

Safety Evaluation Report  
GE Topical Report, NEDO-10466A Addendum 1  
Power Generation Control Complex

Introduction

In Revision 2 of NEDO-10466A dated March 1978, General Electric recommended that a Halon 1301 fire extinguishing system would be required to protect the PGCC. The system would provide a 20 percent concentration of Halon 1301 for a soak time for 20 minutes for deep seated fires. The staff found it acceptable.

By letter dated February 28, 1985, General Electric submitted Addendum 1 to NEDO-10466A. General Electric requested deviations that would reduce the Halon 1301 concentration to be provided to protect the PGCC and the amount of soak time required. For PGCC's with 80 percent or greater Tefzel cable, General Electric requested that the concentration and soak time of Halon 1301 be changed to be surface burning fire concentration and soak time, i.e., 6 percent for 10 minutes.

Discussion/Evaluation

Based on testing and research performed on cable insulation since 1978, General Electric has reevaluated deep seated fires occurring in the PGCC. General Electric indicates that Figure 4.2 of NEDO-10466, Revision 2, Appendix F, shows that the rate and degree of burning of the Tefzel cable used in the PGCC essentially corresponds with that of the ignition source. Because of this, the key to limiting the severity of burning of Tefzel is in the capability of extinguishing the ignition source. If the ignition source is extinguished, the fire in the Tefzel will self-extinguish, almost simultaneously. Tefzel is a thermoplastic material, which means that as its temperature is raised it will melt before it burns, that is, the auto ignition temperature is higher than its melting temperature. This characteristic of melting before it burns ensures that burning can occur only at its surface as a liquid.

The surface burning characteristic of Tefzel have been substantiated in every fire test conducted by General Electric.

After reviewing the test results in Appendix F of NEDO-10466A, we agree with General Electric that Tefzel cable will exhibit surface burning characteristics and not deep seated. Therefore, the amount of Halon 1301 required to extinguish Tefzel cable fires should be based on surface burning fires in accordance with NFPA 12A, i.e., 6 percent for 10 minutes.

Based on the burning characteristics of Tefzel cable, fire test results in non-Tefzel cables, and NFPA for acceptance, for non-Tefzel cable we find that an automatic Halon 1301 extinguishing system with an adequate amount of Halon 1301 to achieve a 6 percent concentration for a 10 minute soak time will extinguish cable fires in PGCC's enclosures which contain 80 percent or greater by weight Tefzel cabling.

#### Conclusion

Based on our evaluation, we conclude that an automatic Halon 1301 extinguishing system with an adequate amount of Halon 1301 to achieve a 6 percent concentration for a 10 minute soak time will be acceptable for PGCC's which contain 80 percent or greater by weight Tefzel cabling. Therefore, we find General Electric's request for deviation from NEDO-10466A acceptable.