Nuclear Energy Institute

GUIDELINES FOR PRIORITIZATION AND SCHEDULING IMPLEMENTATION

DRAFT

April 2014

Nuclear Energy Institute, 1201 F Street, NW, Suite 1100, Washington D.C. (202.739.8000)

ACKNOWLEDGMENTS

NOTICE

Nuclear Energy Institute, 1201 F Street, NW, Suite 1100, Washington D.C. (202.739.8000)

TABLE OF CONTENTS

Deleted: 9

Deleted: 10

Deleted: 12

Deleted: 13

Deleted: 15

Deleted: 17

Deleted: 26

Deleted: 32

Deleted: 33

Deleted: 33

Deleted: 33

Deleted: 35
Deleted: 36
Deleted: 36
Deleted: 38
Deleted: 38
Deleted: 38
Deleted: 39
Deleted: 40
Deleted: 41
Deleted: 41
Deleted: 43
Deleted: 45
Deleted: 46
Deleted: 46
Deleted: 47
Deleted: 47
Deleted: 47
Deleted: 49

FIGURES

TABLES

ABBREVIATIONS AND ACRONYMS

ACRS	Advisory Committee on Reactor Safeguards
ASME	American Society of Mechanical Engineers
ATWS	Anticipated Transient without Scram
CDF	Core Damage Frequency
EDG	Emergency Diesel Generators
EDMG	Extensive Damage Mitigation Guidelines
EOP	Emergency Operating Procedure
EP	Emergency Planning
FLEX	Diverse and Flexible Coping Strategy for Extended Loss of Power
GAET	Generic assessment expert team
HEP	Human Error Probability
I&C	Instrumentation and Control
IDP	Integrated Decision Panel
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination External Events
ISI	In Service Inspection
LERF	Large Early Release Frequency
LOCA	Loss of Coolant Accident
MSPI	Mitigating Systems Performance Index
NEI	Nuclear Energy Institute
NFPA-805	National Fire Protection Association (Standard) 805
NRC	Nuclear Regulatory Commission
NTTF	(NRC Fukushima Lessons Learned) Near Term Task Force
PORV	Power Operated Relief Valve
PRA	Probabilistic Risk Assessment
PSF	Performance Shaping Factor
RA	Recovery Action
RCP	Reactor Coolant Pump
ROP	Reactor Oversight Process
RP	Radiation Protection
SAMA	Severe Accident Mitigation Alternatives
SAMG	Severe Accident Mitigation Guidance
SC	Success Criteria
SDP	Significance Determination Process
SGTR	Steam Generator Tube Rupture
SME	Subject Matter Expert
SRO	Senior Reactor Operator
SSC	Systems, Structures and Components

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe industry's guidance for characterizing and prioritizing regulatory and plant-identified actions and scheduling plant improvements at licensee facilities consistent with safety significance. Generic and plant-specific prioritization and plant-specific scheduling are two elements of the proposed approach for improving the process for managing emerging regulatory issues and addressing industry and regulatory concerns on the cumulative impact of additional regulatory requirements. This guidance applies to power reactors only. Fuel cycle facilities and material licensees will monitor and adjust the process, as necessary, based on lessons learned from the power reactor activities and the unique circumstances applicable to non-power reactor licensees.

Safety impact/importance is the predominant factor in the assignment of scheduling priority. Following safety importance characterization (high, medium, low, very low, none), an overall characterization is performed that takes into account additional factors such as emergency planning, security, equipment reliability, and radiological protection to capture the safety significance of any issues in those areas that could not be captured under the safety impact. This overall characterization is factored into the plant's scheduling process that takes into account other factors.

The approach is risk-informed, in that generic and plant-specific risk information is an important input to the overall safety impact characterization process. Relevant sources of risk information can be considered, and both qualitative and quantitative approaches may be used. A set of qualitative screening questions is used to support the initial steps of the process. PRA models can be used to inform the process. The ability to factor in the quantitative risk information will rely on the quality of PRA models. The approach is consistent with existing functions such as the reactor oversight process and the 10 CFR 50.59 process. This safety importance characterization is intended only for the purposes of scheduling.

The overall scope of the prioritization process is expected to include:

- Regulatory issues. Note that an immediate action necessary for continued safe operation (e.g., to support NRC finding of adequate protection, or to restore compliance with a Technical Specification, or to resolve an environmental compliance issue with an adverse effect on public health and safety, or to remove a threat to personnel safety) should not use the prioritization process.

- Non-regulatory risk insights to determine what non-regulatory issues or nonsafety-related equipment have safety implications

Comment [M1]: Explain (give examples) how the process would prevent plant-identified actions or improvements with any safety significance would ever be scheduled after a security related item. It appears that security would always be delayed to the backstop.

Comment [S2]: Without this change, we will need concurrence from NMSS, FSME etc.

Deleted: focuses on

Comment [M3]: It's not clear how the safety/security interface of 10 CFR 73.58 is integrated into the process.

Comment [F4]: This should go under the licensee's regular planning activities as opposed to RPI. In line with the discussions at the public meeting, RPI should focus on regulatory activities and not on the overall plant maintenance process. Requesting NRC approval for deferral for purposes other than safety may include other considerations for a specific regulatory action that the NRC has the purview of approving. However, comparing a low safety significance activity that reflects "other" factors such as personnel availability or power-generating priorities would shift the burden to the NRC in approving activities not necessarily meeting the initial purpose statement of this guidance in terms of focusing on safety first.

Deleted: , such as availability of personnel and equipment

Comment [F5]: While a requirement may not be appropriate, the proper use of PRA remains an issue. This is a lukewarm statement that appears to place PRA as an optional tool when both the tabletops and internal NRC insights indicate using PRA would provide the best vehicle for addressing the intent of this effort as well as the Commission's communications on the subject. Without a clear and solid focus on enhancing the use of PRA, this guidance may not meet the full intent of the motivation behind RPI.

Comment [F6]: Sets an a priori expectation of quality. Final decision on appropriate implementation quality and technical content of the guidance will be an NRC decision.

Deleted: For the purposes of scheduling activities, this process provides an appropriate level of technical rigor.

Comment [M7]: In addition the questions provided in RG 5.74 should be referenced for screening of planned and emergent activities or changes.

Comment [S8]: Inspection findings should be out of scope. Enhancements to ROP to better risk-inform ROP should rely on the ROP Feedback process as opposed to RPI.

Comment [F9]: As stated in the public meeting, adding inspection findings significantly expands the scope of the impacted framework and involvement from internal and external stakeholders. Inspection findings are already process through a risk-informed process, and the use of PRA to establish significance could be impacted by their inclusion in additional guidance with unintended consequences. This should be deleted.

Deleted: and

Deleted: findings findings

Comment [F10]: This statement appears at the very end of the document. It needs to be stated upfront.

- Non-regulatory issues and activities, as identified by resource peaks in the business plan

Thus, each plant may have a slightly different scope of actions to be prioritized. For regulatory activities, the first step is a generic safety characterization performed by an industry expert team. This assessment is used to inform a plant-specific assessment of the activity, taking into account the nature of plant-specific risk contributors, such as seismic or flooding. The plant-specific assessment is performed by a multi-disciplinary plant integrated decision-making panel (IDP). Plants may also identify and characterize activities that have no direct regulatory nexus, but rather are identified by the plant to improve performance, reliability, or otherwise affect the design or operation of the facility.

