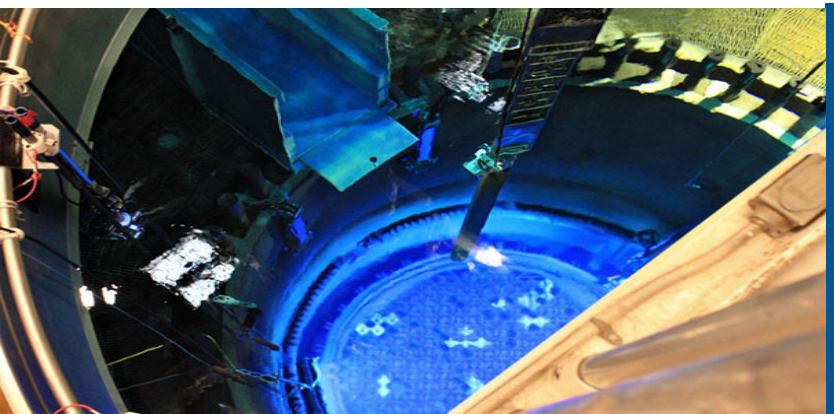
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Risk Management Committee Meeting

PWROG Meeting: April 27, 2022

Meena Khanna, Deputy Director
Division of Risk Assessment
Office of Nuclear Reactor Regulation



Introduction

Meena Khanna, Deputy Director, Division of Risk Assessment

AGENDA

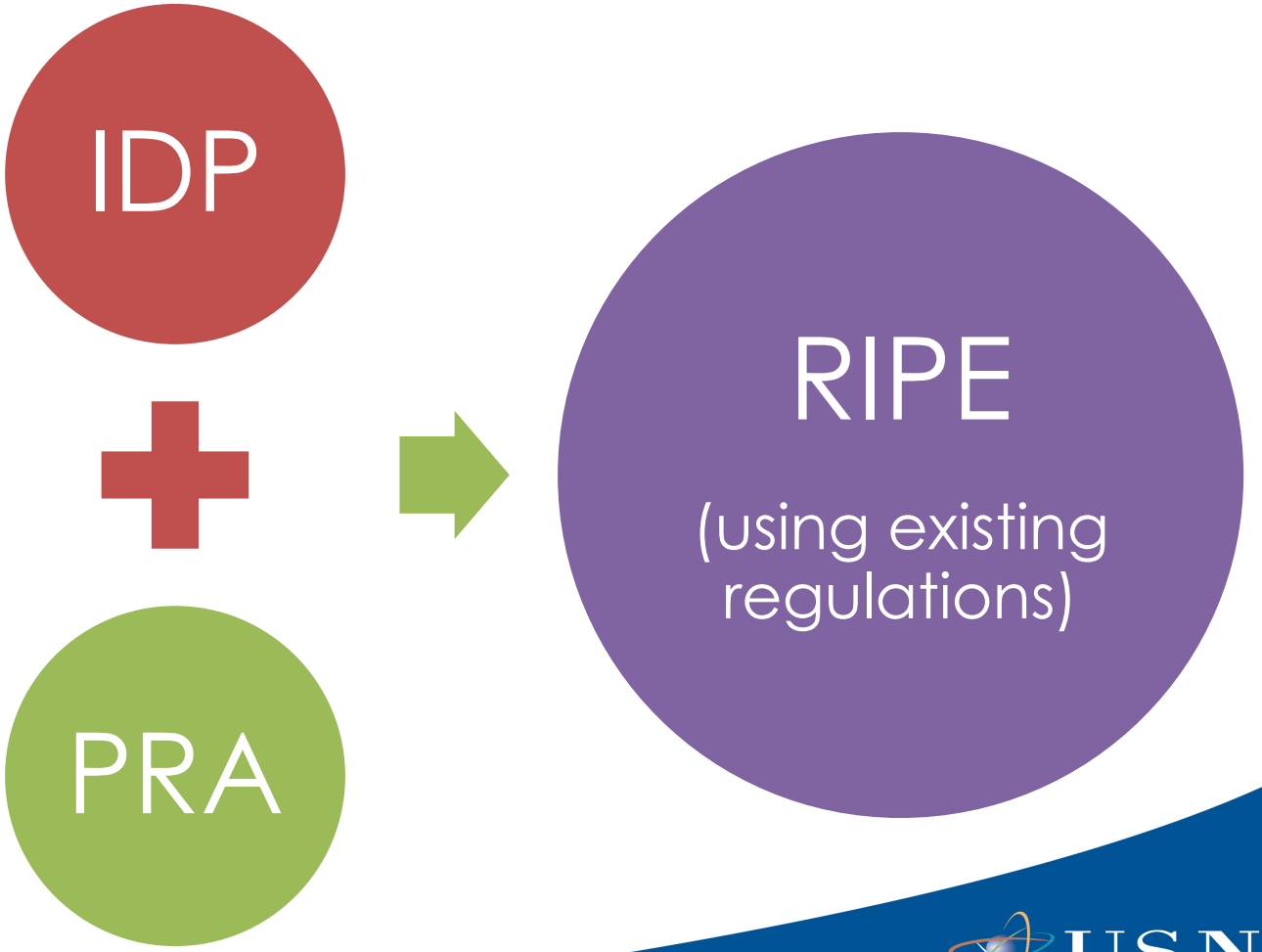
- Risk Informed Process for Evaluations (RIPE)
- High Energy Arcing Faults (HEAF)
- PRA Configuration Control
- Risk-Informed Categorization and Treatment of Electrical and Electronic Equipment (IEEE)
- TSTF-505 Lessons Learned
- RI Diversity For Common Cause Failure in Digital I&C Systems
- Seismic Update
- RG 1.200 Update

