

CAT 1

APS Phone Call with NRC - Agenda
Thursday, June 17, 2004
8:00 AM MST (11:00 AM EDT)

- Introduction
- Discussion of 230 KV system, including protection devices
- Discussion of 500 KV system
- Sequence of events on Monday, June 14
- Discussion of PVNGS and Compliance with GDC-17

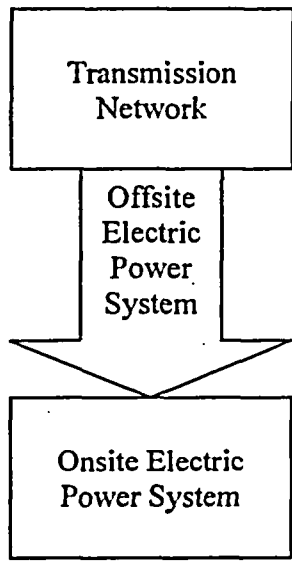
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Harvey Leek, Design Eng & Paper Drafter
Mike Windsor; Dir. Design Eng. & Paper Approver.

Palo Verde Offsite Power Supply Compliance with GDC 17

The loss of offsite power event that occurred at Palo Verde on June 14, 2004 is classified as an "anticipated operational occurrence" as defined in 10CFR50 Appendix A: "...those conditions of normal operation which are expected to occur one or more times during the life of the nuclear power unit and include... loss of all offsite power." This is an analyzed design basis event as discussed in UFSAR section 15.2.6: LOSS OF NONEMERGENCY AC POWER TO THE STATION AUXILIARIES. A frequency of five loss of offsite power events in the life of a unit was assumed in the Palo Verde design (UFSAR Table 3.9-1.I.F.3.a).

General Design Criterion 17 discusses three elements of the power system: the transmission network, the offsite electric power system, and the onsite electric power system. These can be depicted as follows:



The offsite electric power system delivers power from the transmission network to the onsite electric power system. GDC 17 imposes certain design conditions on the offsite electric power supply as follows:

Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions.

The design of Palo Verde's offsite electric power system conforms to these conditions as discussed in UFSAR section 8.2.1.3.1. These design conditions specifically apply to the "two physically independent circuits" that deliver power from the transmission network to the onsite electric power system, and not to the transmission network, itself. Palo

Verde concurs with the NRC staff interpretation that there is no "requirement for meeting single failure, and in the absolute sense single failure cannot be met because there is only one power source, the grid."

There are many possible initiators for loss of offsite power events besides those that are prevented by proper design of the "two physically independent circuits". Certain other initiators are addressed in the Standard Review Plan (NUREG 0800). These are discussed in UFSAR section 8.2.2. This involves verification that:

...the system can withstand the following disturbances without loss of system stability or loss of load:

- A. A permanent 3-phase fault on the switchyard 525 kV bus with subsequent loss of the critical 525 kV line.
- B. A sudden loss of one of the three PVNGS units with no underfrequency load shedding measures in effect.
- C. The sudden loss of the largest single load on the Arizona-New Mexico-California-Southern Nevada system.

Implicit in this review is the recognition that there are other disturbances not discussed in NUREG 0800 that are more severe (but less likely) that could cause a loss of system stability resulting in a loss of offsite power event. One such disturbance, among many others, is a major fault in combination with failure of an electrical protective device to actuate as occurred on June 14.

Palo Verde recognizes the importance of minimizing the frequency of loss of offsite power events and is taking steps to eliminate the vulnerabilities disclosed by the June 14 event.

EXISTING

EX-2

DC+

125 VDC

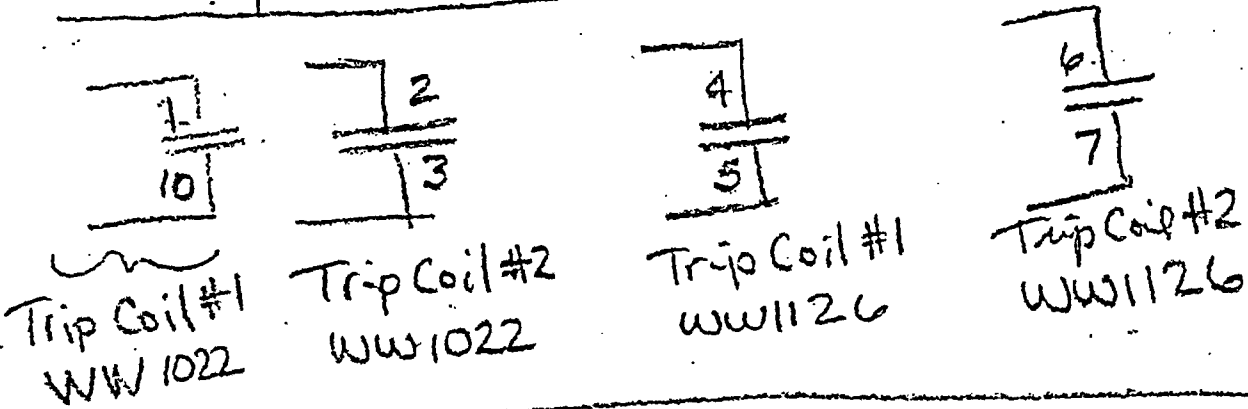
Line Relays

Trip Bus

Relay Contacts



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New Scheme

DC+

Line Relays

Trip Bus

NEW

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