling and containment cooling systems, which provide sufficient engineered safety features equipment to cover all breaks, will be proven operable.

- D. The diesel fuel supply of 10,000 gallons will supply each diesel generator with a minimum of 2 days of full load operation or about 4 days at 1/2 load. Additional diesel fuel can be obtained and delivered to the site within an 8-hour period; thus a 2-day supply provides for adequate margin.
- E. Diesel generator operability is discussed in Paragraph 3.9.C above.
- F. Specifications are provided to ensure the operability of the RPS Bus Electrical Protector Assemblies (EPA's). Each RPS MG set and the alternate power source has 2 EPA channels wired in series. A trip of either channel from either overvoltage, undervoltage, or underfrequency will trip the associated MG set or alternate power source.

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4.9 SURVEILLANCE REQUIREMENTS BASES

- A. The monthly test of the diesel generator is conducted to check for equipment failures and deterioration. Testing is conducted up to equilibrium operating conditions to demonstrate proper operation at these conditions. The diesel will be manually started, synchronized to the bus, and load picked up. The diesel shall be loaded to at least half load to prevent fouling of the engine. It is expected that the diesel generator will be run for 1 to 2 hours. Diesel-generator experience at other Commonwealth Edison generating stations indicates that the testing frequency is adequate and provides a high reliability of operation should the system be required. In addition, during the test, the generator is synchronized to the offsite power sources and thus not completely independent of this source. To maintain the maximum amount of independence, a 30-day testing interval is also desirable.

Each diesel generator has two air compressors and four air tanks. Two air tanks are piped together to form an air receiver. Each air compressor supplies an air receiver. This arrangement provides redundancy in starting capability. It is expected that the air compressors will run only infrequently.

During the monthly check of the diesel, the receivers 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. Pressure indicators are provided on each of the receivers.

Following the monthly test of the diesels, the fuel oil day tank will be approximately half full based on a 2-hour test at full load and 205 gph at full load. At the end of the monthly load test of the diesel generators, the fuel oil transfer pumps will be operated to refill the day tank and to check the operation of these pumps from the emergency source.

The test of the emergency diesel generator during the refueling outage will be more comprehensive in that it will functionally test the system, i.e., it will check diesel starting, closure of diesel breaker, and sequencing of loads on the diesel. The diesel will be started by simulation of a loss-of-coolant accident. In addition, an undervoltage condition will be imposed to simulate a loss of offsite power. The timing sequence will be checked to assure proper loading in the time required. The only load on the diesel is that due to friction and windage and a small amount of bypass flow on each pump.

Periodic tests between refueling outages verify the ability of the diesel to run at full load and the core and containment cooling pumps to deliver full flow. Periodic testing of the various components plus a functional test at the refueling interval are sufficient to maintain adequate reliability.

- B. Although station 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.

In addition, the checks described also provide adequate indication that the batteries have the specified ampere-hour capability.

- C. Because the availability of electricity to the system is a normal operating function, a check of the status of these systems provides adequate surveillance.

- D. The diesel fuel oil quality must be checked to ensure proper operation of the diesel generators. Water content should be minimized, because water in the fuel would contribute to excessive corrosion of the system, causing decreased reliability. The growth of micro-organisms results in slime formations, which are one of the chief causes of jellying in hydrocarbon fuels. Minimizing of such slimes is also essential to assuring high reliability.

- E. Diesel-generator operability surveillance is discussed in Paragraph 4.9.A above.

- F. Surveillance requirements are provided for the RPS EPA's to demonstrate their operability. The setpoints for overvoltage, undervoltage and underfrequency have been chosen based on analysis (Reference T. Rausch letter to H. Denton dated 2-04-83).