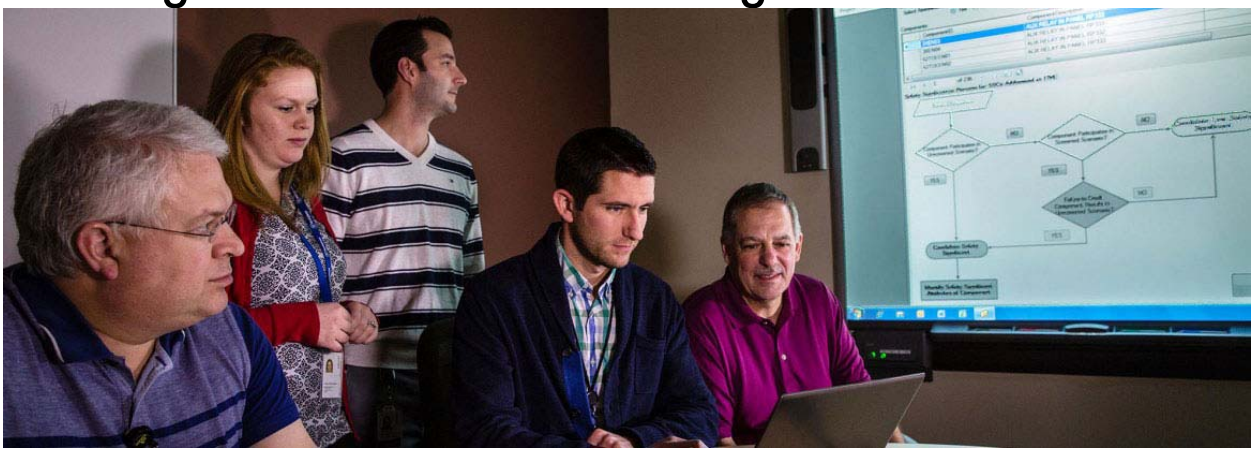
Westinghouse 10 CFR 50.69 Program



Consistent with the tenets of the Delivering the Nuclear Promise initiative, Westinghouse has developed a streamlined approach to promote cost-effective, standardized implementation of the 10CFR50.69 regulation throughout the industry.

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WESTINGHOUSE 10 CFR 50.69 PROGRAM

Executive Summary

Adoption of 10 CFR 50.69 [1] greatly improves economic performance related to meeting regulatory requirements. Implementation of 10 CFR 50.69 allows sites to realize significant savings and efficiencies in procurement, testing, maintenance and design change control [2].

NEI 16-09 [3] provides general implementation guidance for a licensee opting to implement Risk-Informed Engineering Programs [RIEP] through the 10 CFR 50.69 rule. NEI 16-09 provides a concise overview of the elements needed to meet and implement 10 CFR 50.69 requirements. The overall elements from NEI 16-09 are provided in Figure 1.

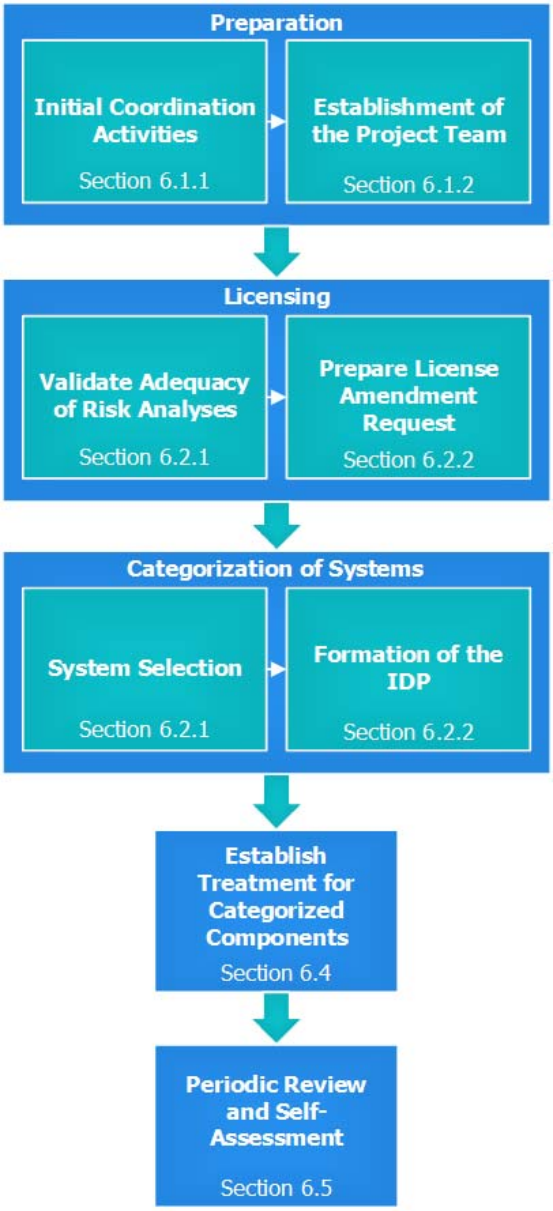

Figure 1: Overview of Implementation Process (figure 6-1 of NEI 16-09)

The purpose of this document is to deconstruct the key elements of the 10 CFR 50.69 implementation process, identify where site-specific effort is required and identify the areas where Westinghouse can provide the needed expertise in support of the 50.69 program.

Table 1 provides a summary of the Westinghouse 10 CFR 50.69 program and is intended to be used with your site leadership to identify areas where Westinghouse support could be provided.

Table 1: Westinghouse 10 CFR 50.69 Program

Phase	Area	Utility Interest
Phase 1: Preparation	50.69 Technical Coordination Engineer	
Phase 2: Licensing Requirements	PRA Model Assessment	
	PRA Model Gap Closure Plan	
	Closeout Outstanding F&Os	
	Package LAR template	
Phase 3: Categorization	System Evaluation and Prioritization	
	System Categorization: Full Scope	
	System Categorization: *Define required plant-specific inputs*	
	System Categorization: *Perform system engineering assessment*	
	System Categorization: *Perform component safety significance assessment*	
	System Categorization: *Perform defense-in-depth assessment*	
	System Categorization: *Provide preliminary engineering categorization of functions*	
	System Categorization: *Perform risk sensitivity study*	
	System Categorization: Assemble IDP package	
Phase 4: Establish Treatment for Categorized Components	Review of Industry Categorization	
	Alternate Treatment Justification	
	Alternate Treatment Implementation	
Phase 5: Periodic Reviews	PRA Update Reviews	
	Plant Modification Evaluation	
	Optimization of RISC-3 Equipment	
	Review of Industry Data for Additional Alternate Treatments	
ALL	Consulting Services	

PHASE 1: PREPARATION

Content of Phase 1: Preparation

- Purpose
- Industry Efforts
- Site-Specific Needs
    - o 10 CFR 50.69 Technical Coordination Engineer

Purpose

The Westinghouse 10 CFR 50.69 Program offers to provide technical coordination engineers to assist in the development of the site strategic vision and the implementation of the licensee's plan.

