



BWR Owners' Group Introduction & Overview

Steven Douglas (TVA) – BWROG Executive Committee Chairman

BWROG Executive Oversight Committee & NRC Meeting
December 12, 2022



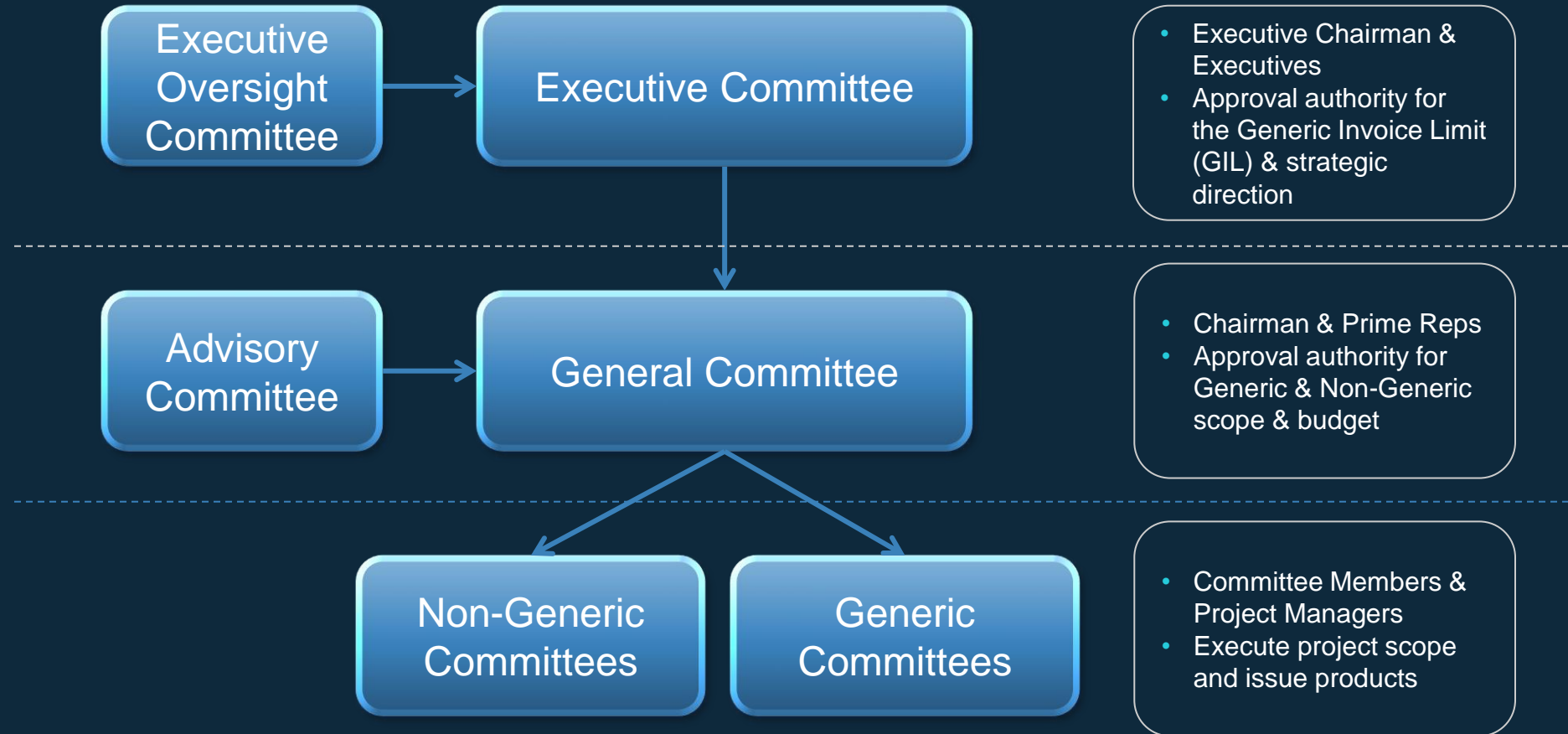
BWROG Mission

- ◇ The mission of the Boiling Water Reactor Owners' Group (BWROG) is to provide a forum, in the spirit of partnership with GE-Hitachi Nuclear Energy, which allows its member utilities to maintain and improve plant safety, achieve higher plant reliability, minimize and share costs, facilitate regulatory interaction, and effectively apply limited technical resources for mutual resolution of issues applicable to two or more members. (Ref. BWROG Charter Sec. II)
 - The BWROG is a utility lead organization designed to benefit the utility members. The member utilities decide what activities get worked and the timeline for those activities.





BWROG Org Structure





BWROG Leadership

Steve Douglas



Executive Chair

Shawn Gibby



Executive Vice Chair

Denver Atwood



General Chair

Mitch Dior



General Vice Chair

Lucas Martins



Director





BWROG Executive Oversight Committee

- ◇ Steve Douglas (TVA - Executive Chair)
- ◇ Shawn Gibby (Duke Energy - Executive Vice Chair)
- ◇ Peter Gardner (Xcel Energy – BWROG CNO Sponsor)
- ◇ Ken Knaide (PSEG – EOC At-Large Member)
- ◇ Ho Nieh (Southern Nuclear – EOC At-Large Member)
- ◇ Marty Bonifanti (Constellation – EOC At-Large Member)
- ◇ Sean Miers (GEH – EOC At-Large Member)





BWROG Membership

Domestic (Members)	
Constellation	NPPD
DTE Energy	PSEG
Duke Energy	Southern Nuclear
Energy Harbor	Talen Energy
Energy Northwest	TVA
Entergy	Xcel Energy
International (Members)	
CFE	JAPC
Chubu	KKL
Chugoku	Tohoku
Hokuriku	TEPCO
Iberdrola	
Conditional (Members)	
J-Power	





BWROG Committees - 2022

* Non-Generic Committees

** Converts to Generic in 2023

Core Committee	<ul style="list-style-type: none">Emergency ProceduresIntegrated Risk-Informed RegulationLicensingReactivity Controls Review	<ul style="list-style-type: none">Reload Analysis & Core Management
Plant Performance	<ul style="list-style-type: none">BWR Water ChemistryI&C MaintenanceOperations Significant Event Review**Outage Management	<ul style="list-style-type: none">Rad Pro / ALARARefueling PerformanceValve Technical Resolution GroupReactor Recirc ASD/VFD Performance*
System Improvement	<ul style="list-style-type: none">Condenser PerformanceControl Rod DriveECCSFeedwater	<ul style="list-style-type: none">Offgas**Reactor RecircReactor Water Clean UpTurbine Generator & Aux**
Special Topic	<ul style="list-style-type: none">50.69BWR6 Rod Control & Info System*BWR Parts Obsolescence**	<ul style="list-style-type: none">2022 Ion Exchange WorkshopR.G. 1.183 Rev1 – ASTTarget Rock 2-Stage SRV Performance*





BWROG PMO Organization

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- 50.69 Committee
- BWR Water Chemistry
- Condenser Performance
- Ion Exchange Workshop
- Reload Analysis & Core Management
- Target Rock SRV Performance Improvement

Robert Hartwick

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- Executive Committee
- General Committee
- International / Conditional Member Program
- Potential Issue Review Team (PIRT)

Richard Rusin

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- BWR/6 Rod Control & Information System
- BWR I & C Maintenance
- Licensing
- Operations Significant Event Review
- Radiation Protection/ALARA
- Turbine Generator & Auxiliaries System Improvement
- Valve Technical Resolution Group

Phillip Ellison

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- ECCS System Improvement
- Emergency Procedures
- Feedwater System Improvement
- Offgas System Improvement

