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TRM Rev. # 022

Responsible Licensing Engineer/Specialist Tony Browning

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## Technical Requirements Manual

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## TB 3.8 ELECTRICAL POWER SYSTEMS

### TB 3.8.1 24 VDC Sources

#### BASES

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The 24 VDC System provides power for reactor neutron monitoring and process radiation monitoring. The neutron monitoring function is fail-safe in that loss of 24 VDC power would cause the associated trip to occur. Two independent plus and minus 24 VDC sources are provided, each consists of a center tapped 48 V battery and two 24 V battery chargers that are fed from essential AC buses. Separation is provided for all equipment and feeders as in all safeguards systems. If a battery is disconnected from its distribution bus and only the charger is supplying bus voltage, while the charger can carry all the necessary accident loads, the associated 24 VDC subsystem shall be considered inoperable, as the charger requires a reference voltage from the battery to perform properly (Ref. 2).

Although the station batteries will deteriorate with time, utility experience indicates that there is almost no possibility of precipitous failure. The type of Surveillance Requirement described is one which has been demonstrated over the years to provide an indication of a cell becoming irregular or unserviceable long before it fails completely. The presence of physical damage or deterioration does not necessarily represent a failure of TSR 3.8.1.3, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

The service discharge test provides adequate indication of the batteries' ability to satisfy the design requirements (battery duty cycle) of the associated DC system. This test may be performed using simulated loads at the rates and for the durations specified in the design load profile, or, due to the constant nature of the normal system loads, using the connected load as the discharge source. Additionally, the voltage of each cell shall be determined after the discharge and recorded. Following discharge, battery cell parameters must be restored in accordance with TLCO 3.8.2. The performance discharge test provides adequate indication and assurance that the batteries have the specified amp hour capacity. The rate of discharge during this test shall be in accordance with the manufacturer's discharge characteristic curves. The results of these tests will be recorded and compared with the manufacturer's recommendations of acceptability.

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#### References for Bases Section TB 3.8.1

1. UFSAR Section 8.3.2.
2. ACE001485: 1D52 DC Breaker Tripping Due to Abnormally High Output Voltage

## TB 3.8 ELECTRICAL POWER SYSTEMS

### TB 3.8.3 24 VDC Distribution System

#### BASES

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The 24 VDC System provides power for reactor neutron monitoring and process radiation monitoring. The neutron monitoring function is fail-safe in that loss of 24 VDC power would cause the associated trip to occur. Two independent plus and minus 24 VDC distribution subsystems are provided, each supplied by a center tapped 48 V battery and two 24 V battery chargers that are fed from essential AC buses. The distribution subsystems are independent, with each having its own distribution panel. Separation is provided for all equipment and feeders as in all safeguards systems. If a battery is disconnected from its distribution bus and only the charger is supplying bus voltage, while the charger can carry all the necessary accident loads, the associated Distribution System shall be considered inoperable, as the charger requires a reference voltage from the battery to perform properly (Ref. 2).

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#### References for Bases Section TB 3.8.3

1. UFSAR Section 8.3.2.
2. ACE001485: 1D52 DC Breaker Tripping Due to Abnormally High Output Voltage