Industry Efforts

Industry	On-going Activities	Site Impact & Westinghouse Role
PWROG PWR Owners Group	• The PWROG (and joint with the IRIR) have regular round tables to jointly discuss ongoing 50.69 programs and lessons learned.	• Stay engaged with PWROG activities to incorporate lessons learned and take full advantage of generic programs • Westinghouse can collect industry direction to ensure site implementation plan is aligned
NEI NUCLEAR ENERGY INSTITUTE	• NEI 16-09 provides implementation guidance for preparation of the 10 CFR 50.69 program.	• Stay engaged with NEI activities to incorporate lessons learned • Westinghouse can collect industry direction to ensure site implementation plan is aligned

Figure 2 provides a summary of the various industry work streams.

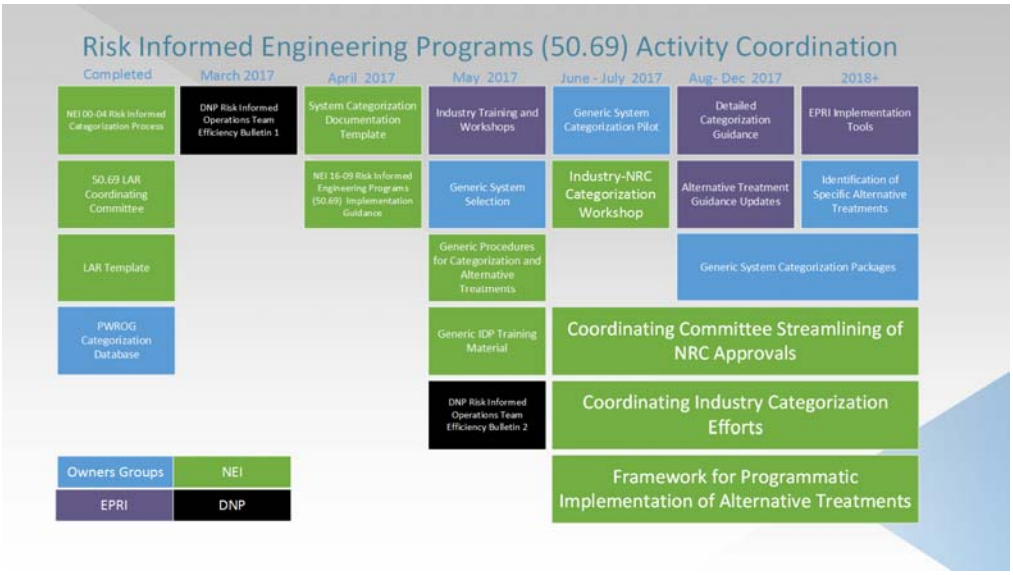

Figure 2: NEI Documented Industry Coordination

Site-Specific Needs

As described in NEI 16-09, RIEP is a broad risk-informed application and has the potential to impact many areas within the organization (e.g., procurement, work planning, licensing, ISI, IST, repair/replacement, design engineering, system engineering, maintenance, risk management). Therefore, strategic planning and the establishment of proper controls are needed to successfully implement RIEP.

Task 1.1: 10 CFR 50.69 Technical Coordination Engineer

To that end, the Westinghouse 10 CFR 50.69 Program offers to provide technical coordination engineers to assist in the development of the licensee's strategic vision and the implementation of the licensee's plan.

Westinghouse understands the value of Delivering the Nuclear Promise by working with the industry to streamline 50.69 activities. This includes:

- Risk Informed Engineering Programs – participating in NEI activities
- PWROG coordinated activities – actively owning and participating in activities
- Project Team participation for TRIO updates – currently industry driven
- Alternate Treatment NEI activities – participating in task force

Scope (Task 1.1)

This role can be customized to meet the site needs. Activities could include the following efforts:

1) **Review Industry 10 CFR 50.69 Activity and Manage Impact to Licensee's Strategic Vision**
   The Westinghouse 10 CFR 50.69 Technical Coordination Engineer will monitor the activities of the primary industry groups involved in 10 CFR 50.69 activities including EPRI, NEI, and the PWROG. The 10 CFR 50.69 Technical Coordination Engineer will continually identify and communicate pertinent operating experience and efficient approaches for consideration of inclusion to on-going efforts to the 10 CFR 50.69 implementation plan.
2) **Technical Support of NRC Interactions**
   The Westinghouse 10 CFR 50.69 Technical Coordination Engineer will participate as a technical consultant during interactions with the NRC reviewers.
3) **Support for Project Team**
   This role will support the overall project team coordination. This function will oversee the implementation team activities and provide the discussed deliverables. The project team includes:
   a. Engineering
   b. Licensing
   c. Operations
   d. PRA
   e. Supply Chain and Procurement

   Westinghouse is capable to support in all areas of this project team as needed (see other phases for detailed scope).
4) **Implementation Coordination**
   Implementation coordination involves the planning and execution of the various tasks within the scope of work. This includes preparing the project schedules and budgets, conducting meetings and issuing meeting notes, ensuring requirements management is followed, and providing input for periodic updates.
   This role will also be responsible for the tracking of requirements of the rule.

5) **Review Other DNP Activity and Manage Impact to the Site 10 CFR 50.69 Program**
The Westinghouse 10 CFR 50.69 Technical Coordination Engineer will review site work performed on other DNP activities and meet with site leads for these activities to track on-going efforts. The Westinghouse 10 CFR 50.69 Technical Coordination Engineer will identify the potential impact on the 10 CFR 50.69 implementation plan based on these activities.

Deliverable (Task 1.1)

Deliverables can be customized to meet site needs. For example, the following items could be requested:

1. Dashboard report outs (see dashboard in Phase 2)
2. Coordinated planning reports (see attachment to this document as example)
3. Schedule updates (Primavera)
4. Coordinated meeting minutes from project team discussions (could include engineering, risk, licensing, etc.)

Table 2 shows an example dashboard of PRA technical acceptability that can be used by plant management through the Phase 2 scope. Dashboards that meet the needs of the project team can be developed and implemented by the coordination engineer.