Risk-Informed Process for Evaluations (RIPE)

Antonios Zoulis, Chief, PRA Oversight Branch

RIPE Leverages Previous Risk-Informed Initiatives

Integrated Decision-making Panel (IDP) Reviews Key Engineering Principles



Demonstrated Probabilistic Risk Assessment Acceptability

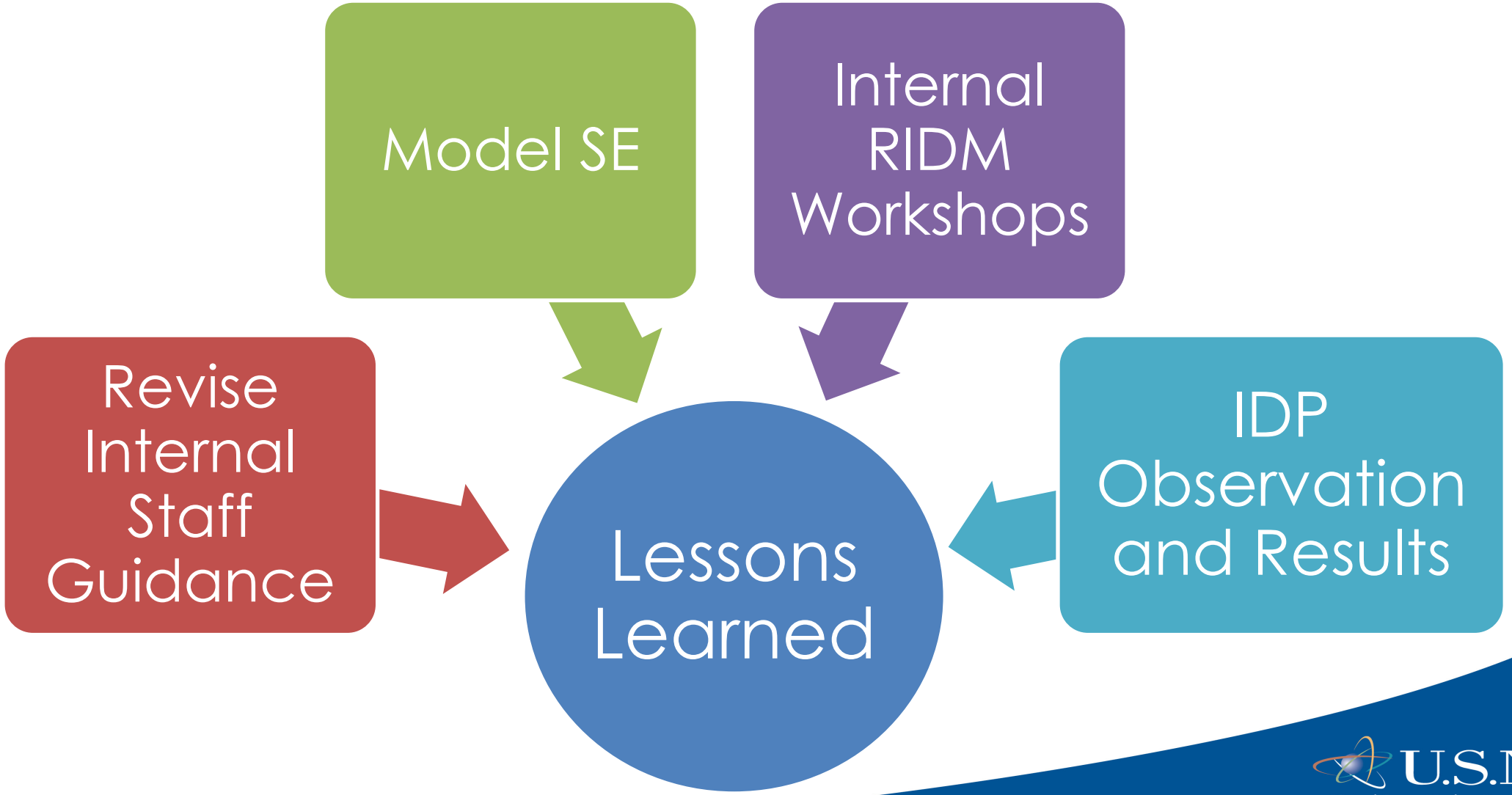
1st Application Submitted Under RIPE

- First RIPE exemption request submitted by APS for review January 2021
  - Exemption from 10 CFR 50.62(c)(1) (ATWS Rule) for Palo Verde
  - The ATWS Rule includes the following three requirements in 50.62(c): (1) the diverse auxiliary feedwater actuation, (2) diverse turbine trip, (3) diverse reactor scram as well as the existing safety related actuation of AFS (AFAS) and the reactor protection system reactor/turbine trip under the conditions of an ATWS
- The RIPE submittal requested a partial exemption to eliminate the Diverse Auxiliary Feedwater Actuation System (DAFAS) requirement only
- Acceptance review did require request for clarifying information
- SE completed and issued on March 23, 2022, within 8½ weeks
  - PVNGS RIPE Exemption SE (ML22054A005)
  - PVNGS RIPE Exemption (ML22054A006)

Schedule & Resources for Palo Verde Exemption (RIPE)

Milestone	RPS Date*	Actual Date	Remarks
Application declared in ADAMS	1/21/22	1/18/22	Application received on 1/14/22 (COB) (ML22014A415)
Staff sends acceptance review results to licensee	2/7/22	1/31/22	ML22032A031
Staff issues final RCIs to the licensee	2/14/22	2/10/22	ML22035A330
Licensee submits to staff its response to RCIs	2/28/22	2/22/22	ML22053A212
DRA/APOB submits SE input to DORL	3/4/22	2/22/22	
DORL provides SE to OGC for NLO/concurrence	3/18/22	2/23/22	
OGC completes review	4/1/22	3/17/22	
DORL issues exemption	4/18/22	03/23/22	**Total hours ~ 97**

Preliminary Lessons-Learned



Future Work

- Expand RIPE to allow Technical Specifications changes - guidance is expected to be issued by June 2022
- Continue working with the PWROG on RIPE-G generic process for topical reports
  - Observe the GAET process
  - Plan for future public meetings
- Any other applications?