1.2 Content of This Guidance Document

Section 2 presents high-level guidance for generic and plant-specific assessment and the prioritization process.

Section 3 presents guidance for generic and plant-specific characterization of safety importance.

Section 4 presents guidance for generic and plant-specific characterization of security, emergency preparedness, radiological protection, and reliability importance.

Section 5 presents guidance for aggregating the inputs from Sections 2 and 3 and reaching an overall priority of the activity. Guidance for adjusting schedules is also in this section.

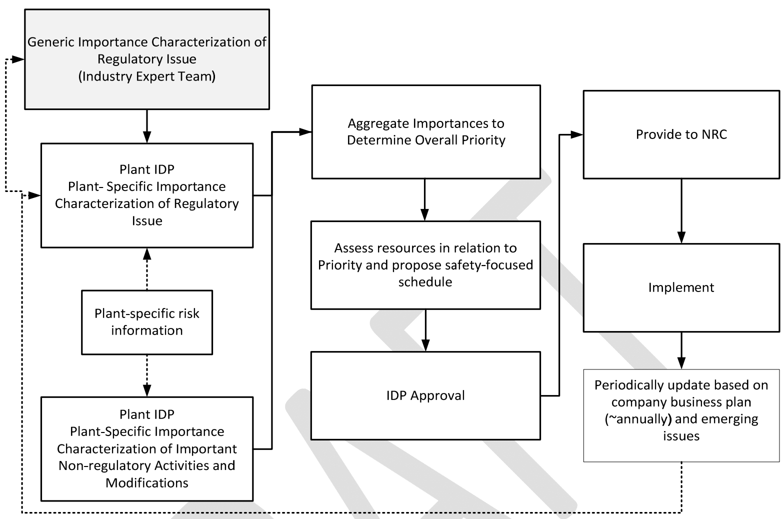
The appendix provides examples of the safety importance determination.

Figure 1-1 provides the overall process to be implemented by the plant.

Comment [F11]: Unclear whether this should be part of the scope. Once regulatory approval is requested for prioritization of activities under the authority of the NRC, it is unclear why non-safety items should be considered. If items without an increased safety benefit are being used to delay regulatory activities, this may be problematic for the NRC to approve.

Comment [F12]: Following above discussions, these items already fall under the purview of the licensee plant maintenance activities. Prioritizing the implementation of regulatory activities is intended to first and foremost focus on items of enhanced safety benefits. If the items covered under this statement fall within that category, then they are consistent with the intent of the guidance. If they are not, then it is unclear why it should be considered in a process that ultimately will result in a request for NRC approval.

Figure 1-1
Plant Process for Schedule Prioritization



The overall process addresses the following decision attributes:

- Safety – reactor and spent fuel pool safety; plant personnel safety (other than radiological exposure avoidance) is addressed here on an item-specific basis
- Security – including cyber security
- Emergency preparedness (EP)
- Radiological protection (RP) – including exposure avoidance for plant personnel
- Reliability as it pertains to improve plant safety.
- Aggregation to determine priority
- Scheduling

Comment [F13]: If a plant-specific non-regulatory activity with safety implications has generic applications, is there a provision for the GAET to be informed by the IDP? If a determination made by the GAET can be better informed by IDP considerations (e.g., IDP identifies additional aspects that could impact the overall priority characterization that GAET did not consider and could have an impact for other site IDP considerations) is there an early feedback look (currently, this feedback appears to occur at the end)?

Comment [F14]: Critical issue: the term "safety" is used in two ways in this document: public and worker safety, and issues pertaining to reactor and spent fuel pool safety. This could be perceived as separating attributes such as EP from safety importance. However, it is understood that the attribute needs to be identified in some manner. Suggest considering a different term (e.g., Reactor Core and Spent Fuel Pool Integrity).

Comment [F15]: May need a better definition. As currently written, the same statement can be applied to RP.

Comment [F16]: Needs a clear more full definition of scope. As a more general comment, document will need a glossary when finalized.

Comment [F17]: Needs a high level definition in line with safety.

Comment [F18]: See comment on Security, regarding definition.

Comment [S19]: Unless we are careful here, the output of this product may have components outside of the regulatory purview. Therefore, the process should focus on issues that have nexus to safety.

Comment [M20]: Reliability might also pertain to the function of Security or EP equipment.

Comment [F21]: One of the insights of the tabletops is that this item is being added for issues that may have little safety benefits but are of importance for power-generating aspects. Placing the burden of approval on the NRC for such considerations deviates from the focus of the initiative. For non-regulatory actions with enhanced safety benefits, the existing attributes already cover safety considerations. Hence, it is not clear that this attribute is needed, and it may be detrimental to the overall clarity of the guidelines.

Comment [AMZ22]: Reliability in the sense it has a nexus to safety. Otherwise, plant initiatives can used this process to prioritized their work but those issues should not trump or defer regulatory issues. In other words, the regulatory issues should be prioritized on their merit and the merit of other regulatory issues. Their scheduling should then be done according to their priority. Other issues can use the flexibility in the schedule to prioritize and schedule their plant initiatives using their existing planning and scheduling processes.

Comment [F23]: Needs further definition of what Aggregation is at a high level here.

2.0 GENERIC ASSESSMENT EXPERT TEAM (GAET), AND PLANT INTEGRATED DECISION-MAKING PANEL (IDP)

The importance characterization for each category involves a generic component (for regulatory issues), and a plant-specific component (for plant-specific implementation of regulatory issues as well as plant-initiated modifications that have safety, security, EP, and RP implications.

Deleted: , etc.).

The generic and plant-specific processes involve the same steps. The generic evaluation is carried out by an industry expert team, known as the Generic Assessment Expert Team (GAET). The GAET evaluation characterizes the importance of the regulatory issue or activity at a generic level and provides an overall assessment and important attributes for consideration in the plant-specific evaluation. The plant-specific process is carried out with the use of a plant integrated decision-making panel (IDP), which evaluates the generic characterization provided by the GAET and the plant-specific evaluation provided by a plant subject matter expert (SME), and reviews to arrive at plant-specific importance characterization. This importance is determined as one of the following:

- none (no impact)
- very low
- low
- medium
- high

Comment [F24]: Not clear why this category should exist for regulatory requirements while it may be applicable for non-regulatory issues. Consistent with risk-informed approaches, if there is a nexus to safety, it is possible that a very low determination may be made. However, a category that indicates "none" assumes a deterministic determination of no relationship to safety exists. Given the potential for misperception, suggest eliminating this or clarifying such a determination should not be made for regulatory activities if the NRC has issued a requirement that such activity be undertaken, especially if this term is intended to be applied for activities that will somehow not be pursued (as opposed to prioritized).

These are intended to be general, approximate characterizations of importance in each category for the purpose of scheduling and sequencing of activities in a safety focused manner. They are not intended for any other use such as cancelling projects. The overall intent is for a practical, efficient and timely process that can be widely implemented after piloting.

Comment [F25]: As stated above, none should not be a general category that could be applied subjectively without appropriate justification for regulatory activities or could be used for very low probability/high consequence events. It is unclear that such a category should exist in this case. Even for non-regulatory activities with safety nexus, there should be some definition/criteria as to what "none" can be applied to.

Comment [F26]: This is in line with above comment on the intent of "none".