Table 2: Example Dashboard

Hazard	% Complete	Total Remaining Effort
Internal Events		High
Fire		Medium
Internal Flooding		Low
External Hazards		Low
Seismic		High
Shutdown DID		Low
LAR readiness and LAR template		Low

Schedule (Task 1.1)

The scope of this phase is based on support needed to execute contracted phases or support. This role would be T&M and can be based on 6 month duration for planning purposes.

PHASE 2: LICENSING REQUIREMENTS

Content of Phase 2: Licensing Requirements

- Purpose
- Industry Efforts
- Site-Specific Needs
  - PRA Model Assessment
  - PRA Model Gap Closure Plan and Execution
  - Close Out of Open F&Os
  - LAR Development

Purpose

The Westinghouse 10 CFR 50.69 Program offers to provide services to aid the licensee in the demonstration that the quality and level of detail of the systematic processes that evaluate the plant for internal and external events during normal operation, low power, and shutdown (including the plant-specific probabilistic risk assessment (PRA), margins-type approaches, or other systematic evaluation techniques used to evaluate severe accident vulnerabilities) are adequate for the categorization of structures, systems and components (SSCs).

Industry Efforts

Industry Group	On-going Activities	Site Impact & Westinghouse Role
PWROG PWR Owners Group	• PWROG-16009 (PA-RMSC-1017), "Application of RG 1.200 Requirements to Risk Informed Applications" o Appendix to map necessary requirements for 50.69 o Used as guidance for licensing requirements • Application Core Team o Providing feedback to NEI 05-04 o Reviewing PRA closure activities at the PWROG level	• Westinghouse will continue to participate in ongoing initiatives to streamline the PRA acceptability process for risk-informed applications including 10 CFR 50.69. • Through the PWROG interactions, Westinghouse can also relay to the site where risk-informed applications (LAR submittal preparation) can be linked for applications.
NEI NUCLEAR ENERGY INSTITUTE	• Development of NEI 16-09 o Industry LAR template o 50.69 Categorization Summary Report template • PRA peer review finding closure process (NEI 05-04, Appendix X)	• Westinghouse is part of the Risk Informed Engineering Program Task Force and will utilize this in site specific work.

Site-Specific Needs

As described in NEI 16-09, RIEP is a broad risk-informed application and has the potential to impact many areas within the organization (e.g., procurement, work planning, licensing, ISI, IST, repair/replacement, design engineering, system engineering, maintenance, risk management). Therefore, strategic planning and the establishment of proper controls are needed to successfully implement RIEP.

Table 3 illustrates the end goal of Phase 1 – to complete PRA technical acceptability for 10 CFR 50.69 licensing submittal. Westinghouse can provide services throughout this Phase to prepare for the submittal, a sampling of services are summarized in Tasks 2.1 – 2.4.

Table 3: Summary of PRA Example Deliverable

Hazard	Approach for Risk Assessment	Baseline PRA Results	
		CDF	LERF
Internal Events	Internal events including internal flooding PRA model version [utility version and date] [accepted by NRC for TSTF 505 or other application, date, ML # (Reference X)].	**[1.23E-05]**	**[4.56E-07]**
Internal Fire	Fire induced vulnerability evaluation (FIVE) [accepted by NRC SER dated xx, ML # (Reference X)]. ***OR*** Fire PRA model version [utility version and date] [accepted by NRC for NFPA 805 or other application dated xx, ML # (Reference X)].	**[1.23E-05 OR N/A]**	**[4.56E-07 OR N/A]**
Seismic	Success Path Component List (SPCL) from the IPEEE seismic analysis [accepted by NRC SER dated xx, ML # (Reference X)] ***OR*** Seismic PRA model version [utility version and date	**[1.23E-05 OR N/A]**	**[4.56E-07 OR N/A]**
External Events	External [hazard] PRA model version [utility version and date]. ***AND/OR*** Using the IPEEE screening process as approved by NRC SER dated [dated xx, ML # (Reference X)] the other external hazards were determined to be insignificant contributors to plant risk.	**[1.23E-05 OR N/A]**	**[4.56E-07 OR N/A]**
Low Power and Shutdown	Qualitative defense-in-depth (DID) shutdown model for shutdown configuration risk management (CRM) based on the framework for DID provided in NUMARC 91-06, “Guidance for Industry Actions to Assess Shutdown Management”, which provides guidance for assessing and enhancing safety during shutdown operations.	**[1.23E-05 OR N/A]**	**[4.56E-07 OR N/A]**

Task 2.1: PRA Model Assessment

Westinghouse will review the existing PRA models (and other approaches) to confirm that are of sufficient quality and level of detail to support the categorization process.

Scope (Task 2.1)

The scope of this task involves review of Peer Review Reports, IPEEE analysis and referenced model documents for all hazards required to support the 10 CFR 50.69 program. Westinghouse will review the PRA models for internal events and internal flooding. The gap assessment will also review either the PRA model or the IPEEE analysis for internal fire, seismic events and other external hazards dependent upon which evaluation will be used to support categorization. IPEEE analyses review will include an assessment to the as-built as-operated plant, against the applicable hazard scenarios and identification of any changes as required by NEI 00-04 and the guidance in the NEI 16-09 LAR template.

Criteria for PRA Technical Adequacy

The criteria for the PRA gap assessment is that the applicable supporting requirements (SR's) of RA-Sa-2009 [6] generally be Met at Capability Category II which is currently endorsed by the NRC in Regulatory Guide (RG) 1.200 [7]. The gap assessment will also consider the published RA-Sa-2013 [8] standard and include any potential impacts with regard to the newer version with the recognition that this version has not been endorsed by the NRC. The report will annotate areas where a lower CC is sufficient for the application (based on PWROG-16009 (currently in draft form) and approved LARs/industry consensus) and still adequately supports the objectives of the endorsed business plan.

Evaluation of Hazards not Modeled in the PRA

For hazards not modeled in the PRA, the IPEEE screening evaluations (FIVE, SMA, other external events) will be reviewed to support the 10 CFR 50.69 risk categorization process. The review will include an evaluation of the as-built, as-operated plant against the hazard scenarios identified in the existing screening analyses to determine if there have been any changes in the mitigation function of any unscreened scenarios. Any changes to the screening analysis, and mitigation features will be identified.

The IPEEE screening evaluations will result in more conservative categorization results in comparison to fire, seismic, external hazards PRAs. For plants that address therisk due to these hazards with a qualitative evaluation, a smaller number of components will be categorized as LSS compared with what could be achieved with a PRA. Additionally, some utilities have neither a qualitative evaluation nor a RG 1.200-compliant PRA for one or more hazards. Assistance will be provided to develop the basis supporting the technical adequacy of PRAs that are not compliant with RG 1.200 and non-PRA-type analyses these hazards.

