

Procedures Development and Maintenance

Background

Starting with the first commercial Westinghouse-design nuclear power plants, Westinghouse has been involved in the development of generic, as well as plantspecific, guidance for response to plant events. Following the Three Mile Island (TMI) accident, the U.S. Nuclear Regulatory Commission (NRC) issued NUREG-0899, which provided requirements for utility preparation and implementation of emergency operating procedures (EOP), including development, writing and maintenance. This was followed by NUREG-1358, in which the NRC reinforced its expectations with respect to the plantspecific technical guidelines, EOP writers guide, EOP verification and validation (V&V) and EOP training. Together, these regulations comprise the plant-specific procedure generation package (PGP).

Description

As the NRC requirements developed and matured, the Westinghouse EOP group developed a wide range of experience in the field of EOPs. Our involvement has included:

- Development of Revision 1 of the emergency operating instructions (EOIs) in 1979
- Creation of the exceptional emergency operating instructions (E²OIs) in 1980
- Creation of Revision 1 of the emergency response guidelines (ERGs) in 1983, as well as subsequent revisions through Revision 2 in 2005
- Creation of the ERG footnote basis document

- Creation of the sump blockage control room guideline (SBCRG)
- Creation and continued oversight of the ERG maintenance program
- Review and development of plant-specific EOPs and EOP setpoints for various plants
- Evaluation of plant-specific EOP programs for compliance with the generic ERGs, NUREG-0899 and NUREG-1358
- Creation of CE emergency procedure guidelines (EPGs), CEN-152

Symptom-based EOPs

Westinghouse was a leader in converting event-based EOPs to the new symptom-based format. Today, procedure guidance must be symptom based, while addressing multiple events, multiple failures, inadequate core cooling events and anticipated transient without scram (ATWS). The EOPs and related program documentation must be developed, written and maintained in accordance with NRC requirements and must include appropriate provisions for V&V and training. Plant-specific documentation must be verified for power uprates, instrumentation design changes and other plant modifications and changes to human performance protocols.

Benefits

Westinghouse is intimately familiar with the evolution of the Westinghouse ERGs, the CE EPGs and the NRC guidance and requirements for EOP programs. We are uniquely qualified to evaluate plant EOP programs to provide complete compliance with NRC expectations regarding:

- EOPs
- EOP background documents

- EOP-ERG deviation documents
- EOP setpoint documents
- EOP V&V
- We have the capability to provide services associated with:
 - Plant-specific implementation of new revisions to the ERGs
 - Replacement steam generators (RSGs) for Westinghouse and CE designs
 - Power uprates
 - EOP evaluations and assessments, including independent review of EOP procedure generation packages in preparation for outside audits
 - New plant EOP development and maintenance
 - Upgrades to plant-specific EOP documentation such as EOP setpoints
 - Instrument design changes (e.g., instrument uncertainties)
 - Plant equipment modifications such as reactor vessel upper head replacement
 - Development of AP1000™ EOPs
 - EOP review and assessment program for EOP audits to assess plant readiness for an EOP audit by the NRC
 - EOP versus design bases review to provide that the plant-specific EOPs are consistent with the plant design bases
 - EOP technical accuracy review where plant consistency of EOPs with the strategies employed in the vendor-specific guidelines is assessed
 - EOP simulator validation support where we assist the performance of simulator validation of plantspecific
- EOPs
- Introduction to EOP writing principals for new EOP coordinators workshop to familiarize new plant EOP coordinators with the principals and special considerations of EOP writing

- Normal operating procedures, abnormal operating procedures and alarm response procedures development and maintenance

Experience

Westinghouse developed and is responsible for maintaining the vendor-specific guidelines used for writing plant-specific EOPs for the Westinghouse and CE fleet. Additionally, Westinghouse has helped write and review plant EOPs for other vendor designs around the world. This experience and knowledge level enables our EOP group to write and/or maintain procedures for normal operations, abnormal operations and alarm responses. Recent Westinghouse experience in plant support of EOP programs includes:

- V.C. Summer EOP setpoints upgrade
- Indian Point Unit 2 EOP setpoints upgrade
- Watts Bar RSG
- Watts Bar Tavg reduction
- Point Beach extended power uprate
- Comanche Peak stretch power uprate
- Prairie Island measurement uncertainty recapture
- Diablo Canyon upper head temperature reduction
- Callaway EOP self assessment
- Ginna EOP and EOP setpoints independent assessment
- Comanche Peak RSG
- Farley pressurizer level EOP setpoints relaxation
- Seabrook stretch power uprate
- VVER (Ukraine) EOP and EOP setpoints upgrade (including V&V)
- Beaver Valley extended power uprate
- St. Lucie extended power uprate
- Crystal River 3 steam generator replacement
- Millstone 2 EOP program assessment
- Palo Verde EOP program assessment