James Konrad

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- ASD/VFD Performance
- Integrated Risk-Informed Regulation
- Reactor Recirc System Improvement
- Refueling Performance
- RG. 1.183 Revision AST

Terri Farthing

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- CRD Performance Improvement
- Outage Management
- Reactivity Controls Review
- RWCU System Improvement
- BWR Parts Obsolescence

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- PM Support

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- PM Support

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Thanks! Any Questions



Emergency Procedures Committee Update



Bill Williamson (TVA) – Committee Chairman
Phil Ellison (GEH) – Project Manager

BWROG Executive Oversight Committee & NRC Meeting
December 12, 2022



Topics to be Discussed

- ◇ Emergency Procedures Committee Overview
- ◇ Current Year Activities (2022)
- ◇ 3-Year Plan
- ◇ EPG/SAG Rev4 Implementation
- ◇ SAMG CBT





BWROG – Emergency Procedures Committee

- ◇ Purpose
 - Revise, maintain and socialize the EPGs/SAGs and related documents
 - Advise the BWROG on issues related to emergency and severe accident response strategies
- ◇ Products
 - Emergency Procedure and Severe Accident Guidelines (EPGs/SAGs)
 - Technical Support Guidelines (TSGs)
 - FLEX Support Guidelines (FSGs)
 - SAMG Computer Based Training (CBT)