The GAET provides generic importance characterization information and attributes to the industry. Using this information where applicable, in conjunction with plant-specific evaluation performed by a plant SME, the plant IDP is responsible for making the plant-specific determinations of issue importance. The IDP is separately used to approve the final schedule developed on the basis of the prioritization. The following guidance is provided relative to the makeup of these panels.

Comment [F27]: As part of the demonstration pilots, it would be expected that some clarity on format, content, and documentation on panel conducts would be gained such that additional practical guidance can be added here.

The GAET is comprised of industry subject-matter experts with relevant expertise to the issues being evaluated. The GAET will vary depending upon the issue. The GAET members are expected to have the essential understanding of the issue safety nexus for their assigned issue, and familiarity with the prioritization process guidance and approach. For example, GAET for Cyber Security should consist of an individual who has multi-year experience in working on Cyber Security related projects as a licensee personal or consultant as well. . Experience and qualifications which relate to their role in the GAET should be documented.

The plant SMEs are knowledgeable in a particular technical discipline or disciplines (e.g. NFPA 805 implementation or cyber security). They function as the lead presenter of the regulatory issue or activity to the IDP. Experiences and qualifications which relate to their role in the IDP should be documented and maintained. For most regulatory issues, it is reasonable to expect that a generic assessment that is well documented isand available prior to a plant-specific assessment. If a generic assessment is available, this assessment should bes used by the SME as a key input into the plant-specific assessment along with relevant plant-specific information so that the experience of industry experts can be utilized in plant specific assessments. The SME should provide his/her evaluation of Steps 1, 2 and 3A/3B and present the questions and proposed responses to the IDP. The SME should take responsibility to ensure that all relevant generic and plant-specific documents are available to the IDP. The SME should work with the overall coordinator of the prioritization process to ensure that the results of the IDP deliberation are documented and records are maintained.

The IDP is composed of knowledgeable plant personnel whose expertise represents the important process and functional elements of the plant organization, such as operations, engineering (e.g., design, systems, electrical, I&C including information technology, nuclear risk management), industry operating experience, licensing and maintenance.

The IDP can call upon additional plant personnel or external consultants, as necessary, to assist in the evaluation of issues. The precise makeup of the IDP is determined by the licensee. Experience, plant knowledge, and availability to attend the meetings, are important elements in the selection of IDP permanent members. The minimum requirement is the inclusion of experts designated as members of the IDP with joint expertise in the following fields:

- plant operations (SRO qualified)
- safety analysis

Comment [S28]: We need more specificity here, especially if we plan to rely on the GAET's output into CER. Example words are suggested.

Comment [F29]: See prior comments. This may be informed by the demonstration pilots, and should definitely be an item for further guidance for all the attributes. Additional guidance on the conduction of IDP discussions was an insight obtained from the tabletops and this should apply to GAET as well. Added comments below indicate additional information that needs more guidance.

Deleted: i

Comment [F30]: Since these documents may be required for NRC audit/inspection, additional guidance may be needed.

Comment [F31]: It's unclear how an IDP could be successfully conducted without the participation of all fields. Even if an issue may not pertain to PRA modeling directly, risk-insights can be leveraged in a number of ways which may be missed if a PRA expert is not included because an a priori determination by non-PRA practitioners is made that PRA may not be needed. The impact for issues where PRA (or any other attribute) may have limited insights should be of limited burden and therefore there is no reason to exclude such participation.

Deleted: In general,

Deleted:

Deleted:

Deleted: there should be

- design and systems engineering
- probabilistic risk assessment (PRA)
- licensing
- security, emergency planning or other subject matter experts as needed

Members may be experts in more than one field; however, excessive reliance on any one member's judgment should be avoided. The IDP should be aware of the benefits and limitations of the plant-specific PRA and other risk analyses, and, where necessary, should receive training on the plant-specific PRA, its assumptions, and appropriate implementation. This training is for IDP familiarity and the importance of making well-supported, technical assumptions whether quantitative or qualitative information is used.

The IDP should be familiar with the technical approach and guidance for prioritization. In order to have a full understanding of the issue being characterized, all questions in each applicable step of the guidance should be answered, even if an initial "yes" response has already determined the outcome of that step.

A consensus process should be used for decision-making for both GAET and IDP. Differing opinions should be documented and resolved, if possible. However, a simple majority of the panel is sufficient for final decisions regarding priority of activities. The IDP should, apply objective decision criteria and minimize subjectivity.

The IDP should be described in a plant administrative document that includes the designated chairman, panel members, and panel alternates; required training and expectations for the chairman, members, and alternates; requirements for a quorum, attendance records, agendas, and meeting minutes.

2.1 Documentation

GAET: The GAET evaluation results and summary, including basis and description of important considerations/characteristics for plant-specific assessment by the SMEs and IDPs, will be documented and provided to the industry and the NRC for information. Since the prioritization process addresses only scheduling of activities, 10 CFR 50 Appendix B does not apply. However, they should conform to a specific standard that is appropriate for its purposes. The specific information that should be provided by the GAET includes:

Deleted: limitations

Deleted: .

Comment [F32]: While the statement is valid, this is an effort where risk plays a central role. Hence, this comment could cause the impression that PRA information should not be taken seriously and should be avoided.

Deleted: (i.e., it is not intended to make the IDP PRA "experts").

Comment [F33]: This will be an item of high interest for the demonstration pilots as the tabletops indicated familiarity with the guidance and intent of questions to be critical.

Deleted: where possible,

Comment [F34]: As part of this process, the NRC will consider what mechanisms for review and/or inspection may be needed to assess appropriate characterization of regulatory issues.

- A description of the specific regulatory issue or proposed activity, including success criteria
- Related and publically available references such as
  - Regulatory documents including Regulatory Analyses; Orders; Commission Papers (SECYs and associated staff requirements memoranda (SRMs)); NUREG and NUREG/CR reports; relevant Commission and Advisory Commission on Reactor Safeguards (ACRS) meeting slides and transcripts; regulatory guides and interim staff guidance; and generic communications such as bulletins and information notices
  - Industry documents including NEI guidance documents and correspondence with the NRC; research reports (e.g., Electric Power Research Institute and Owners Groups); and conference papers
  - International Atomic Energy Agency and Nuclear Energy Agency reports
- Screening questions related to the determination of any impact (Step 1), assessment of more than minimal impact (Step 2), and qualitative/quantitative determination of safety importance level (Step 3A/3B) Technical bases for conclusions regarding nuclear safety importance; the generic security threat assessment (if appropriate); and EP and RP issue significance characterization if available. It is expected that the effectiveness determinations for security, EP, and RP will be very plant-specific. Reliability importance assessment is expected to be almost completely plant-specific.
- Considerations and characteristics that may affect the plant-specific importance determination, particularly for safety. For example, the GAET may determine that based on reactor fleet considerations, the existing level of risk of an external initiator is 10^{-4} to 10^{-5}/ year CDF on average (Medium). If information is available, the GAET would convey what attributes could make the plant-specific assessment higher or lower.

IDP: The prioritization process should be documented through plant procedures or other administrative controls. The decisions of the IDP, including a summary of the basis, should be documented and retained as plant records. In particular, the assessment of GAET identifying important issue considerations/characteristics and how they apply to the plant, and a basis for significant plant-specific departures from the general GAET ranking, should be noted. Since the prioritization process affects only scheduling of activities, 10 CFR 50 Appendix B does not apply. However, they will meet a lesser standards that the licensees use

Comment [M35]: How are Classified, SGI, and OUO documentation controlled, handled, stored, referenced? Such as Non-publicly available Reguides, SFAQs, Reports.