Deliverable (Task 2.1)

The deliverable for Task 2.1 will provide the results of the gap assessment and a plan to resolve the items necessary to ensure technical adequacy of the PRA and non-PRA evaluations to support preparation of the LAR submittal (NEI 16-09 Appendix A).

Westinghouse will perform a gap assessment in accordance with industry methods (i.e., NEI-04-05, PWROG-16009 (currently in draft form), approved LARs, and other industry consensus, etc.) The gap assessment report will provide a summary of outstanding Facts and Observations (F&Os) from past peer reviews and a recommend approach to resolve and close Findings and Suggestions that impact the implementation of 10 CFR 50.69.

The gap assessment will include review of all contracted parts of the PRA against the ASME/ANS standard and provide results and recommended resolutions for each hazard in fashion similar to Table 4.

Table 4: Summary of Gap Assessment Example Deliverable

Finding #	Recommended CC for 50.69	Gap Assessment	Recommended Resolution
IE-A1-01	Met	Met	No action
IE-B3-01	II	Identified Gap	Recommend update to initiating event grouping to follow systematic approach.

Schedule (Task 2.1)

An assessment could be completed in one schedule month with the proper inputs in place.

To perform a gap assessment, one to two schedule months should be allocated for internal events with flood. Hazards could be done in parallel.

Task 2.2: PRA Model Gap Closure Plan and Execution

10 CFR 50.69 specifies that the PRA and non-PRA evaluations are technically adequate support the categorization process, and must be subjected to a peer review process assessed against a standard or set of acceptance criteria that is endorsed by the NRC. Westinghouse will close peer review findings using an NRC-endorsed process.

Scope (Task 2.2)

Westinghouse will:

- Provide a site specific offer resolving identified gaps
- Provide gap resolution plan that includes self-assessments to the PRA Standard

Following the gap closure plan, Westinghouse can then execute the gap closure by updating identified areas of the PRA model and documentation. This could include all areas considered in the rule including internal events, internal flood, fire PRA or FIVE, seismic PRA or SMA, external hazards and LPSD.

Deliverable (Task 2.2)

Based on the gap resolution plan, this could be arrangement combination of deliverables such as:

- Revised PRA Notebooks
- Revised PRA Models
- Updated T&H runs

Schedule (Task 2.2)

Schedule will be site-specific based on the recommendations in the F&O resolution plan.

Task 2.3: Close Out of Open F&Os

The licensee must demonstrate that all peer review Facts and Observations (F&Os) have been resolved or undertake an NRC-endorsed review process to confirm close out of the F&Os. NEI 05-04 [9] provides licensees with several options to achieve permanent closure of their F&Os. These options include another peer review (full scope or focused-scope), NRC closeout, and independent assessment. Westinghouse will develop a recommendation as to the best approach based on the type and quantity of outstanding F&Os.

Scope (Task 2.3)

Option 1: Full or Focused Scope Peer Reviews

Westinghouse can provide technical support during any peer reviews conducted to close F&Os. Westinghouse can also support the debt/credit matrix of the peer review scheduling through the PWROG. If the utility requires additional expertise for the credit of the peer review, Westinghouse can support.

Benefits to working through the PWROG include:

- Highest quality - Access to a pre-existing resource pool of proven peer review leaders and experienced third party support
- Lowest risk of evolving expectations – Consistent peer review / F&O closure leads with oversight by the PWROG Risk Management Committee Chairman
- Highest cost-effectiveness - Benefit of access to utility volunteers (PWRs and BWRs) through use of the credit/debit matrix, minimizing cost for additional contractors
- Access to a well-established funding process
- PWROG has decades of experience in providing highly effective PRA peer reviews

Option 2: NRC Closeout

Westinghouse can develop the dispositions for open F&Os and provide the technical basis that supports the disposition or closure of the F&O is appropriate for 10 CFR 50.69 as well as other identified applications.

Option 3: Independent Assessment of F&O Resolution

Following NRC acceptance to guidance [9], Westinghouse will perform an independent review of the F&O resolutions and provide an assessment.

Deliverable (Task 2.3)

The deliverable to this task is a report of the finding closure process. Table 5 is an example deliverable table.

Table 5: F&O Closure Deliverable

Finding Number	Supporting Requirement(s)	Capability Category	Description	Disposition for 10 CFR 50.69
Identifier from PR report	# from Standard	CC identified in PR report	Writeup of finding from PR report	Details on how it was resolved with reference to supporting documentation.

Schedule (Task 2.3)

A full scope peer review could require two schedule months with the full report.

Depending on schedule needs, Westinghouse can support parallel independent reviews of F&O closure as needed to support the LAR schedule.

Task 2.4: LAR Development

Scope (Task 2.4)

Westinghouse can populate the LAR template as part of the other tasks in Phase 2 or standalone.

The utility can also request licensing support from Westinghouse as needed.

Westinghouse can also align other applications submittals with 50.69 including RITS 4B and RITS 5B.

Deliverable (Task 2.4)

The deliverable to this task is a completed LAR template from the NEI 16-09 template.

Schedule (Task 2.4)

Based on the number of findings and other aspects, this scope could be one to three months prior to LAR submittal. Licensing support also needs to be factored in.

PHASE 3: CATEGORIZATION

Content of Phase 3: Categorization

- Purpose
- Industry Efforts
- Site-Specific Needs
    - o System Evaluation & Prioritization
    - o System Categorization

Purpose

The Westinghouse 10 CFR 50.69 Program offers to provide services to aid the evaluation of SSCs classified as either safety related or non-safety related and determine whether they can be additionally categorized as high or low safety significant.