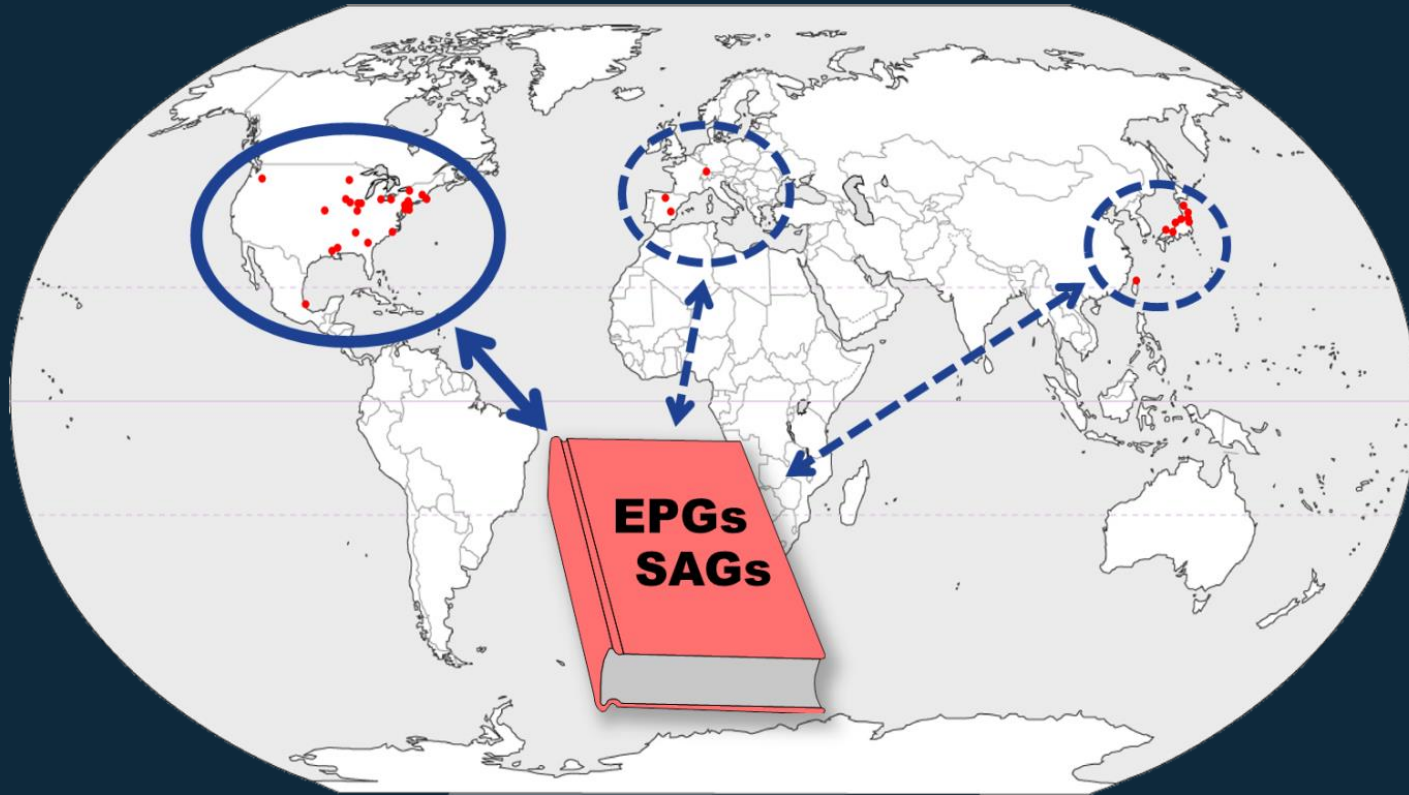




BWROG EPC Members

EPC Membership:

- U.S. BWRs
- Japan BWRs
- Mexico BWRs
- Spain BWR
- Switzerland BWR





Current Year (2022)