Deleted: Step 1, 2, and 3A/3B results and discussion

Deleted: ¶

Comment [M36]: What is the technical basis for the generic threat assessment? How and Who performs this assessment? How is a generic assessment used to provide a very plant-specific effectiveness determination for security. Licensees do not have the clearance to do this effectively particularly on an on-going basis.

Comment [M37]: Security Effectiveness? What does that look like? Who does it?

Formatted: Superscript

Deleted: 5

Formatted: Superscript

Deleted: 4

Deleted: / yr

Deleted: identified

Deleted: ied

internallyHowever, other plant programs or procedures governing expert panels should be used and leveraged.

Documentation on the prioritization of each issue should be maintained onsite to assist in periodic review/update and to accommodate any NRC audits. The level of documentation should be such that a sufficient basis is provided for a knowledgeable, independent review to reach the same conclusion. The basis for any engineering judgment and the logic used in the determination should be documented to a degree commensurate with the safety significance and complexity of the issue/activity. The items considered by the GAET/SME/IDP must be clearly stated.

For each issue licensees should maintain:

- a copy of the generic package, if applicable
- a copy of the plant-specific package the SME submits to the plant IDP
- a summary of the plant IDP discussion on the issue
- a revised copy of the package, if applicable
- the Priority assigned to the issue and any impact on schedule (e.g., none, accelerate, defer)

For each prioritization period, licensees should maintain:

- a list of issues prioritized during that period and their Priority 1 to 5
- the basis for decision analysis results to differentiate within priority levels, if applicable
- supporting documentation for adjusting licensing/regulatory schedules of issues as applicable

2.2 IMPORTANT ATTRIBUTES OF THE PROCESS

For each step in the process, there are important common elements that should be considered in the assessment, as follows:

1. Ensuring the issue and success criteria are well defined

   Although the goal of the overall process is to have clearly defined issues and success criteria prior to evaluation by GAET or IDP, the actual assessment may indicate that additional definition is appropriate. In addition, as the assessment

Deleted: knowledgeable

Deleted: individual could

Deleted: the information

Deleted: and come to

Comment [F38]: If it cannot be justified commensurate with the safety significance, then practicality should not be used as an alternate criteria.

Deleted: to the extent practicable and

Comment [F39]: These are critical attributes and should be more than just considerations.

Deleted: CONSIDERATIONS

Deleted: FOR

Comment [F40]: An important insight from the tabletops was that panel members need to ensure there is a common understanding on the issue and associated plant modification proposals. Open ended questions (e.g., is Cybersecurity as whole a safety significant program) and/or ill-defined plant modification options may not provide sufficient definition for efficient decision-making. This item should be questioned at the beginning of any discussion.

progresses to subsequent steps, the actual conduct of the assessment may identify additional considerations not identified in the initial definition(s). It is therefore critical that the specific issue and potential options for addressing it are appropriately defined and communicated.

2. Being realistic where appropriate so as to not bias the prioritization

   The level of realism and level of analyses will vary depending on the issue, but in order to avoid biasing, realistic analysis is the objective. A pairwise comparison, generic and plant-specific integrated expert panel, and matrices with wide ranges are included in the process to limit the potential impact of uncertainty. Note that if the risk impact is exceedingly small, or clearly large, a bounding evaluation can suffice.

3. Considering uncertainty

   Although the characterization and importance matrix in Table 3-1 does not require quantitative risk measures, the matrix is based on relative risk and is consistent with the Significance Determination Process (SDP) process of green, white, yellow and red. Thus, each of the entries on current risk differs by about a factor of ten. This should address most concerns on uncertainty for the context of the prioritization process. Therefore, both the GAET and IDP reviews need to be aware of specific issues, such as external events, for which uncertainty considerations may produce risk estimates with multiple orders of magnitude.

4. Considering the need for additional information

   There is the potential that for the assessment of some issues more timely or recent information than originally provided by the GAET will be needed, for example, external flooding at some sites. For such issues, existing NRC-industry practices, including public meetings and interactions between the industry and NRC subject-matter experts, may provide a source of additional information. The decision to pursue additional information should occur sufficiently early in this process such that performing this action does not become the driving factor in delaying a risk-informed prioritization decision and, ultimately, the timely implementation of a regulatory activity.

5. Evaluating the overall nature of the risk impact of a potential action

   Beneficial and adverse effects should be considered (e.g., replacing a small pump with a large pump could reduce the available margin of an emergency diesel generator (EDG); closing and depowering pressurizer power/pilot operated relief

Comment [M41]: Label the tables

Comment [M42]: A Security finding might be green, but potentially involve target sets. How does this lineup with the significance. SDP might not always be the best method for security. How are items that kick out of the SDP worked?

Comment [F43]: There should be a consideration for timeliness in addressing regulatory actions that may be impacted by this item. This should be identified early, such that requesting/producing additional information for prioritization characterization does not become a critical path by itself. Leveraging additional information/interactions to further refine prioritization assessments with NRC should not be pursued as alternative to making a decision with the available information.

Deleted: Using caution in identifying how, and how much,

Deleted: impacts risk

Comment [F44]: This seems to belong more to item 6 (FLEX is also used as an example). In fact, there are two important separate issues that appear to be comingled here. The suggested revision is intended to address this.

Deleted: The specific intended function of implementation, as well as other correlated or indirect effects, should be considered (e.g., FLEX provides mitigation for more than external hazards even though that is its fundamental intended purpose).

Deleted: ¶

Comment [M45]: This is another place where the Safety/Security interface is relevant valves (PORV) block valves to prevent spurious operation could reduce effectiveness of feed and bleed).

6. Identifying the overall extent of the impact of an individual issue when considering other issues

   The specific intended function of implementation, as well as other correlated or indirect effects, should be considered. In other words, one specific plant modification could impact the specific activity under consideration as well as multiple other separate plant modifications. As discussed above, this could include both positive as well as negative impacts that may not be immediately evident when considered individually. For example, implementation of FLEX impacts the potential benefits of future changes to the station blackout rule. Guidance on a pairwise comparison is included to support both a peer check on issue rankings as well as for support in identifying any commonalities.

   It is critical to consider and identify these issues throughout the process in order to support an aggregation that fully accounts for relevant insights in an integrated manner.

2.3 Types of Models and Evaluation Tools

The models and evaluation tools available or achievable are extensive, and the philosophy for the prioritization process is to use available sources of risk information, with understanding of their benefits and limitations. The appropriate model/tool will depend on the issue. For the prioritization process, formal methods to document PRA technical adequacy are not needed, since the process is used for scheduling purposes only and since effective backstops should be in place to prevent excessive delays in the dispositioning of regulatory issues. However, use of PRAs that meet the Quality Standards are beneficial in substantiating any request for exemptions from regulatedregulatory action due dates.. In this context, indicating the level of quality of the tool used for decision-making can provide additional confidence on the prioritization characterization of an issue. In addition, choosing a less formal, qualitative approach when more appropriate tools are available should be avoided.