Industry Efforts

Industry	On-going Activities	Site Impact & Westinghouse Role
PWROG	• PA-RMSC-1477 "10 CFR 50.69 – Identification of Common Low Risk – High Cost SSC's" • PA-RMSC-1515 "Industry Risk-Informed Operations Tool for 10 CFR 50.69 Categorization" • PA-RMSC-1516 "10 CFR 50.69 Generic Categorization Process Development"	• Westinghouse's support to the PWROG ensures alignment between generic, cafeteria and site-specific categorization.TRIO categorization tool development is being industry led to move to Version 2.0 through the PWROG.
EPRI ELECTRIC POWER RESEARCH INSTITUTE	• QlikView software and data • Categorization training	• Westinghouse through the PWROG continues to look for ways to support categorization training with TRIO support and can implement industry learning into site specific applications.
NEI NUCLEAR ENERGY INSTITUTE	• NEI 00-04 – 10 CFR 50.69 SSC Categorization Guideline • NEI 16-09 – Risk-Informed Engineering Programs (10 CFR 50.69) Implementation Guidance • Coordination of generic industry issues regarding 10 CFR 50.69	• Westinghouse continues to support NEI initiative to streamline categorization through use of the TRIO and PWROG programs. • Westinghouse will coordinate industry efforts into plant-specific implementation

Site-Specific Needs

As described in NEI 16-09, categorization is one of the most resource intensive elements of RIEP implementation and should be planned strategically to maintain cost effectiveness of the program. The 10 CFR 50.69 rule allows the licensee the freedom to choose which systems to categorize, but it requires that the entire system chosen be categorized in its entirety. The level of effort required to perform the categorization greatly varies with the system being categorized. In general, the cost of categorizing a system increases with the complexity of the system and the total number of components in the system.

Task 3.1: System Evaluation and Prioritization

As summarized in NEI 16-09, due to the large potential areas that could be augmented with the implementation of RIEP, it is important that necessary resources are allocated to those plant programs and processes that will receive the largest benefit from treatment changes. The cost and benefit received will vary with each system the licensee chooses to categorize and the alternative treatments they choose to implement. Westinghouse will work with the licensee to prioritize which plant systems are highly favorable for categorization and alternative treatments.

Systems with a large number of components have more potential cost savings benefit. Use of available data to evaluate site components will assist in prioritization:

- Systems with a large number or high percentage of safety-related components have more potential to have a high number of components categorized as low safety significant (LSS) (RISC-3).
- Systems with a small percentage of components modeled in the plant probabilistic risk assessment (PRA) model have a higher potential for components being categorized as LSS.
- Systems with a high percentage of ASME Class I components have lower cost savings potential as such components are not eligible for treatment reduction for the pressure boundary aspects.
- Systems with high costs (i.e., procurement, maintenance, etc.) have greater potential savings from treatment reductions.
- Systems with high numbers of Maintenance Rule Functional Failures (MRFFs) have greater potential savings from MRFFs being eliminated based on categorization as LSS.
- Upcoming procurement costs, if known, should be considered. Categorization of a system can potentially minimize expected procurement costs for the LSS SSCs of that system.
- System costs over 5-10 years should be evaluated, including costs associated with the exempted special treatment programs identified in the 10 CFR 50.69 rule. Identification of significant system cost savings for the more substantive programs will benefit the site business plan for RIEP implementation.

Scope (Task 3.1)

Westinghouse will develop the RIEP strategic implementation plan to support the site's implementation of 10 CFR 50.69, which will include:

1. Description of the rationale and site objectives for implementing the cost reducing RIEP.
2. Outline of the responsibilities and supporting actions for program development at the site.
3. Integration plan for other on-going industry efforts, such as generic categorization in the PWROG, industry lessons learned and guidance, and industry research.
4. System analysis summarizing the number of SSCs, summary of SR SSCs, summary of SSCs modeled in the relevant PRA model(s), as well as other system data relevant to the site implementation plan for 10 CFR 50.69. This summary will be completed in coordination with the site RIEP project team.
5. System cost analysis summarizing historical system costs in areas such as procurement, repair, testing, inspection, and reporting. The cost analysis will also consider planned capital or future procurement costs. This summary will be completed in coordination with the site RIEP project team and is intended to identify high cost systems with the potential for implementing alternative treatments.
6. Prioritization of system categorization to meet site objectives.

The overall objective of the strategic implementation plan is to identify systems that are highly favorable for system categorization, and later, implementation of alternative treatments to reduce costs associated with materials and resources.

Deliverable (Task 3.1)

Westinghouse, in coordination and review by the site lead(s) and project team for RIEP, will deliver a letter report detailing the strategic implementation plan that will directly support the site's strategic implementation goals, including a prioritization of systems for categorization that will support these goals.

Schedule (Task 3.1)

Westinghouse will schedule the completion of the strategic implementation plan to support the site implementation goals. Depending on the number of systems to be included in the strategic implementation plan, the schedule for delivering the plan may vary. It is anticipated to take approximately six to eight weeks to deliver the letter report if five systems are included in the scope of the plan.

Task 3.2: System Categorization

The purpose of system categorization is to evaluate safety related and non-safety related SSCs in a system to determine if they can be further classified as either high safety significant (HSS) or low safety significant (LSS) based on their safety significance to the functions of the system. The rule (10 CFR 50.69) does not require a specific scope of implementation. Thus, the licensee may select the systems for which 10 CFR 50.69 would be implemented, and may conduct the implementation in a phased manner. However; 10 CFR 50.69 provides that implementation should be conducted on the entire system that is selected for categorization, not selected components within a system. The primary reason that 10 CFR 50.69 requires the categorization to be performed for entire systems is to ensure that all functions (which are primarily a system-level attribute) for a given SSC within a given system are appropriately considered when determining its safety significance. Westinghouse offers to work with the licensee to categorize selected systems per the rule and the guidance provided in NEI 00-04.

Scope (Task 3.2)

Westinghouse will perform the system categorization for a selected system following the guidance in NEI 00-04, which provides detailed guidance on the NRC endorsed process for categorization. Westinghouse will lead the categorization effort but will work closely with the utility throughout the process to ensure that the site RIEP project team is familiar with the process and the work that is being done. Westinghouse will use the industry-recognized database Tool for Risk-Informed Operations (TRIO) to complete system categorization and document the categorization results. The general process for completing system categorization includes the following steps:

1. **Define required plant-specific inputs**
   This step involves the collection and assessment of the key inputs to the categorization process, including design and licensing information, PRA analyses, and other relevant plant data sources. In addition, this step includes the critical evaluation of plant-specific risk information to ensure that they are adequate to support this application (from Phase 2).
2. **Perform system engineering assessment**
   This is the initial engineering evaluation of a selected system to support the categorization process. This includes the selection of the system and the definition of the system boundary to be used, the components to be evaluated, the identification of system functions, and a coarse mapping of components to functions. The system functions are identified from a variety of sources:
   a. Final Safety Analysis Report (FSAR);
   b. Design and licensing basis analyses;
   c. Maintenance Rule assessments;
   d. PRA analyses.
3. **Perform component safety significance assessment**
   The safety significance assessment involves the use of the plant-specific risk information to identify components that are candidate safety-significant. The process, as described in NEI 00-04, includes consideration of the component contribution to full power internal events risk, fire risk, seismic risk, other external hazard risks, and shutdown safety. The TRIO will be used to complete this assessment as part of the categorization process.
4. **Perform defense-in-depth assessment**
   The defense-in-depth assessment is the evaluation of the role of components in preserving defense-in-depth related to core damage, large early release and long term

containment integrity. This assessment will be completed using the TRIO database as part of the categorization process.