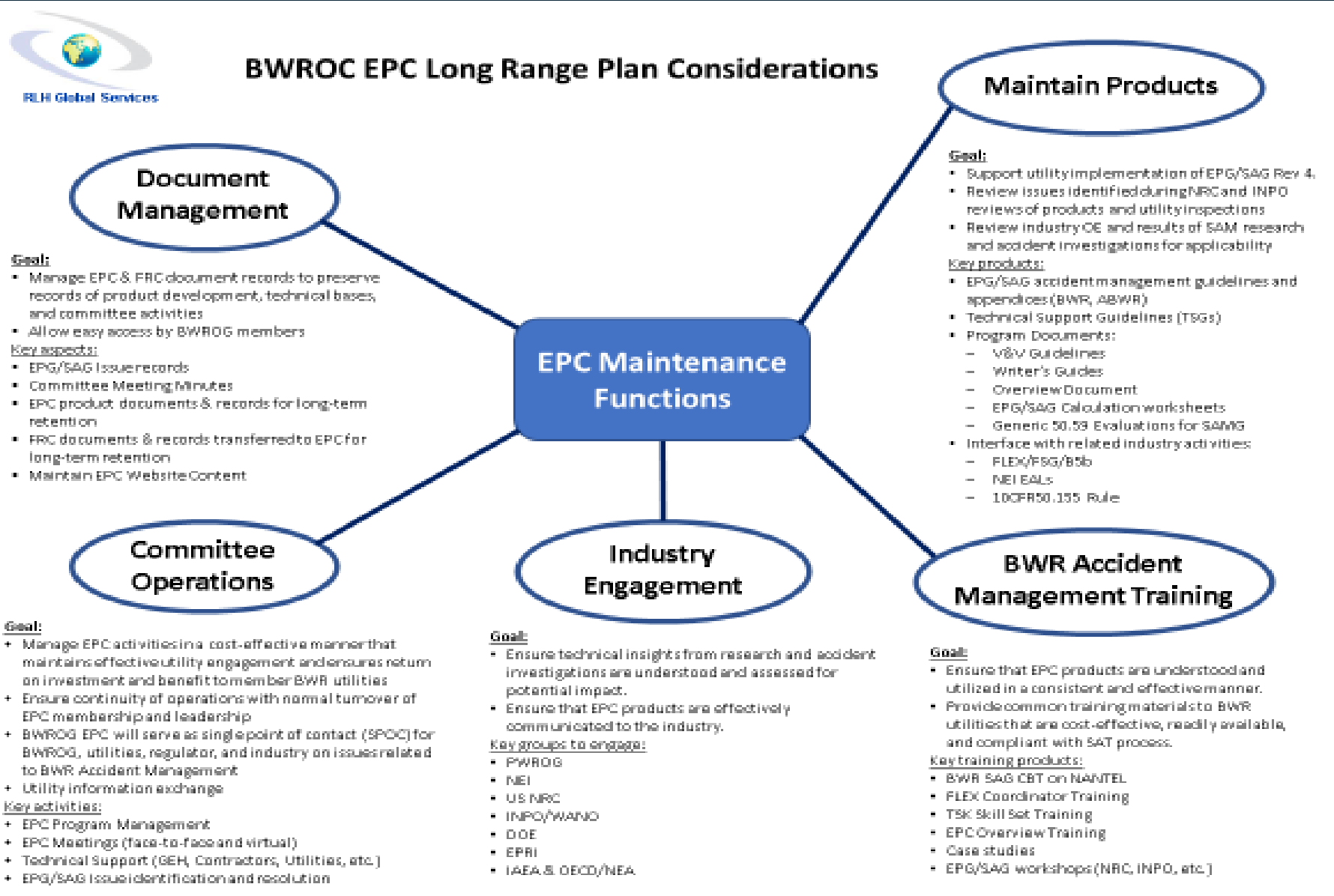
Committee activities are focused on Rev 4 implementation and long-term maintenance. Below are a listing of some of the committee's 2022 activities:

- ◇ 3-Year Product Long Term Maintenance Plan Recommendations
- ◇ EPG Rev 4 Critical Tasks Recommendations
- ◇ Insights from NRC Site Inspections associated with EPG/SAG Rev 4
- ◇ CBT Long Term Maintenance Program Plan (Analysis Document)
 - CBT Modules updated with Student Comments (ADDIE Process) and provided to INPO for NANTeL updates in January 2023
- ◇ SAMG CBT SAT Document Revision
- ◇ 2022 EPG/SAG Rev 4 and TSG Rev 1 Issues Summary
- ◇ TSG Site Updates for Common Insights
- ◇ Significant Updates/Recommendations to the EPC Document Website
 - Collaborative online product maintenance
 - KT&R Products
 - International Member access to CBT and other training documents





3-Year Plan





3-Year Plan

2023			
		Meetings	
		1. Feb 2023 2. June 2023 3. Sept 2023	
Major Topics	EPG/SAG Rev 4 Implementation <ul style="list-style-type: none">• Background: EPG/SAG Rev 4 consists of several products that require maintenance and improvement based on operator feedback, EPRI, DOE Fukushima Forensics & NRC programs. Maintenance is required for the FSGs, TSGs, EPG, SAGs, Calculational Aids & Computer based Training (NANTEL Modules). Long term emergency procedure maintenance/updates are a utility commitment to the NRC.• Committee Plans: Four technical products produced by EPC Subcommittees. The detailed scope is identified in TP21-05-008r0 "EPC KTR Long Range Product Maintenance Planning". Products are utility identified issue driven updates to the: (1) SAMG CBT, (2) EPGs, (3) SAGs and (4) TSGs (e.g., resolved issue updates in the CBT, V&V Guidelines, Writer's Guide, EPG, SAGs, Calculation Aids, TSGs, Case Studies). The EPC product subcommittees are EPG/SAGs (2 products) , TSGs (1 Product) & Training (1 product); technical product subcommittees are led by the EPC Vice Chairman SMEs from the BWR fleet.• Value: Fleet wide guidance to address common issues identified in Rev 4 Implementation.		
KT Plans	<ol style="list-style-type: none">1. Topic specific mini-workshops associated with EPG/SAG Rev 4, TSGs and the CBT2. Technical interactions with peer groups (EPRI, INPO, DOE & IAEA)3. BWROG Leadership training for new vice-chairs		