Models/tools include:

1. qualitative checklist or flowchart

2. comparison to a previously ranked issue(s)—which is addressed by using a pairwise comparison

Deleted: ¶

Deleted: commonalities with

Moved (insertion) [1]

Deleted: The resolution of other issues could have a beneficial or adverse impact on the priority of an issue

Comment [F46]: At this stage, there isn't significant guidance in this document to support this statement. However, it is understood that this would be developed from additional insights from the demonstration pilots.

Deleted: A

Comment [M47]: Although, this provides for what should happen, it should provide a method or reference to another section of how this is done.

Moved up [1]: For example, implementation of FLEX impacts the potential benefits of future changes to the station blackout rule.

Deleted: ¶

Comment [F48]: If the PRA benefits are immediately identifiable, this should be also considered. In other words, qualitative insights should not always take precedence when considering the best available information for a risk-informed decision.

Deleted: to

Deleted: all

Deleted: formal methods to document PRA technical adequacy are not needed

Comment [S49]: Licensees who have high-quality PRAs should be encouraged to use them.

Deleted: ed

Comment [F50]: In tandem with the above comment, the guidance needs to make clear that, while PRA modeling is not a requirement or the ultimate goal, this guidance is not intended to encourage more subjective, qualitative discussions in lieu of using readily available, higher quality tools.

3. review of previous studies (e.g., severe accident mitigation alternatives (SAMA) and issue-specific cost-benefit evaluations)

4. direct use of an existing PRA model

5. adaptation of an existing PRA model

6. development of a focused scope assessment

7. direct, adaptive or new deterministic model, such as to characterize margin in system capability

2.4 Evaluation

The importance characterization starts with a specific issue (either current or future) and associated issue definition and success criteria. This is a precondition for starting the evaluation. In addition, available information is collected, including NRC and Industry information. Available cost-benefit analyses and SAMA-like analyses are also collected, as available.

In addition the effectiveness of existing or planned programs and processes to address the underlying issue (e.g., reactor oversight process (ROP), mitigating system performance index (MSPI) program, maintenance rule, fire-protection programs) should be considered. The industry and the NRC may have programs and processes that either could directly, or with changes, address the underlying issue and eliminate the desirability of developing new programs or conducting new analyses. To be effective, such programs and processes would be expected to provide the information and actions needed to address the underlying issue. Further an alternate, smarter action may be identified during the evaluation such that either the cost would be reduced and/or the risk further reduced compared to using the offered success criteria.

Comment [F51]: For the purposes of RPI, all issues should be considered current. While characteristics of this process may be used to address CER issues, the intent of RPI should not be to perform a second check of the appropriateness of new NRC decisions. Instead, the focus should be on the risk-informed prioritization such that safety enhancements are optimized through this process.

Comment [F52]: This appears to address future issues, which is under the purview of the NRC. While these considerations could be gathered and submitted for NRC review under the appropriate process, it is unclear how it would be used under the licensee's purview. In this respect, strict consideration of existing processes should not be used as input for prioritization purposes (e.g., an issue should not be deemed low or very low, because an existing process such as ROP may identify safety implications afterwards). Instead, a particular plant modification may be considered that has the added benefit of improving performance trending programs such as SDP/MSPI.

Comment [S53]: This section is not clear. In addition, it appears to indicate that RPI may be used to offer alternatives as opposed to rescheduling. We must fully understand the purpose of this paragraph and get it reworded. This section may be a good place to discuss further development of PRAs to support proposing alternatives or recommending exemption from a requirement.

There are two ways to use the process as follows:

- direct use by the GAET/IDP
- use by a separate team that would follow the process and develop an objective assessment that the GAET/IDP would then use to implement Figure 3-1 or 3-2

The characteristics of the issue will determine the most efficient way. Considerations include complexity of an issue(s) and the potential desire to have refined analyses in advance of the GAET/IDP deliberations.

The success criteria (SC) for a specific issue can range from a potential plant change (e.g., hardware, procedure change, training, staffing) to the conduct of an evaluation.

- For a potential plant change identified to address a regulatory requirement or non-regulatory plant initiated action, treat the assessment as if the plant change could impact safety/risk (i.e., an a priori bias on the overall characterization of the issue should be avoided). This could include a change aimed at reducing risk [e.g., FLEX] or a change aimed at preventing or minimizing a potential increase in risk due to a future increase in hazard level or frequency [e.g., cyber attacks].
- For the conduct of an evaluation, treat the assessment as if the evaluation could identify plant changes, which if implemented, could impact safety/risk. (In the cost evaluation, note that both evaluation costs and potential implementation costs will need to be estimated.).)

Note: Although the expectation is that an issue and associated definition entering this process is intended to reduce risk/improve safety/security/EP/RP/reliability, there is a potential for the SC to be adverse to risk/safety/security/EP/RP/reliability. The process addresses this possibility. If an adverse impact is identified, there are alternative paths:

- Continue using the process and address the adverse impact in the overall assessment of benefit and cost.
- Develop and implement a plan for interacting with the NRC (regardless of whether the SC was established by the NRC or the industry). A "plan" here means the approach to communicating with the NRC including, as appropriate, a recommended course of action.

Comment [M54]: Process?

Deleted: .

Deleted: (

Comment [M55]: Safety/Security interface: Changes to hardware, procedures, staffing can affect the fidelity/capability to respond to a physical attack.

Comment [F56]: It is not entirely clear what the guidance is addressing here (suggested edits are provided assuming the guidance intends to avoid bias in the initial steps of the process).

Deleted:].)

Deleted:)

Comment [M57]: When evaluating difference options for resolution of an issue, it's not clear how the options are considered. Are the options developed first and each option run through for evaluation or is the issue run through with the option that the GSET or IDP has determined would be the best option. This is particularly perplexing when there is no identified negative impact identified for several options. How is all this integrated into the best overall option? Please provide clarification.

Comment [F58]: It is not clear how this guidance will be interpreted in some cases. This could be applied to regulatory actions which may require some form of reassessment (e.g., Fukushima lessons-learned external events reevaluations). While, in some cases, it may be possible to bound the potential range of impacts based on previously developed information; some studies may be required because new information has come to light and/or the effect of new insights may need to be factored in (as in the Fukushima accident). In such cases, performing an a priori assessment on the importance of the evaluation itself could lead to an immature preemption of the insights that the actual analysis can provide. This should be factored in the guidance.

Comment [F59]: This was identified in Section 2.2 already.

Comment [F60]: Is this different than the rest of the guidance for going through the prioritization process? I.e., is this intended to be an early interaction prior to the full prioritization? This is not clear.

Comment [F61]: This should follow the usual processes for addressing issues. If one of the insights of a plant modification is the identification of an unanalyzed condition, nothing in this guidance should preempt NRC reporting requirements.

2.5 Insufficient confidence

This is a sequential screening process. Thus, at any step in the process, except Step 3B, the GAET or plant can continue to the next step if there is insufficient confidence in the assessment result for the previous step. Alternatively, the GAET/plant may develop a plan to gain the information needed to have sufficient confidence. The plan could include interaction with the NRC, conduct of analyses, etc. This applies on a plant-specific basis also. The plant IDP may advise the performance of additional analyses to improve confidence in the outcome of any step. Sufficient confidence exists when the GAET/IDP concludes that the safety importance and/or priority outcome would not change if additional information was obtained or developed.

Comment [M62]: Isn't this going to be the case for almost Security Related issue?