5. **Provide preliminary engineering categorization of functions**
   The result of the four previous steps is the preliminary engineering categorization of functions, which provides the preliminary categorization of the safety significance of system functions. This is used to identify the SSCs in the system that are candidates to be categorized as low safety-significant.
6. **Perform risk sensitivity study**
   A risk sensitivity study is performed to investigate the aggregate impact of potentially changing treatment of those low safety-significant SSCs. This sensitivity study will need to be performed by the site based on their site-specific PRA models. Westinghouse will provide support for this process step.
7. **Assemble Integrated Decision-making Panel (IDP) package**
   The resulting preliminary (or recommended) categorization results for the SSCs in the selected system will be summarized in a report that can be presented to the IDP. The IDP package will be prepared from the data stored in the TRIO database, along with any other supporting data, and will be formatted to match the report structure presented in NEI 16-09. The IDP will be comprised of site experts and the IDP review will be led by the site project team with support from Westinghouse. The site project team will manage the IDP and Westinghouse will participate for items covered in the scope of this project.

The IDP review must be conducted by the site RIEP project team with the IDP comprised of multi-disciplinary experts on the system being reviewed. For this reason, Westinghouse cannot lead this part of the categorization task. However, following the IDP review, Westinghouse will support the closure of any open items that were addressed during the IDP review, and will support the finalization of the categorization results for the system, which may include updates to the TRIO database to address any re-categorization identified during the IDP review, or additional documentation for the like.

Deliverable (Task 3.2)

The deliverables from this task will include a completed TRIO database file that documents the basis for the recommended categorization results for the IDP review, and a completed IDP package that conforms to the recommended format presented in NEI 16-09. These deliverables will be used by the site RIEP project team to conduct the IDP review and finalize the categorization results for the SSCs in the selected system.

Schedule (Task 3.2)

The schedule for completing this task is highly dependent on the complexity of the system being categorized. However, for small to moderately sized systems it is expected that this task will take two to three months.

PHASE 4: ESTABLISH TREATMENT FOR CATEGORIZED COMPONENTS

Content of Phase 4: Alternate Treatments

- Purpose
- Industry Efforts
- Site-Specific Needs
    - Review of Industry Categorization
    - Alternate Treatment Justification
    - Alternate Treatment Implementation

Purpose

The Westinghouse 50.69 Program offers to develop actions the licensee can implement to remove the LSS SSCs from the scope of the existing site programs and implement alternative treatments for those SSCs.

Industry Efforts

Industry	On-going Activities	Site Impact & Westinghouse Role
PWROG PWR Owners Group	• Providing alternate treatment specific and component specific justification for alternate treatments – Project Authorization development to be determined • Providing industry cost and categorization data through TRIO for comparison – PA-RMSC-1515	• Provides a standardized approach for implementing specific alternate treatments • Provides useful data for quantifying future cost benefit • Westinghouse will use generic approaches and tailor output for plant-specific implementation
EPRI ELECTRIC POWER RESEARCH INSTITUTE	• Providing generic implementation templates for each alternate treatment (Documentation in process) • EPRI 1015099, “Option 2, 10 CFR 50.69 Special Treatment Guidelines” • EPRI 1009748, “Guidance for Accident Function Assessment for RISC-3 Applications, Alternate Treatment to Environmental Qualification for RISC-3 Applications” • EPRI 1011783, “RISC-3 Seismic Assessment Guidelines”	• Provides industry standard documentation for use • Westinghouse is providing training to EPRI members on the use of the TRIO • Westinghouse can incorporate industry templates into TRIO to enforce a standard industry approach
NEI NUCLEAR ENERGY INSTITUTE	• Collection of information through the DNP repository • Development of comparison reports and data summaries	• Westinghouse is participating on industry framework teams • Westinghouse will coordinate industry efforts into plant-specific implementation
INPO®	• Collection of operating experience within the ICES database	• Provides justification for the application of specific alternate treatments • Westinghouse will use plant-specific data and operating experience databases for justification

Site-Specific Needs

The 10 CFR 50.69 rule provides licensees wide latitude in establishing appropriate treatment of categorized components without NRC prior approval. To take advantage of these opportunities, licensees will need to establish and justify new alternative treatments that they determine are sufficient to achieve reasonable confidence that categorized components will continue to perform their design functions.

For SSCs categorized as RISC-3 or RISC-4, 10 CFR 50.69 allows licensees to implement alternative treatments for areas identified in Figure 3. The rule requires that the licensee or applicant ensure, with reasonable confidence, that RISC-3 SSCs remain capable of performing their safety-related functions under design basis conditions, including seismic conditions and environmental conditions and effects throughout their service life. The term owner-controlled alternative treatment or simply alternative treatment is used in NEI 16-09 [3] to describe the controls that the licensee develops and implements to comply with the language of the rule. The rule does not further define reasonable confidence nor is reasonable assurance defined within any regulations. Additionally, the rule does not provide any more detail on what is required for these alternative treatments and it does not require NRC approval. This was intended to allow licensees maximum flexibility in determining how to comply with the rule. Any review by the NRC would be conducted through audits or inspections.

It should be noted that the process of categorization described in Phase 3 is separate from the process of alternative treatment development. Each process requires a different skill set for the team that needs to support implementation. Though identification of alternative treatments may influence system selection, it should not be used to influence the IDP categorization of SSCs. Conversely, how SSCs are categorized determines if alternative treatments can be established.

A summary of how treatment of SSCs in each category should be established is provided in NEI 16-09 [3]. The scope of this task will focus on the treatment of RISC-3 items. For SSCs determined to be RISC-3, the licensee is able to remove requirements imposed by the applicable regulations. However, the licensee is responsible for implementing alternative treatment/controls to ensure with reasonable confidence that the SSCs remain capable of performing their safety-related functions.

Though “reasonable assurance” is not defined within the NRC regulations, nor within related guidance documents, existing requirements imposed by those regulations are understood to be adequate. Controls adequate for “reasonable confidence” are understood to be less than those regulatory requirements and to be defined by the licensee.

Once the RISC-3 SSCs are identified, the overall process for establishing owner-controlled alternative treatment should be performed in the context of the specific engineering program to be altered. A blended approach incorporating both industry initiatives and NEI 16-09 [3] guidance is proposed in the task structure herein.