Potential Benefits

- Focus NRC and licensee resources on the most safety significant issues
- Address low safety significance compliance issues in an efficient and predictable manner consistent with NRC's Principles of Good Regulation
- Leverage existing regulations and risk insights
- Incentivize the further development and use of probabilistic risk assessment models and applications

Update on Aluminum High Energy Arcing Fault (HEAF) LIC-504 Assessment

Reinaldo Rodriguez, PRA Oversight Branch

Status Update

- Completed site visits to Reference Plants (one BWR and one PWR)
  - Received outstanding support from licensees to help NRC improve realism of analysis supporting the LIC-504 evaluation
  - Collaborating with reference plants to estimate realistic risk estimates associated with the new PRA HEAF method
  - Conduct sensitivity studies to augment the analysis making it more generically applicable

Preliminary Insights

- The team identified a technical issue in the draft of the updated PRA methodology for HEAFs
  - RES/EPRI working group is in the process of addressing this issue
- Based on staff assessments and the site visits completed to date, the HEAF frequency for many sources has decreased; however, due to possible additional targets for bus ducts, we may see some risk increases
- It's too early to tell if any insights would help shape future inspections

Next Steps

Complete documenting risk-informed insights from operational experience and information obtained from reference plant site visits. (June 2022)

Issue LIC-504 team recommendations on any regulatory actions, as needed, based on results from the LIC-504 assessment (July 2022)

Complete supporting technical documents

(December 2022)

LIC-504 Team Recommendations

- LIC-504 team recommendations will be informed by results of staff analyses and staff's review of operating experience
  - Reference plant site visits enable staff to enhance realism of LIC-504 analyses

PRA Configuration Control

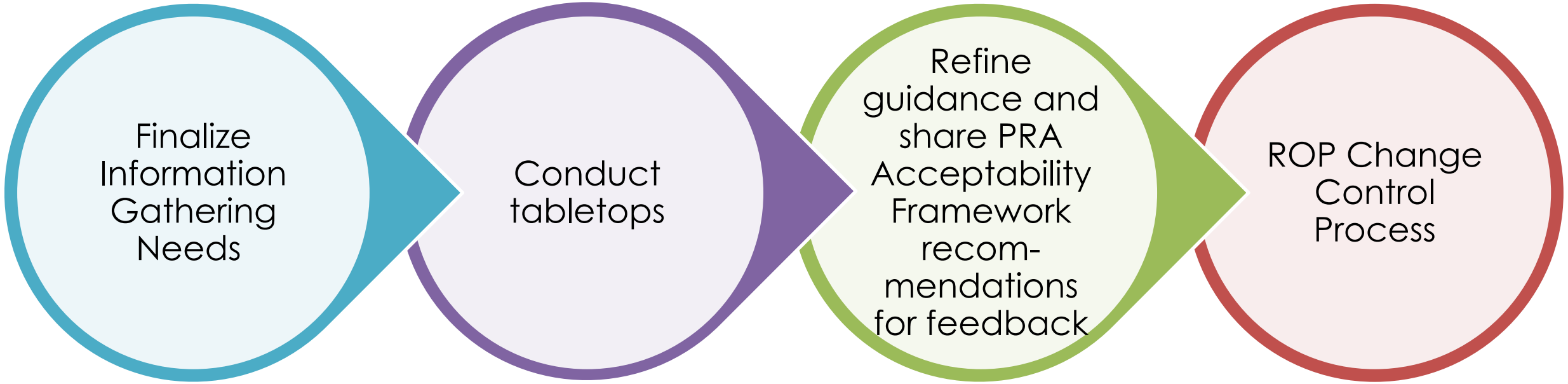
Antonios Zoulis, Chief, PRA Oversight Branch

