Kewaunee Nuclear Power Plant

Technical Specification Pages Affected by

Proposed Amendment No. 74

Surveillance of Diesel Generators

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## 4.6 PERIODIC TESTING OF EMERGENCY POWER SYSTEM

Applicability

Applies to periodic testing and surveillance requirements of the emergency power system.

Objective

To verify that the emergency power sources and equipment are operable.

Specification

The following tests and surveillance shall be performed:

a. Diesel Generators

1. Manually-initiated start of each diesel generator, and assumption of load by the diesel generator. This test shall be conducted monthly, loading the diesel generator to at least 2600 KW (nominal) for a period of at least 1 hour. | 74
2. Automatic start of each diesel generator, load shedding, and restoration to operation of particular vital equipment, all initiated by a simulated loss of all normal a-c station service power supplies together with a simulated safety injection signal. This test will be conducted at each refueling interval to assure that each diesel generator will start and assume required loads to the extent possible within one minute, and operate for $\geq$5 minutes while loaded with the emergency loads.
3. Each diesel generator shall be inspected at each major refueling outage.
4. Diesel generator load rejection test in accordance with IEEE 387-1977, section 6.4.5 shall be performed at least once per 18 months.
5. Each diesel generator shall be loaded to 2950 KW (nominal) for 2 hours every operating cycle, not to exceed 18 months. | 74

6. Safeguard Bus Undervoltage and Safeguard Bus Second Level Undervoltage relays shall be calibrated at least once per operating cycle (not to exceed 18 months). | 74

7. During each operating cycle (not to exceed 18 months), a checkout of emergency lighting will be performed. | 74

b. Station Batteries

1. The voltage of each cell shall be measured to the nearest hundredth volt each month. An equalizing charge shall be applied if the lowest cell in the battery falls below 2.13 volts. The temperature and specific gravity of a pilot cell in each battery shall be measured.
2. The following additional measurements shall be made every three months: the specific gravity and height of electrolyte in every cell and the temperature of every fifth cell.
3. All measurements shall be recorded and compared with previous data to detect signs of deterioration.
4. The batteries shall be subjected to a load test during the first refueling and once every five years thereafter. Battery voltage shall be monitored as a function of time to establish that the battery performs as expected during heavy discharge and that all electrical connections are tight.

BASIS TECHNICAL SPECIFICATION 4.6, PERIODIC TESTING OF EMERGENCY POWER SYSTEMS

Each diesel generator can start and be ready to accept full load within 10 seconds, and will sequentially start and supply the power requirements for one complete set of engineered safety features equipment in approximately one minute.(1)

The specified test frequencies provide reasonable assurance that any mechanical or electrical deficiency will be detected and corrected before it can result in failure of one emergency power supply to respond when called upon to function. Its possible failure to respond is, of course, anticipated by providing two diesel generators, each supplying through an independent bus, a complete and adequate set of engineered safety features equipment. Further, both diesel generators are provided as backup to multiple sources of external power, and this multiplicity of sources should be considered with regard to adequacy of test frequency. | 74

## BASIS TECHNICAL SPECIFICATION 4.6.a.1, MONTHLY DIESEL GENERATOR SURVEILLANCE

The monthly tests specified for the diesel generators will demonstrate their continued capability to start and carry rated load. The fuel supplies and starting circuits and controls are continuously monitored, and abnormal conditions in these systems would be indicated by an alarm without need for test startup. Monthly tests are performed in accordance with the intent of IEEE 387-1977, paragraph 6.6.1.

## BASIS TECHNICAL SPECIFICATION 4.6.a.2, REFUELING INTERVAL DIESEL GENERATOR SURVEILLANCE

The refueling interval diesel generator surveillance demonstrates that the emergency power system, and its control system, will function automatically to provide engineered safety equipment power in the event of loss of offsite power coincident with a safety injection signal. This test demonstrates proper tripping of motor feeder breakers, main supply and tie breakers on the affected bus, and sequential starting of essential equipment to demonstrate operability of the diesel generators. This surveillance is performed to meet the intent of IEEE 387-1977 paragraph 6.6.2. (Note also that Reg. Guide 1.108 addresses diesel generator surveillance.) 74

A separate test demonstrates that the emergency lighting system is operable.

## BASIS TECHNICAL SPECIFICATION 4.6.a.3, REFUELING INTERVAL DIESEL GENERATOR INSPECTION

Inspections are performed at refueling outage intervals in order to maintain the diesel generators in accordance with the manufacturers' recommendations. The inspection procedure is periodically updated to reflect experience gained from past inspections and new information as it is available from the manufacturer.

## BASIS TECHNICAL SPECIFICATION 4.6.a.4, 18-MONTH LOAD REJECTION TEST

The load rejection test demonstrates the capability of rejecting the maximum rated load without overspeeding or attaining voltages which would cause the diesel generator to trip, mechanical damage, or harmful overstresses.

BASIS TECHNICAL SPECIFICATION 4.6.a.5, OPERATING CYCLE SHORT-TERM LOAD TEST

Loading the diesel generators to their short-term rating will demonstrate their capability to provide a continuous source of emergency AC power during a load perturbation of up to 112% of the diesel generator's continuous rating. 74

BASIS TECHNICAL SPECIFICATION 4.6.b STATION BATTERIES 74

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 indication of a cell becoming unserviceable long before it fails.

If a battery cell has deteriorated, or if a connection is loose, the voltage under load will drop excessively, indicating need for replacement or maintenance.

Reference

(1) USAR Section 8.2