Task 4.1: Review of Industry Categorization

Scope (Task 4.1)

Westinghouse will:

1. Assess the output from Phase 3.
2. Review industry data on similar alternate treatments and their effectiveness using TRIO.
3. Organize the RISC-3 components using weighted criteria
4. Identify the design function(s) of the SSC.
5. Identify the specific activities imposed by the engineering program associated with the SSC.
    a. What activities are required by regulation within the program
    b. The frequency of those activities
    c. How those activities should be performed/implemented
    d. The extent to which the implementation of completed processes is documented
6. Identify any related limitations imposed by technical specifications. As 10 CFR 50.69 is not a technical specification requirement change, those limitations would still need to be met.
7. Identify which activities or elements of the program that are required to support the design function(s).Consider what activities are required for reasonable confidence.
8. Identify which specific activities can be eliminated completely.
9. Identify which specific activities can be continued to be performed differently or less frequently.

Deliverable (Task 4.1)

Westinghouse will provide a listing of the site's RISC-3 components that are expected to be cost effective to incorporate an Alternate Treatment.

Task 4.2: Alternate Treatment Justification

The technical justification should as a minimum explain why the alternative treatment provides reasonable confidence with regards to the SSC's design function(s). Per guidance documentation, this justification can cite:

- Industry-wide experience with the performance of the SSC
- Plant-specific operating experience
- Other means of testing or inspection
- Crediting other maintenance or operational activities (e.g, system engineer walkdowns, operator rounds, condition monitoring)
- Vendor documentation

EPRI and other industry groups initiated the development of various guidance documents to support the implementation of 10 CFR 50.69 and Risk-Informed Engineering Programs. EPRI 1009748 [4] and EPRI 1011783 [5] provide more specific guidance on Environmental Qualification and Seismic Qualification, respectively, provides a summary on what to consider for each program when identifying alternative treatments.

Westinghouse will:

1. Use industry templates to aide in the documentation of an appropriate alternate treatment
2. Develop a technical justification for the alternative treatment (e.g., alternative acceptance basis for procured items, changes in frequency of testing or inspections, different types of testing, different ways to monitor performance, a less rigorous process for evaluating the suitability of alternate items).
3. Document the technical justification of the alternative treatment.

Deliverable (Task 4.2)

Will be customized for site needs. Could include: 1) completed reports for component alternate treatment; 2) updated site-specific TRIO database with alternate treatment information; 3) communication to NEI to support the industry collaboration efforts.

Task 4.3: Alternate Treatment Implementation

A listing of the twelve identified special treatments where an Alternate Treatment can be developed are listed in Figure 3.

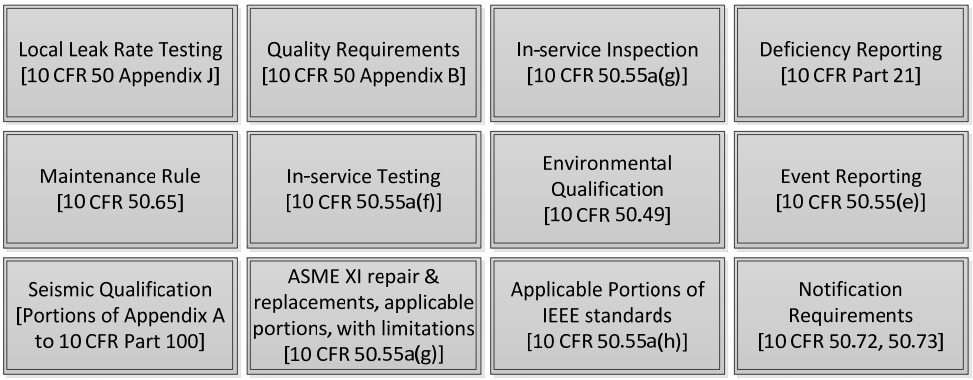

Figure 3: Alternate Treatments

Westinghouse can customize services per site need. For example, this service could include the identification and update of site documents to reflect the alternate treatment for each component including programmatic and procedure changes.

Deliverables (Task 4.3)

Develop completed reports and update documents as appropriate.

Potential actions for each alternate treatment are listed in Table 6.