3-Year Plan

Major Committee Topics

2024	Maintenance of EPG/SAG Rev 4, TSG Rev 1 and the CBT <ul style="list-style-type: none">• <u>Background:</u> EPG/SAG Rev 4 consists of several products that need to be maintained and updated based on feedback from operators, along with insights from the associated EPRI, DOE Fukushima Forensics & NRC programs. Items to be maintained are TSGs, EPG, SAGs, Computational Aids & Computer based Training (NANTeL Modules)• <u>Committee Plans:</u> Update and resolve issues in a timely manner• <u>Value:</u> Support knowledge transfer and fleet best practices regarding Rev 4 EPG/SAGs
2025	Maintenance of EPG/SAG Rev 4, TSGs & CBT <ul style="list-style-type: none">• <u>Background:</u> Items to be maintained are TSGs, EPG, SAGs, Computational Aids & Computer based Training (NANTeL Modules)• <u>Committee Plans:</u> Update and resolve issues in a timely manner• <u>Value:</u> Support knowledge transfer and fleet best practices regarding Rev 4 EPG/SAGs

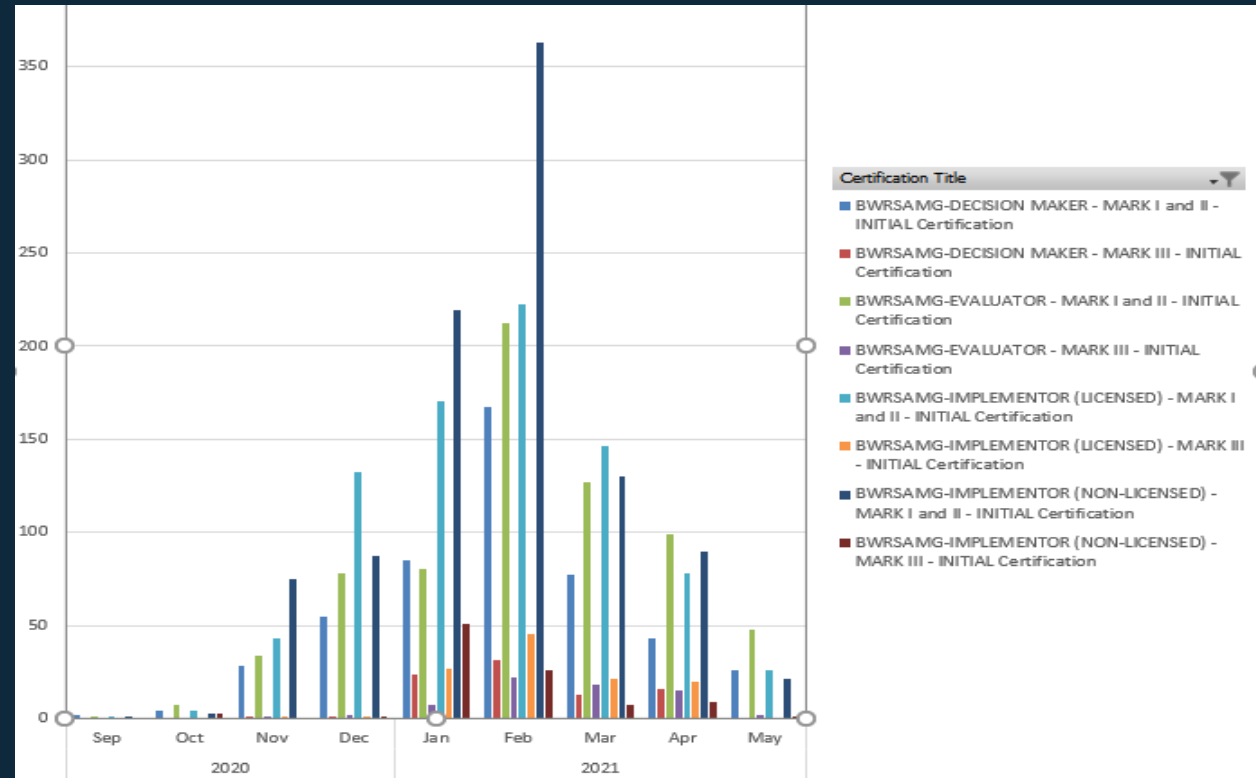




SAMG CBT

More than 3,000 BWR SAMG Decision Makers, Evaluators and Implementors have been trained to date on the SAMG CBT (INPO NANTeL)