Edgardo Torres, PRA Oversight Branch

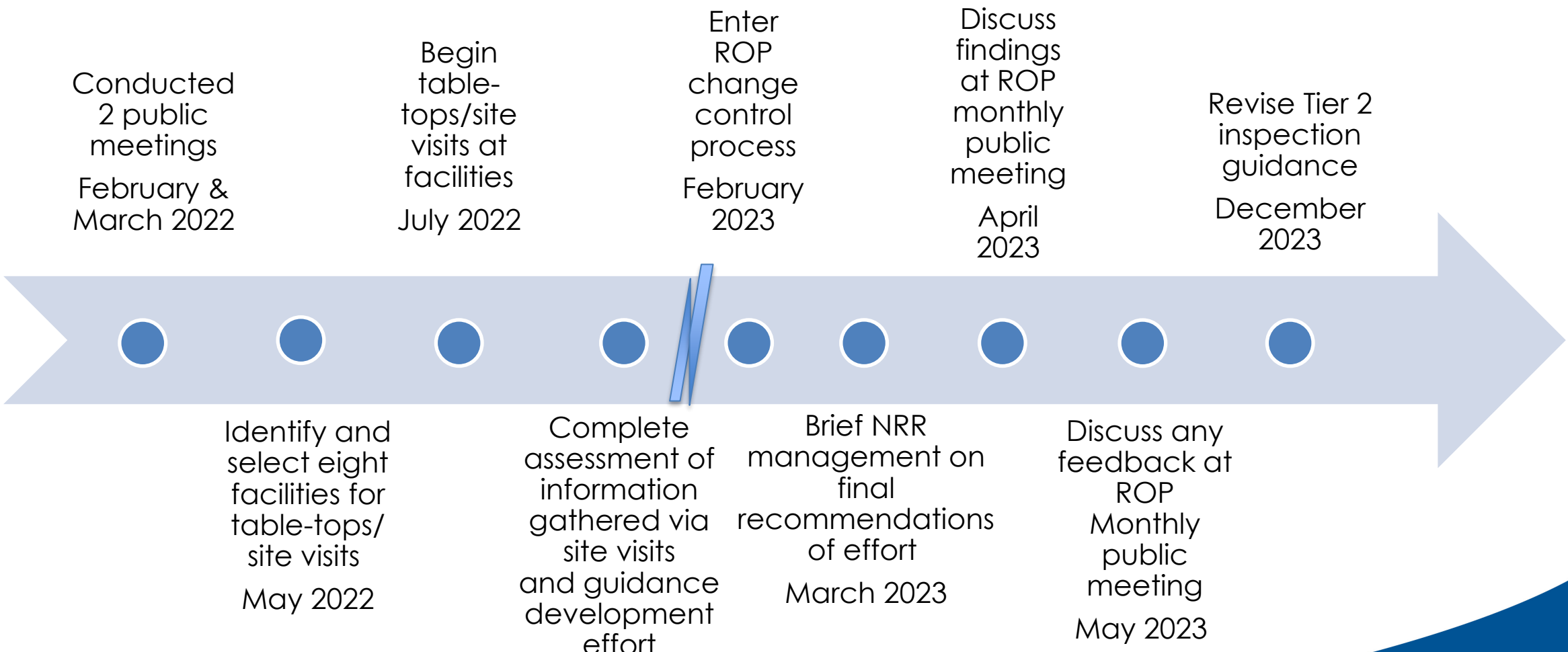
PRA Configuration Control Update

- To date, NRC has held two public meetings:
  - PRA Acceptability Framework (February 2)
  - Information Gathering & Guidance Development Effort (Tabletops) (April 5)
- NEI Sponsored PRA Configuration Control Workshop (April 22)

What's Next?



What's Next?



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IEEE 1819-2016

Robert Pascarelli, Chief, PRA Licensing Branch A

IEEE 1819-2016 Background

- **Purpose:** provides methods to categorize electrical and electronic components using a risk-informed process and provides the recommended treatment of categorized components commensurate with their safety significance
- **Goal:** Seek endorsement by NRC for applicability to electrical and electronic systems and components only
- Public meeting was held on March 16, 2022, to discuss staff's consideration of IEEE 1819-2016

IEEE 1819-2016 Current Status

- Public meeting held with representatives from the nuclear industry, including the Institute of Electrical and Electronics Engineers (IEEE) – Nuclear Power Engineering Committee (NPEC)
- Purpose of the meeting was to discuss the NRC staff's consideration of IEEE Std 1819-2016
- Multiple presentations given by NRC, NEI and IEEE. IEEE requested insights from other groups and participation in the development of the next revision of IEEE Std. 1819
- Meeting Summary issued April 4, 2022 (ML22091A227)