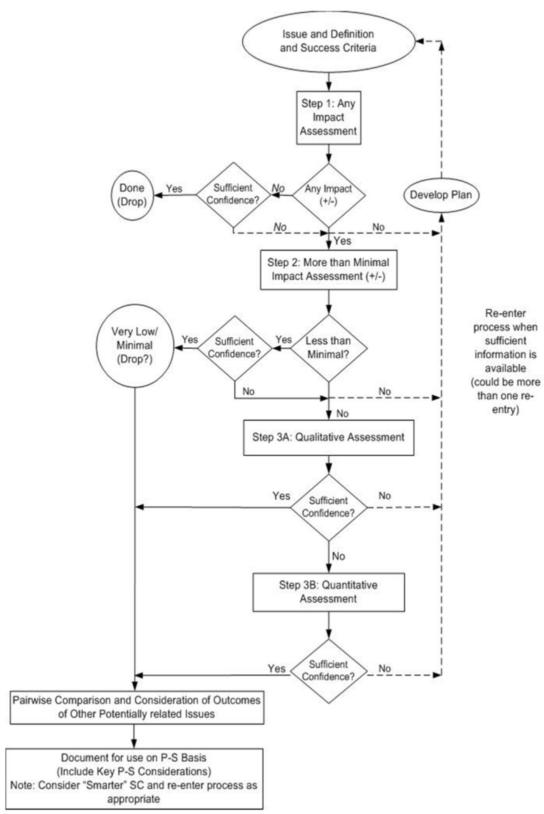
Comment [F63]: This should be balanced by timeliness issues as identified in prior comments.

3.0 SAFETY IMPORTANCE CHARACTERIZATION

Figures 3-1 and 3-2 provide the generic and plant-specific processes for safety importance characterization, respectively.

Figure 3-1

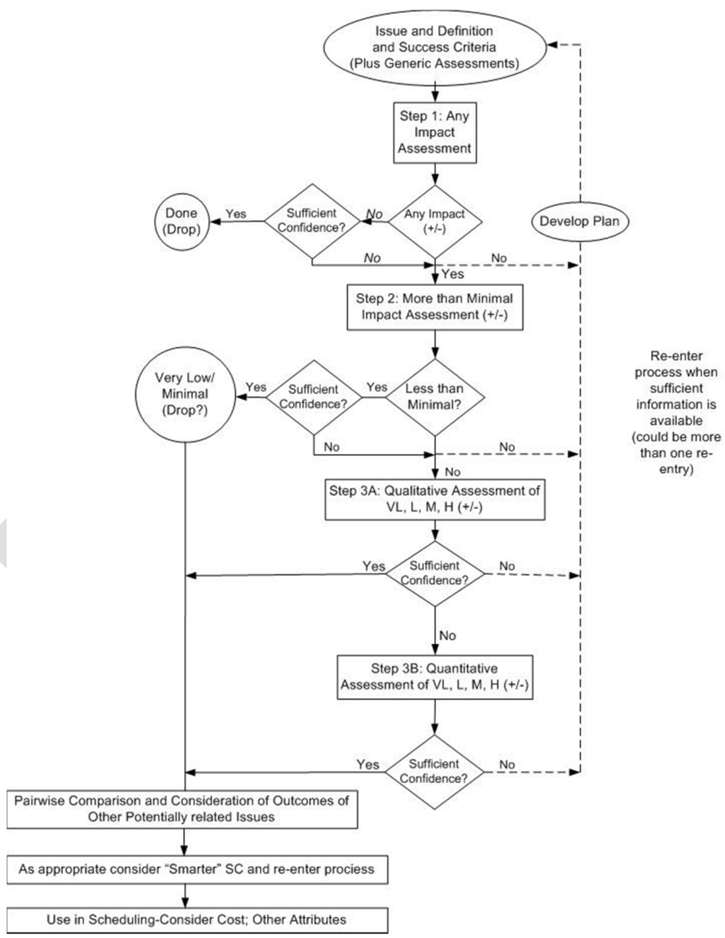
Progressive Screening and Evaluation
– Safety Importance (Generic) –



Comment [F64]: This figure includes an option to drop an issue (including a regulatory issue). As currently discussed, there isn't an envisioned mechanism by which an NRC requirement would be voluntarily dropped by an external industry panel. Even if information exists that support the assessment that there is absolutely no nexus to safety enhancement, this should be discussed with the NRC through appropriate processes.

Figure 3-2

Progressive Screening and Evaluation
– Safety Importance (Plant-Specific) –



Comment [F65]: As identified in the previous figure, the same comment on drop option applies here.

The process is a progressive screening and evaluation, and includes three basic steps: 1) a series of screening questions to address the "no safety impact" step; 2) a series of similar screening questions to address the "more than minimal" impact on safety step; and 3) evaluation using qualitative and quantitative risk estimates to assign high, medium, low, or very low importance to activities that do not screen in Steps 1 and 2. For evaluations the overall safety importance is determined based on a matrix, provided in Table 3-1.

Examples are provided in the Appendix to further illustrate the process steps.

Step 1 (Screening for any impact)

Step 1 involves screening the issue or activity for "any" impact versus "no" impact on safety. The evaluation should screen for both beneficial and adverse effects.

Thus, a change that decreases/increases the reliability of a function whose failure could initiate an accident would be considered to adversely/beneficially affect risk. Similarly, changes that would introduce a new type of accident or malfunction of structures, systems or components (SSC), or eliminate a type of accident, would screen in.

If a change has both beneficial and adverse effects, the change should be screened in.

The Step 1 screening process is not intended to be excessive or resource intensive and is not concerned with the magnitude of adverse/beneficial effects that are identified. Any change that adversely or beneficially affects risk is screened in. The magnitude of the effect (i.e., is the minimal increase standard met?) is considered in the more detailed evaluation in Step 2.

Screening determinations are made based on the engineering/technical information supporting the potential action. The screening focuses on functions, etc., and ensures the essential distinction between no impact, minimal impact and more than minimal impact addressed in Steps 2 and 3. Technical/engineering information, e.g., design evaluations, that demonstrates changes have no adverse/beneficial effect on functions, methods of performing or controlling functions, or evaluations that demonstrate that intended functions will be accomplished may be used as basis for screening out the potential change.

Comment [F66]: See prior comments on qualitative focus of the overall issue. While it is understood that not all issues are amenable to detailed, quantitative PRA modeling, this statement could be interpreted as dis-incentivizing the use of already existing, high quality PRA insights. Without modification, this sentence may not meet the original intent of Commission statements on the focus of the RPI efforts. Suggest deletion and or appropriate discussion of this issue.

Deleted: The safety importance characterization process is intended to use risk information, but primarily in a qualitative fashion.

The guidance and examples here are used to support this screening. The screening on no impact addresses the following set of questions:

Does the proposed activity or issue:

1. **☐ YES ☐ NO Result in an impact on the frequency of occurrence of a risk significant accident initiator?**
2. **☐ YES ☐ NO Result in an impact on the availability, reliability, or capability of SSCs or personnel relied upon to mitigate a risk significant transient, accident, or natural hazard?**
3. **☐ YES ☐ NO Result in an impact on the consequences of a risk significant accident sequence?**
4. **☐ YES ☐ NO Result in an impact on the capability of a fission product barrier?**
5. **☐ YES ☐ NO Result in an impact on defense-in-depth capability or impact in safety margin?**

If ALL the responses are NO, issue or activity screens to NO IMPACT and Nuclear Safety Importance is None.