- ◆ The SAMG CBT is also now available (2022) to Non-US BWROG members and the NRC staff through SOUL (Japan, Mexico and Switzerland have recently requested Access to SOUL to date)
- ◆ Over 40,000 Modules have been completed and 8,000 Student Feedback Surveys received and reviewed
- ◆ Significant fleet wide cost savings





Thank You





Risk Topics

Robert Rishel (Duke Energy)

BWROG Executive Oversight Committee & NRC Meeting
December 12, 2022



Topics

- ◇ Endorsement of various Standards by NRC
- ◇ Endorsement of ANS/ASME 2022 PRA Standard for Low Power Shutdown in RG 1.200 Rev 4 for existing Light Water Reactors
- ◇ Low Power Shutdown Fire PRA methods development and industry participation
- ◇ Concern of transparency with Seismic research currently in process
- ◇ Common cause of Digital





Standard Endorsement

- ◇ NRC Endorsement of IEEE 1819, **IEEE** Standard for Risk-Informed Categorization and Treatment of Electrical and Electronic Equipment at Nuclear Power Generating Stations
 - Encourage NRC to consider implications of endorsement, when the current standard as written conflicts with NRC endorsed guidance for 50.69 in NEI 00-04
 - Future standards could be submitted for NRC endorsement that conflict with existing NRC endorsed NEI guidance.
 - Use of pilot process by Licensee prior to NRC consideration of endorsement is an approach that could be used





Low Power Shutdown Standard

Endorsement of ANS/ASME 2022 PRA Standard for Low Power Shutdown in RG 1.200 Rev 4 for existing Light Water Reactors

- ◇ BWROG IRIR piloted the LPSD PRA in 2018.
 - Compared against an existing LPSD PRA
 - Many of the Supporting Requirements are not realistic and/or provide no value for applications
 - Level of effort to meet CCII is extensive and projected to be significantly more costly than internal events
- ◇ No identified application for LPSD PRA by industry
- ◇ Suggest NRC defer endorsement until an application is identified and then many of the trouble SRs can be reviewed for applicability





LPSD Fire PRA Methods / Seismic Work

- ◇ Low Power Shutdown Fire PRA methods development and industry participation
 - Not sure what the driver is for development of a LPSP Fire PRA for the existing fleet
 - Outage fire risk would seem to require at least a rudimentary LPSP PRA

- ◇ Process for the Ongoing Assessment of Natural Hazards Information (POAHNI) for Seismic NGA East
 - Process excludes exchange of technical information until the end.
 - Does not seem to be transparent approach
 - Licensee will find out results either after screening or at the end with formal regulatory process.
 - Licensee may not be able to respond in typically regulatory time line due to the complex nature of seismic hazard evaluations
 - Could result in significant delay in conclusion of effort and expenditure of resources if Licensee (or EPRI) and NRC Seismic disagree on technical inputs.





Treatment of CCF in Digital Systems

- ◇ Common Cause of Digital
 - Agree that SRM-SECY-93-087 needed to be updated to address modern digital systems
 - ACRS Digital I&C subcommittee meeting on 5/20/2022
 - Discussion from the committee members that using very high/1.0 CCF probabilities in models supporting risk-informed programs would be the only values accepted
 - Our position is that CCFs of 1.0 are not reasonable and could mask other risks
 - Move forward adopting reasonable methods of modeling digital systems
 - Capture the uncertainties
 - Engage the most knowledgeable people in the area
 - Address mistrust of digital systems