TSTF-505 Lessons Learned

Robert Pascarelli, Chief, PRA Licensing Branch A

TSTF – 505 Background

- Allows licensees to create and manage a TS configuration risk management program to establish Risk-Informed Completion Times (RICTs) for LCO Allowed Outage Times (AOTs)
- Adds new program in TS "Administrative Controls" entitled the "Risk-Informed Completion Time Program"
- Provides list of STS Conditions in scope, model license amendment application and model safety evaluation

TSTF-505 Background/Current Status

- Revision 2 addressed issues identified in Revision 1 (suspended in November 2016)
- Addresses loss of function conditions
- Additional treatment of Common Cause Failure (CCF)
- Industry has submitted 27 applications to adopt RITS Initiative 4b
- NRC staff has approved 17 applications
- Currently reviewing the remaining 10 applications and Anticipate receiving an additional 7 applications by the end of FY 2022

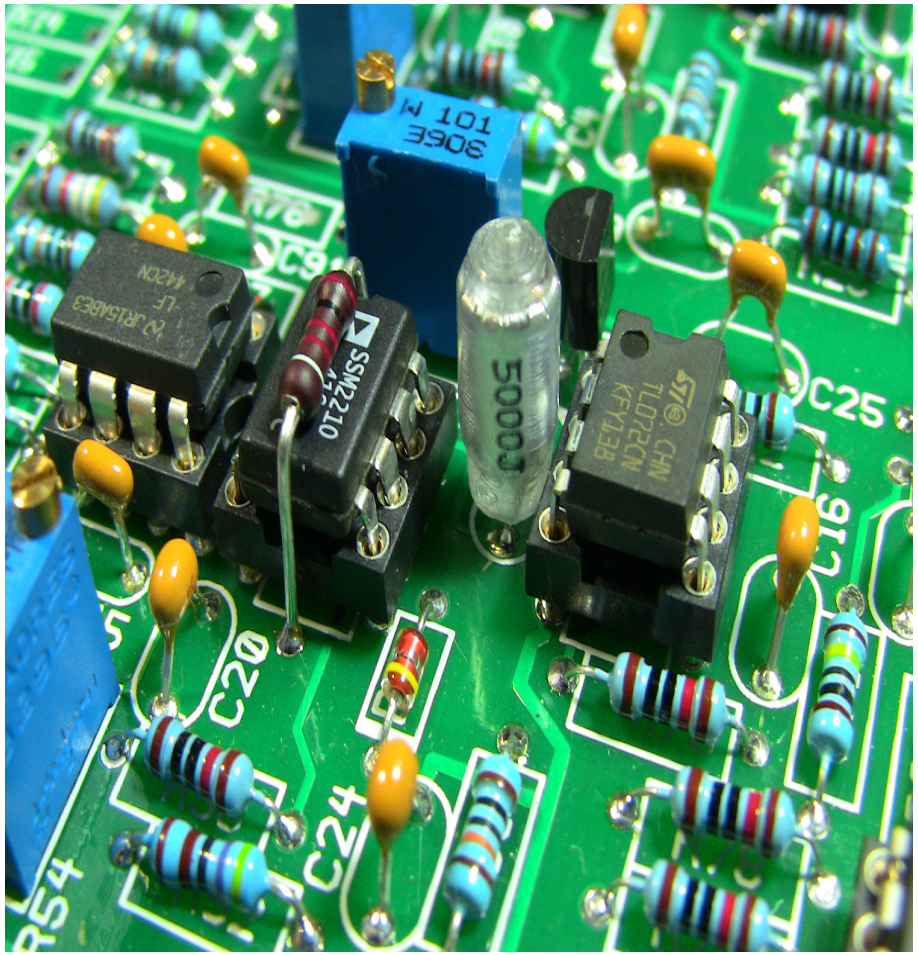
TSTF-505 Best Practices

- Pre-submittal meetings are helpful to staff to understand licensee's strategies and goals for LAR
  - Allows for early dialogue/clarifications to reduce acceptance review pitfalls
- Reviewing previous submittals and following best practices will facilitate efficient NRC review
- Pro-active measures can also help licensee anticipate and address common RAIs
- Leveraging F&O closure process is a valuable tool to increase efficiency of review process
- Audit preparation facilitates quality NRC review on complex topics

