

Phase 3 SDP Analysis

- Performance Deficiency
 - ANO Unit 1 fire zone 99-M (North Electrical Switchgear Room) did not meet regulatory requirements for separation of electric cables and equipment of redundant trains of systems necessary to achieve post-fire safe shutdown, and there was lack of adequate procedures for manual actions to achieve post-fire safe shutdown following a fire in fire zone 99-M (or other identified fire zones equivalent to 99-M)
- Assumptions
 - Red train cables are not protected with one-hour rated barrier, and are not separated from the Green train cables by a minimum of 20 feet distance free of intervening combustibles
 - No automatic fixed fire suppression system
 - Ionization detection system provides alarm in Main Control Room
 - Credit for fire brigade response and arrival at fire zone 100-N, which is adjacent to fire zone 99-M
 - Heat release rates of 200-500 kW in fire modeling of duration and severity

H/S2

Recess

Integrated Assessment of Fire-Induced CDF

- Fire Risk Equation:

$$F_{CDF} = F_i * S_f * P1 * P2 * P3$$

where: F_i = Fire ignition frequency of ignition source

S_f = Severity factor for a challenging fire

$P1$ = Probability of automatic fire suppression system being unavailable

$P2$ = Failure probability of manual suppression by fire brigade

$P3$ = Conditional core damage probability (CCDP), with or without recovery actions

- Identified Ignition Source Scenarios
 - Electrical Switchgear Cabinets
 - *2* Transformers
 - Ventilation Subsystems

limited to

Human Reliability Screening Analysis

- Categories of Important Operator Recovery Actions
 - Manual alignment of emergency feedwater to the steam generators
 - Restoration of service water to affected diesel generators
 - Isolation of letdown flow and inventory control
 - Local start of a diesel generator without dc control power
- Human error probability (HEP) estimates determined using NRC ASP methodology, INEEL/EXT-99-0041, "Revision of the 1994 ASP HRA Methodology (Draft)," January 1999.

*accident
sequence
human*