Station Blackout
Preparedness and Coping

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April 28, 2011
SBO Rule

• Rule in Federal Register 10CFR50.63 “Loss of all alternating current power”
• SBO Rule requires each plant to be able to cope and recover from an SBO event of specified duration
• NRC issued Regulatory Guide (RG) 1.155, “Station Blackout,” on August 1988 and endorsed NUMARC 87-00 industry guidance to implement the SBO Rule
SBO Coping

• Rule provided guidance on how to calculate the plant specific SBO duration.
• The coping duration based on following factors:
  - The redundancy of the onsite emergency ac power sources
  - The reliability of the onsite emergency ac power sources
  - The expected frequency of loss of offsite power
  - The probable time needed to restore offsite power
• SBO event ends when either offsite or onsite power is restored
Coping Methods

• AC independent
  – 44 plants rely on batteries only
  – Maximum duration 4 hours

• Alternate AC
  – 60 plants in this category
  – Emergency Diesel Generators from adjacent unit with excess capacity
  – Gas turbine generators, diesel generators and hydro units
  – Appendix R Diesel generators
Staff Review of SBO Rule Implementation

• NRC staff reviewed and approved by safety evaluations all 104 plants SBO submittals.
• NRC staff conducted pilot inspections at 8 sites (2 per region) using NRC Temporary Instruction 2515/120
• Inspection results revealed that the licensees were implementing the SBO Rule consistent with NRC requirements and staff’s safety evaluations
Design Overview

- Battery coping plants - maximum coping duration is 4 hours
- Battery life may be extended to required duration by load shedding
- Effects of loss of ventilation.
- Condensate, compressed air and RCS inventories verified for adequacy
- Procedures developed for SBO
- Operator training
SBO Procedures

1. Specific actions for restoration of AC power
2. Ensure support equipment functional without AC
3. High priority on steam driven pumps
4. Identify RCS leakage paths
Grid Interface

• Grid Interface Enhancements
  – Grid operator evaluates network on daily basis
  – Plant procedures for degraded grid conditions
  – Plant controlled work in switchyard
  – High priority for TSO to restore power
  – New guidelines from NERC
Summary

• Only one U.S plant has had an SBO, it was in 1990 (App. 1 hour)

• SBO compliance evaluated for
  – License renewal
  – Power uprates
  – License amendment requests
  – New Reactors

• Staff interfacing with FERC to maintain reliability with future changes in generation mix and transmission system upgrades.