If ANY response is YES, continue on to Step 2.

In addressing the above questions, there is similarity with the questions in 10 CFR 50.59 and the guidance in NEI 96-07 (Reference 1). Thus, for Question 3 above, consequence is intended to mean radiological dose from risk-significant accident sequences. The impact should be direct, such as an improved containment spray system could reduce radiological releases in a core damage accident. However, reducing the frequency of core damage is addressed elsewhere and is not the intent of this question. In lieu of dose, impact on containment performance (system performance, hydrogen control, isolation, ultimate pressure capacity, etc.) can be used as a surrogate.

Step 2 (Screening for more than minimal impact)

This step involves addressing the following set of questions, which are modified versions of the Step 1 questions:

Does the proposed activity or issue:

1. **☐ YES ☐ NO Result in more than a minimal decrease in frequency of occurrence of a risk significant accident initiator?**
2. **☐ YES ☐ NO Result in more than a minimal improvement in the availability, reliability, or capability of SSCs or personnel relied upon to mitigate a risk significant transient, accident, or natural hazard?**
3. **☐ YES ☐ NO Result in more than a minimal decrease in the consequences of a risk significant accident sequence?**
4. **☐ YES ☐ NO Result in more than a minimal improvement in the capability of a fission product barrier?**
5. **☐ YES ☐ NO Result in more than a minimal improvement in defense-in-depth capability or improvement in safety margin?**

If ALL the responses are NO, issue or activity screens to MINIMAL IMPACT and Nuclear Safety Importance is Very Low.

If ANY response is YES, continue on to Step 3.

Guidance on addressing the above questions is provided below. Note that any question answered “NO” in Step 1, will be answered “NO” in Step 2.

Question 1: Does the activity result in more than a minimal decrease in the frequency of a risk-significant accident initiator?

In answering this question, the first step is to identify the risk-significant accident initiators that have been evaluated that could be affected by the proposed activity. For regulatory-initiated actions, this should have been determined on a generic basis by the NRC. Then a determination should be made as to whether the frequency of these accident initiators occurring would be more than minimally decreased. Accident initiators can be divided into categories, whether for at power or low power shutdown conditions, for example:

Comment [M67]: How is the equivalent to a risk-significant accident initiator evaluated, particularly when caused by a deliberate actions of sabotage, particularly when the probability or frequency has to be assumed to be 1 and achieving high assurance that it can't occur be the equivalent to zero.

Accident Initiator Categories (Representative)	**Risk Significant?**	**More than Minimal Decrease or Adverse?**
Transients initiated by frontline systems		
Transients initiated by support systems		
Primary system integrity loss (e.g., SGTR, RCP seal LOCA, LOCA)		
Secondary system integrity loss		
Internal flooding		
Internal fires		
Earthquakes		
External flooding		
Tornados and High Winds		
Other External Hazards		
Spent Fuel Pool		

Risk significance: Risk Significance should be based on matrix benchmarks in Table 3-1, which are based on SDP risk significance. Using readily available information, accident initiators that are not risk-significant, i.e., minimal or less than minimal, generally are those:

Comment [S68]: In estimating risk significance for an issue, the definition of the issue become important. Also, can some issues be broken down to pieces in estimating risk significance? For example, if dealing with a regulatory issue entails implementing two plant changes, how would you assess the risk significance of the issue (the two changes)?

- contributing less than 1E-6/year and 1E-7/year for CDF and LERF, respectively (Based on SDP), OR

- contributing less than 1% of total CDF/LERF (consistent with RG 1.174), OR
- contributing to a less than 10% change in frequency (consistent with 50.59 guidance)

If the proposed activity would not meet one of the above criteria, the risk significance of an issue is considered to involve a more than a minimal assessment. If information is not readily available, the risk significance should be determined by comparison to other issues evaluated. While formal guidance on uncertainty treatment is not provided here, the impact on the determination of a less than minimal assessment should be considered.

External hazards: Practically, external hazard frequencies cannot be reduced or increased by a plant-initiated or NRC-initiated change. However, the frequency and/or severity might be changed for certain external hazards (such as external flooding) with changes beyond the nuclear power plant site. For example strengthening a dam could reduce the frequency/severity of an external flood that could affect the nuclear power plant site. Such changes can be considered in this process if under the control of the licensee. Otherwise changes related to external hazards will be considered in the second question.

Considerations for changes to accident initiator frequencies: The frequency of accident initiators can be changed in several ways, such as:

Considerations	**Potential Action Effect?**	**More than Minimal or Adverse?**
Changes in maintenance, training		
Changes in specific SSCs (e.g., installing a more reliable component)		
Changes in materials		
Equipment replacements to address age related degradation		
Changes in redundancy and diversity		
Addition of equipment		
Changes in operating practices		

Comment [F69]: To be consistent with 50.59 guidance in NEI 96-07, this should apply to more than minimal term only. The term "insignificant" is used in the foreword of NEI9-07 in a more general sense "Moreover, substantial resources were expended each year by licensees to process and submit to NRC lengthy evaluations for numerous insignificant changes."

Deleted: as this is insignificant

Deleted: and

Comment [F70]: Suggest adding a clearly defined statement as this section leaves this interpretation open.

The industry, the NRC and each plant have programs and practices for managing accident initiator frequency. Existing programs and practices will support determination of changes in frequency (10 CFR 50.59, NFPA 805, age management programs, piping integrity programs, etc.).

Reasonable engineering practices, engineering judgment and PRA techniques, as appropriate, should be used in determining whether the frequency of occurrence of a risk-significant accident initiator would more than minimally decrease as a result of implementing a proposed activity. A large body of knowledge has been developed in the area of accident frequency and risk-significant sequences through plant-specific and generic studies. This knowledge, where applicable, should be used in determining what constitutes more than a minimal decrease in the frequency of occurrence. The effect of a proposed activity on the frequency of a risk significant accident initiator must be discernible and attributable to the proposed activity in order to exceed the more than minimal decrease standard.

Examples: The following are examples where there is not more than a minimal decrease in the frequency of occurrence of a risk-significant accident initiator.

Example 1

The proposed activity has a negligible effect on the frequency of occurrence of a risk-significant accident initiator. A negligible effect on the frequency of occurrence exists when the change in frequency is so small or the uncertainties in determining whether a change in frequency has occurred are such that it cannot be reasonably concluded that the frequency has actually changed (i.e., there is no clear trend toward decreasing the frequency). An example could be a process change that cannot be demonstrated to have a positive impact, e.g., implementation of a new ASME code on ISI.

Example 2

The change in frequency of occurrence is not more than a minimal decrease if ANY of the following criteria are met:

- The change affects those accident initiators contributing in total less than 1E-6/yr and 1E-7 /yr for CDF and LERF, respectively, OR
- The change affects those accident initiators contributing in total less than 1% of total CDF/LERF (consistent with RG 1.174), OR
- The calculated change in frequency in total is less than 10%.

Comment [S71]: It is good to give an example of situations which can be used to determine that there is a more than minimal increase. See suggestion:

Example 3:

The change in frequency of occurrence is considered more tha minimal if ANY of the following criteria are met:

There is known direct correlation between the issue and the frequency, OR

The calculated change in frequency is more than 10%, OR

………………..

