

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 14, 1994

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: R. Todd Davis

SUBJECT: Backup Power Working Group Meeting, Las Vegas, Nevada,
Trip Report for October 18-20, 1994

1. **Purpose:** This memorandum reports the progress of the Backup Power Working Group (BPWG), which was established to explore ways to increase the reliability and availability of backup power supplies at DOE defense nuclear facilities.
2. **Summary:** Backup Power Supplies (BPSs) are installed at defense nuclear facilities to ensure safety-related loads (e.g., instrumentation and control, monitors, and ventilation systems) are operable after loss of offsite power. A recently issued standard, DOE-STD-3003-94, provides the technical requirements for backup power supplies. Although the groundwork has been established, there are still significant obstacles (e.g., inadequate configuration control, equipment age and original design deficiencies) to providing reliable backup power at DOE facilities.
3. **Background:** In discharging its responsibilities, the BPWG is emphasizing the need for effective design, installation, operation, test and maintenance of backup power supplies at DOE facilities. The group consists of several DOE representatives and many operating contractor employees.
4. **Discussion/Observations:** The following issues were discussed at the BPWG meeting:
 - a. DOE-STD-3003-94, Backup Power Sources for DOE Facilities, has been issued. DOE had previously issued a Defense Programs (DP) standard that provided guidance concerning design, installation, operation, testing and maintenance of backup power supplies; however, the standard only applied to DP facilities. The new DOE standard will ensure that all DOE facilities, including Environmental Management (EM) facilities, have uniform guidance for backup power supplies.
 - b. Backup power for safety-related loads typically require proper operation of an Automatic Transfer Switch (ATS). The ATS monitors the primary source of power and automatically switches to the secondary source, if available, upon loss of power. For

most ATS systems at DOE facilities, maintenance is difficult because there is no method of deenergizing the ATS without deenergizing the associated safety-related loads. Therefore, ATS maintenance is typically not performed. ATS failure, due to inadequate maintenance, has been identified as a significant contributor to backup power failure at defense nuclear facilities. The BPWG is requesting the Office of Nuclear Safety to issue a safety notice identifying ATS problems due to lack of maintenance. The BPWG is also identifying system design changes which will allow ATS maintenance to be performed without deenergizing the associated loads.

- c. In July 1994, the Office of Nuclear Safety at DOE issued a safety notice concerning diesel fuel contamination. A DOE representative provided the background behind this safety notice and provided fuel sampling recommendations to ensure diesel fuel quality is acceptable. Because diesel generators that provide backup power supply are operated infrequently, diesel fuel supply may remain in storage tanks for extended periods. A diesel fuel sampling program is necessary to ensure generator fuel does not degrade.
 - d. The BPWG has committed to adopting a standard approach for measuring backup power reliability. A subgroup is reviewing current practices and will recommend guidelines during the next meeting. A standard approach for measuring reliability will allow comparison across the DOE sites and provide a tool for assessing site trends.
 - e. The BPWG is pursuing standardized purchase specifications for several components associated with backup power supplies (e.g., batteries, Automatic Transfer Switches (ATSs) and Uninterruptible Power Supplies (UPSs)). Standardized purchase specifications will provide a technical baseline for procurement of BPS components.
 - f. The BPWG intends to develop a handbook for BPS systems (e.g., engines, generators, UPSs, ATSs and other support systems) that will provide detailed guidance for maintaining BPS systems.
 - g. Some requirements associated with the new DOE standard for BPSs are not realized by existing backup power systems at DOE facilities (e.g., seismic/high wind protection, load sequencing and documentation). The BPWG emphasized the importance of developing an implementation plan for the new backup power standard and of justifying deviations from the standard using a graded approach based on the safety significance of the facility electrical loads.
5. **Future Staff Actions:** The BPWG will meet every six months to discuss issues related to backup power systems. The staff will continue to review the progress of the BPWG. In addition, because of the importance of BPSs to defense nuclear facilities, the staff is reviewing the adequacy of safety-related backup power systems across the complex.