

6. The set points and associated ranges for the undervoltage relays have been established to always maintain motor voltages at or above 80% of their nameplate rating and to prevent prolonged operation of motors below 90% of their nameplate rating. All safeguard motors were designed to accelerate their loads to operating speed with 80% nameplate voltage, but not necessarily within their design temperature rise. Prolonged operation below 90% of nameplate voltage may result in shortening of motor insulation life, but short term operation below 90% of nameplate voltage will not result in unacceptable effects due to the service factor provided in the motors and the conservative insulation system used on the motors.

The primary safeguard buses undervoltage trip (85.0% of nominal bus voltage) is designed to protect against a loss of voltage to the safeguard bus and assures that safeguard protection action will proceed as assumed in the FSAR. The associated time delay feature prevents inadvertent actuation of the undervoltage relays from voltage dips, while assuring that the diesel generators will reach full capacity before the safety injection pump loads are sequenced on. | 58

The safeguard buses second level undervoltage trip (92.5% nominal bus voltage) is designed to protect against prolonged operation below 90% of nameplate voltage of safeguard pumps. The time delay of less than 5 minutes allows the operator time to restore voltage by minimizing or balancing loads on the safeguard buses while maintaining the preferred source of power. Up to 5 minutes of operation of safeguard pumps between 80% and 90% of nameplate voltage is acceptable due to the service factor and conservative insulation designed into the motors. | 58

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ENGINEERED SAFETY FEATURES INITIATION INSTRUMENT SETTING LIMITS

<u>NO.</u>	<u>FUNCTIONAL UNIT</u>	<u>CHANNEL</u>	<u>SETTING LIMIT</u>	
9	Safeguards Bus Undervoltage (4)	Loss of Power	85.0% \pm 2% nominal bus voltage \leq 2.5 second time delay	58
10	Safeguards Bus Second Level Undervoltage (5)	Degraded Grid Voltage	92.5% \pm 2% of nominal bus voltage \leq 5 minutes time delay	58

- (1) Initiates containment isolation, feedwater line isolation, shield building ventilation, auxiliary building special vent, and starting of all containment fans. In addition, the signal overrides any bypass on the accumulator valves.
- (2) Confirm main steam isolation valves closure within 5 seconds when tested.
d/p = differential pressure
- (3) The setting limits for max radiation levels are derived from the technical specification allowable release rates found in Technical Specification 3.9.b.
- (4) This undervoltage protection channel ensures ESF equipment will perform as assumed in the FSAR.
- (5) This undervoltage protection channel protects ESF equipment from long term low voltage operation.