Thank You





TSTF-576, Revise Safety/Relief Valve Requirements

Ryan Joyce (Southern Nuclear)

BWROG Executive Oversight Committee & NRC Meeting
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TSTF-576, Revise S/RV Requirements

- ◇ BWR Safety/Relief Valves (S/RVs) are used to prevent overpressurization of the reactor vessel.
- ◇ Both the BWR TS and the ASME Code require testing of the individual S/RVs during a refueling outage.
- ◇ For some S/RV designs, it is not unusual for some valves to actuate outside the SR tolerance when tested, but the collective safety function of the S/RVs (i.e., vessel overprotection protection) has always been maintained.
- ◇ Because of the SR failures, the NRC and BWROG agreed to pursue a change to the TS to replace the “per valve” requirements in the TS with requirements on the safety function; i.e., the collective performance of the S/RV overpressure protection function.
 - The ASME Code will continue to test individual valves.





Interactions

- ◇ In 2019, the BWROG provided a draft of TSTF-576 for comment implementing the proposed approach.
- ◇ Subsequently:
 - ◇ Nine meetings or teleconferences held, including a workshop in February 2022.
 - ◇ NRC has provided three sets of written comments.
 - ◇ BWROG has provided five versions of the traveler.
- ◇ The BWROG has paid over \$250,000 in NRC review fees.
- ◇ At the February 2022 workshop, the NRC proposed relocating the S/RV lift settings to a licensee-controlled document like the Core Operating Limits Report (COLR).
- ◇ The BWROG provided a draft traveler implementing this approach in June 2022.





NRC Comments

- ◇ The NRC provided comments in September 2022 that questioned many of fundamental approaches in the traveler, including the relocation of the limits to a COLR-like document as suggested by the NRC.
- ◇ The comments:
 - Proposed to expand the purpose of the existing TS beyond overpressure protection.
 - Suggested that licensees would be required to submit their overpressure protection analyses for review.
 - Questioned whether the existing NRC-approved methodologies are appropriate for determining the S/RV lift settings.
 - Suggested a new approach of placing a curve in the TS which would continue to maintain “per valve” requirements in the TS, require development of new methodologies, and eliminate most of the benefits of the change.
 - Over half of the comments repeated issues that have already been addressed in the traveler.
- ◇ NRC comments would essentially negate any flexibility licensees would realize by adopting this Traveler.





Next Actions

- ◇ The BWROG cannot continue to pursue this activity without consistent positions from the NRC staff.
- ◇ We request that NRC management encourage the staff to work with the BWROG to find a mutually acceptable path forward that addresses the issue and that will result in a change that will be adopted by BWROG members.





Thank You





Thank You





Reg Guide 1.183 Committee

Tamara Malaney (Xcel Energy)

BWROG Executive Oversight Committee & NRC Meeting
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Topics to be Discussed

- ◇ Strengths in DG-1389 development
- ◇ Areas for improvement





Positive aspects of DG-1389

- ◇ NRC staff requested future fuel plans to tailor non-LOCA release fractions to expected fuel utilization
 - Forward looking guidance
- ◇ Held numerous workshops
 - Good industry engagement
- ◇ New fuel handling accident model developed and released with strong technical basis and guidance also provided
 - Significant improvements in results, allowing for outage improvements and less focus on this low-impact event





Aggressive schedule has left gaps

Questions and concerns raised, but not addressed

- ◇ Not responsive to requests for sample evaluation
- ◇ Questions about two versions of RG 1.183 coexisting answered with a description of what an RG is, not a plan for managing future submittals
- ◇ Questions about applicability and technical basis of SAND-2011-0128, which was a primary source for this update, have not been answered
- ◇ Industry feedback on BWR challenges has not been answered
 - Preliminary industry evaluations show that significant MSIV or control room leakage reductions would be required
 - Proposed industry ideas like suppression pool scrubbing credit have not been adopted





Thank You