Table 6: Alternate Treatment Insights (from NEI 16-09, Table 10-1)	
Regulatory Program Area	**Description of Insights**
10 CFR Part 21 Deficiency Reporting	A RISC-3 component would no longer require reporting of defects identified by the licensee to the NRC. A licensee may still opt to impose selected requirements from the regulation on suppliers thereby requiring them to report defects to the licensee that the supplier may discover.
10 CFR 50.49 Environmental Qualification	Less rigorous means of demonstrating the suitability of replacement items intended for harsh environmental applications could be developed for RISC-3 components. The service life of environmentally qualified components could also be extended for RISC-3 components based on elimination of margins and other conservatisms. Documentation rigors can also be reduced.
10 CFR 50.55(e) Event Reporting	A RISC-3 component would no longer require event reports. Given that no new alternative treatment would need to be imposed, additional analyses or programmatic controls would not be required to demonstrate reasonable confidence or alternative treatment.
10 CFR 50.55a(f) In-service Testing	Less rigorous or less frequent tests could be developed for RISC-3 components, and these tests could be conducted via Preventive Maintenance activities rather than Surveillance Testing. Examples include taking credit for performance history and other means of fault finding (e.g. quarterly mini flow test have identified performance anomalies that do not show up during the flow full test conducted during refueling). Service condition monitoring of snubbers may increase component reliability better than bench testing of the snubber. This basis for transitioning to the alternative treatment would be documented (e.g. engineering evaluation, IST program manual/procedure).
10 CFR 50.55a(g) In-service Inspection	Less rigorous or less frequent inspections could be developed for RISC-3 components and executed through more-direct means. Examples include taking credit for other activities that may address the area of concern (e.g. operator walkdowns in lieu of ASME Section XI pressure test to look for pressure boundary leakage), crediting augmented inspection activities (e.g. localized corrosion and flow accelerated corrosion programs), and keeping the inspection strategy but extending the inspection interval based on acceptable operating history and a lack of a postulated degradation mechanism.
10 CFR 50.55a(g) ASME XI repair & replacements (applicable portions, with limitations) except for ASME Class I	While some Class 1 components may be categorized as RISC-3, only ASME Class 2 and Class 3 SSCs that are determined to be RISC-3 do not require the additional assurance obtained from the specific provisions of the ASME Code. For RISC-3 SSCs, ASME Section XI Travelers are no longer required along with burdens imposed by ANI contracts, stamping, suitability evaluations, etc. Alternate processes (e.g. procurement, installation) could include those used for high-temperature power piping in the turbine building, low energy yet generation important systems. These alternate processes and their basis could be documented in a revision to the existing repair/replacement manual or in an alternate repair/replacement program manual.
10 CFR 50.55a(h) Applicable Portions of IEEE standards	A RISC-3 component would no longer have to comply with sections 4.3 and 4.4 of IEEE 279 and sections 5.3 and 5.4 of IEEE 603–1991, which contain quality and environmental qualification requirements.
10 CFR 50.65 Maintenance Rule (except (a)(4))	A RISC-3 component may be removed from the scope of the Maintenance Rule. Given that no new alternative treatment would need to be imposed, additional analyses or programmatic controls would not be required to demonstrate reasonable confidence or alternative treatment.
10 CFR 50.72, 50.73 Notification Requirements	A RISC-3 component may no longer require event reports in order to follow-up on corrective actions taken by the licensee. Given that no new alternative treatment would need to be imposed, additional analyses or programmatic controls would not be required to demonstrate reasonable confidence or alternative treatment.
10 CFR 50 Appendix B Quality Requirements	For RISC-3 items, the licensee can select which, if any, requirements of 10 CFR 50, Appendix B are needed to provide reasonable confidence that the RISC-3 item continues to perform its safety functions. A RISC-3 item may be procured as commercial grade without having to dedicate it. Non-identical replacement items could be evaluated for suitability using a less rigorous process and criteria. Commercial practices could be followed for receipt inspection of parts, warehousing, and control of M&TE. Elimination of Quality oversight and inspections would be expected.
10 CFR 50 Appendix J Local Leak Rate Testing	Appendix J leakage testing for the RISC-3 SSCs could be credited through normal operational manipulations which demonstrate acceptable leak tightness (i.e., no leakage past closed isolation valves during operational evolutions). This basis for transitioning to the alternative treatment would be documented (e.g. engineering evaluation, LLRT program/procedure update).
Portions of Appendix A to 10 CFR Part 100 Seismic Qualification	Less rigorous means of demonstrating the suitability of replacement items intended for seismic applications could be developed for RISC-3 components. This could include crediting industry seismic experience and analysis (e.g., SQURTS, SQUG, etc.) in lieu of seismic qualification testing. The basis for achieving reasonable confidence would be documented.

PHASE 5: PERIODIC REVIEWS

Content of Phase 5: Periodic Reviews

- Purpose
- Site-Specific Needs
    - PRA Update Reviews
    - Plant Modification Change Reviews
    - Optimization of RISC-3 Equipment and Operating Experience
    - Review of Industry Data

Purpose

The Westinghouse 10 CFR 50.69 Program offers to provide periodic reviews to identify impacts on system categorization results (e.g., from design changes, risk model changes, operational changes, etc.) and identify potential adverse trends in SSC performance resulting from the use of alternative treatments.

Site-Specific Needs

The 10 CFR 50.69 process requires licensees to periodically evaluate and monitor the inputs to the categorization process as well as the performance of components classified as RISC-3. NEI 00-4 requires that a periodic review be performed at least once every two refueling outages. This review is to ensure that the existing categorization information remains valid and alternative treatments are appropriate. If changes are identified that affect the categorization or if RISC-3 component performance is found to be declining the categorization would need to be updated.

Task 5.1: PRA Update Reviews

Plant PRA models are continuously updated due to a variety of reasons; plant modifications, operating experience, procedure changes, etc. As a result of these model changes the risk results used to perform the system categorizations can change. These model changes can be range from minor with minimal impact to large changes with wholesale reshuffling of SSC importance ranking. Westinghouse offers to work with the licensee to update categorization information for PRA model changes during the periodic system update process.

Task 5.2: Plant Modification Changes

Plant modifications occur over time based upon the needs of the plant to deal with design issues, improve plant operation, etc. These changes need to be assessed and impacted in the appropriate plant PRA models and subsequent system categorizations. Westinghouse offers to work with the licensee to update the applicable PRA models and categorization information.

Task 5.3: Optimization of RISC-3 Equipment and Operating Experience

As part of the overall process for incorporating alternate treatments on RISC-3 components in accordance with 10 CFR 50.69, plants are required to periodically assess the performance of these components. This review is to ensure that the re-categorization of RISC-3 SSCs does not overly impact their performance SSCs. Additionally plant specific and industry operating information is required to be reviewed. This review should determine if any operating experience exists that should be factored into the SSC categorization process. Westinghouse offers to work with the licensee to perform the periodic review of RISC-3 performance along with a review of relevant industry and plant specific operating experience. This review would be performed in accordance with the guidance provided in NEI 00-04 and NEI 16-09.

Task 5.4: Review of industry data for additional Alternate Treatments

Alternate treatment methodologies are likely to be developed and evolve as the industry implements the 10 CFR 50.69 process. In addition to Westinghouse working with the licensee to develop relevant alternate treatments (Phase 4); Westinghouse would monitor, recommend and share industry best practices with the licensee. This would ensure that the alternate treatment program implemented by the licensee would remain within the industry consensus and provide opportunities to share lessons learned.

Deliverable (Phase 5)

Westinghouse can customize services per site need. For example, this service could include:

- TRIO Revision Database
- Report with comparison (out of TRIO) of risk result changes

Schedule (Phase 5)

Based on if this scope would be a monitoring program or an updated report in TRIO, the schedule varies.

REFERENCES

1. 10 CFR 50.69, Risk-informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors. Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C
2. Efficiency Bulletin: 17-09, “Industry Coordinated Licensing of 10 CF 50.69,” March 2017.
3. NEI 16-09, “Risk-Informed Engineering Programs (10 CFR 50.69) Implementation Guidance,” April 2017.
4. EPRI 1009748, “Guidance for Accident Function Assessment for RISC-3 Applications, Alternate Treatment to Environmental Qualification for RISC-3 Applications,” October 2005.
5. EPRI 1011783, “RISC-3 Seismic Assessment Guidelines,” December 2005.
6. ASME/ANS RA-Sa-2009, “Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications.”
7. Regulatory Guide 1.200, Revision 2, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities.”
8. ASME/ANS RA-Sa-2013, “Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications.”
9. ML17079A427, “US Nuclear Regulatory Commission Acceptance on Nuclear Energy Institute Appendix X Guidance to 05-04, 07-12 and 12-13, close-out of Facts and Observations (F&Os).”

EXAMPLE TIMELINE