Risk-Informing Evaluations of Common Cause Failures in Digital I&C Systems

Shilp Vasavada, Acting Chief, PRA Licensing Branch C

Risk-Informing Evaluations of Common Cause Failure in Digital I&C Systems



- Policy Expansion – SECY under development
  - High internal and external interest
  - Current policy will remain available
- Aggressive schedule
  - Transmittal of SECY to Commission by August 2022
- Five principles of risk-informed decision-making

Risk-Informing Evaluations of Common Cause Failure in Digital I&C Systems (Cont'd)

- Guidance development
  - Following issuance of Staff Requirements Memorandum (SRM) on SECY
  - Intent is to leverage existing risk-informed decision-making and PRA quality guidance
  - Considering options to avoid software reliability determination

Recent Seismic Hazard Related Activities at NRC

Shilp Vasavada, Acting Chief, PRA Licensing Branch C

Recent Seismic Hazard Related Activities at NRC

- NUREG/KM-0017 and RIL2021-15 provide updated information for site amplification
- Recent letter provides additional information and timeline(ML21312A077)
- NRC's seismic hazard subject matter experts are preparing for a **public meeting in early May**

Update on Next Revision to RG 1.200

Sunil Weerakkody, Senior Level Advisor,
Division of Risk Assessment

Background
Summary of Changes in Revision 3 of RG 1.200

- Endorsed Nuclear Energy Institute (NEI) 17-07, Revision 2.
- Endorsed, with staff exceptions and clarifications, requirements in ASME/ANS RA-S Case 1 for ASME/ANS RA-Sb-2013 Standard for Level 1/LERF PRA of Nuclear Power Plant Applications.
- Endorsed several sections of the Pressurized Water Reactor Owners Group (PWROG), PWROG-19027-NP, Revision 2.
- Enhanced guidance related to key assumptions and sources of uncertainty
- Provided a glossary of key terms
- Provided a list of hazards to be considered in the development and use of PRA.
- Modified the staff's previous endorsement of ASME/ANS RA-Sa-2009 in RG 1.200, Revision 2, to reflect endorsement of terms and their definitions derived from PWROG-19027-NP, Revision 2.

Scope and Schedule for Next Revision (i.e., Revision 4) to RG 1.200

- Schedule and scope of the next revision will vary depending on needs and priorities of NRC and the stakeholders.
- Scope of documents to be endorsed will include the next edition of the Level 1/LERF PRA standard (ASME/ANS RA-S-1.1-2022; to be published May 2022)
- Other items that will be considered for inclusion in the next technical revision of RG 1.200 are:
  - Level 2 LWR PRA standard (ASME/ANS RA-S-1.2) (est. publication ~Feb 2023)
  - ALWR PRA standard (ASME/ANS RA-S-1.5) (est. publication ~Nov 2023)
  - LPSD PRA standard (2014 trial use std., consensus std. by ~Oct 2023)
  - Level 3 PRA standard (2017 trial use std., consensus std. by ~Jan 2023)
  - Multi-Unit PRA standard (est. publication ~Nov 2023)
- Public meetings will be used to identify and communicate scope and schedule.

Regulatory Implications

- Revisions to RGs disseminate the staff positions that reflect the current staff views.
- NRC staff does not intend to use the guidance in this regulatory guide to support NRC staff actions in a manner that would constitute backfitting (10 CFR 50.109 & NRC Management Directive 8.4).
- The staff does not intend to use the guidance to support NRC staff actions in a manner that constitutes "Forward Fitting" (NRC Management Directive 8.4)
- Nor does the NRC staff intend to use revised guidance to affect the issue finality of an approval under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."


Questions