Formatted: No bullets or numbering

Question 2: Does the activity result in more than a minimal improvement in the availability, reliability or capability of SSCs or personnel relied upon to mitigate a risk-significant transient, accident or natural hazard?

In answering this question, the first step is to identify the risk significant SSCs and human actions that have been evaluated that could be affected by the proposed activity. To answer this question the following considerations should be applied:

- For regulatory-initiated actions, this may have been determined on a generic basis by the NRC.
- If guidance is not immediately available, a determination should be made as to whether availability, reliability, or capability of SSCs or personnel relied upon to mitigate a risk-significant transient, accident or natural hazard would be more than minimally decreased.

Similar to accident initiators the availability, reliability or capability of SSCs or personnel can be changed in several ways, as described in the table below:

Considerations	Potential Action Effect?	More than Minimal or Adverse?
Changes in maintenance, testing, training		
Changes in specific SSCs (e.g., installing a more reliable component)		
Changes in materials		
Equipment replacements to address age related degradation		
Changes in redundancy and diversity		
Addition of equipment		
Strengthening of equipment		
Moving equipment (to reduce the impacts of spatial events)		
Eliminating the need for recovery action (RA)		
Improving performance shaping factor related to human performance		
Changes in operating practices		

The industry, the NRC and each plant have programs and practices for managing availability, reliability, capacity and human performance (A/R/C/H). Existing

Comment [F72]: Not sure why this is included here. Is there a completeness issue with regards to how the question is phrased?

Deleted: This includes the reactivity control function, so anticipated transients without scram (ATWS) is addressed here, as ATWS is not an accident initiator, but instead an accident sequence.

Deleted: If not, guidance herein will develop this information.

Deleted: Then,

programs and practices will support determination of minor changes in A/R/C/H (10 CFR 50.59, NFPA 805, age management programs, piping integrity programs, etc.). Potentially major changes (such as changes in redundancy and diversity, additional equipment, strengthening equipment, moving equipment, eliminating RAs and improving performance shaping factors) will require more detailed evaluations.

Risk Significance: Risk significance should be based on matrix benchmarks in Table 3-1, which are based on SDP risk significance. SSCs/human actions that are not risk-significant, i.e., minimal or less than minimal, generally are those associated with potential sequences:

- contributing less than 1E-6/year and 1E-7/year for CDF and LERF, respectively, *unless* the issue being addressed could increase risk above these values, OR
- contributing less than 1% of total CDF/LERF (consistent with RG 1.174), *unless* the issue being addressed could increase risk above these values, OR
- contributing to a less than a 10% change in likelihood of failure (availability, reliability, capability, personnel performance); as such, a change is insignificant and is consistent with 50.59 guidance.

If the proposed activity would not meet one of the above criteria, the risk significance of SSCs/human actions are considered to involve a more than a minimal assessment. If information is not readily available, the risk significance should be determined by comparison to other issues evaluated.

The term "risk-significant" refers to the structures, systems and components (SSCs) performing risk-significant functions, including nonsafety-related and safety-related SSCs and human performance. NUMARC 93-01 (Reference 3) provides specific guidance on risk-significant criteria. In determining whether there is more than a minimal decrease, the first step is to determine what SSCs and human actions are affected by the proposed activity. Next, the effects of the proposed activity should be determined. This evaluation should include both direct and indirect effects.

Direct effects are those where the proposed activity affects the issue (e.g., a motor change on a pump or changing the mounting of an electrical cabinet). The activity changes the performance of the SSC by increasing its reliability or increasing its margin to failure under accident conditions. One can directly attribute the overall improvement in how the SSC performs by quantitative analysis, operating experience, or engineering judgment. Indirect effects are those where the proposed activity could affect other risk contributors. For example, installing FLEX equipment to address extended loss of AC power for external initiators could also reduce plant risk by having additional equipment available for internally initiated events such as loss of main feedwater transients.

After determining the effect of the proposed activity on the risk-significant SSCs and human actions, a determination is made of whether the likelihood of failure has decreased more than minimally. Qualitative engineering judgment and/or an industry precedent is typically used in 10 CFR 50.59 evaluations and can be used here to determine if there is more than a minimal decrease in the failure probability.

An appropriate calculation can be used to demonstrate the change in likelihood in a quantitative sense, if available and practical. The effect of a proposed activity on the failure probability must be *discernible and attributable* to the proposed activity in order to exceed the more than minimal decrease standard.

Engineering insights as well as statistical insights can be used to determine whether a proposed activity influences the likelihood of failure. For example, if research, experiments, operating experience, or simple rules of physics show a direct correlation between the proposed activity and the likelihood of failure (e.g., impact ~~of strengthening~~ the anchorage of a pump on seismic fragility of a pump), then it may be concluded that the proposed activity has significant effect on the likelihood of failure. In the absence of such known correlations, a proposed activity is considered to have a negligible effect on the likelihood of failure when a change in likelihood is so small or the uncertainties in determining whether a change in likelihood has occurred are such that it cannot be reasonably concluded that the likelihood has actually changed (i.e., there is no clear trend toward decreasing the likelihood). A proposed activity that has a negligible effect satisfies the minimal increase standard.

Potential SSC changes, such as increased structural capacity, to address earthquakes, tornadoes and other natural phenomena should also be treated as potentially affecting the likelihood of failure.

Examples: Examples in the Appendix illustrate cases where there would/would not be more than a minimal decrease. [**Note:** The conclusions reached here are not intended to be final as these examples are intended to illustrate the process.]

Comment [S73]: Document should provide clear guidance to screen in as well as to screen out.. Note example shown).

Deleted: of strengthening

Deleted: A

Question 3: Does the activity result in more than a minimal decrease in the consequences of a risk-significant accident sequence?

In answering this question, the first step is to identify the risk significant sequences that have been evaluated that could be affected by the proposed activity.

- For regulatory-initiated actions, this may be determined on a generic basis by the NRC. If not, this information will need to be developed.
- Then, a determination should be made as to whether the consequences would be more than minimally decreased.

Risk significance: Risk significance should be based on matrix benchmarks in Table 3-1, which are based on SDP risk significance. If available using readily available information, accident sequences that are not risk-significant, i.e., minimal or less than minimal, generally are those:

- contributing less than 1E-6/year and 1E-7/year for CDF and LERF, respectively, OR
- contributing less than 1% of total CDF/LERF (consistent with RG 1.174), OR
- contributing to a less than 10% change in consequences.

If the proposed activity would not meet one of the above criteria, the risk significance of accident sequences are considered to involve a more than a minimal assessment. For example, a generic regulatory activity is proposed that would address seismic issues. The site characteristics as well as plant-specific PRA are such that the plant is not susceptible to major seismic concerns. The flooding hazard is very low and the plant design sufficiently robust such that the estimated CDF from seismic contribution is well below 1E-6/year and likewise LERF is below 1E-7/year. Therefore, any further decrease in seismic risk would be just a fraction of the existing risk level and would be less than minimal. It is further expected that all U.S. plants have total CDF (including unquantified external hazards) of 1E-4/year or less. If an activity addresses the risks or sequences amounting to only 1% of the total CDF/LERF, then the risk that might be mitigated is less than the 1E-6/year CDF and 1E-7/yr LERF criterion above. For plants with total CDF in the 1E-5/year to 1E-4/year, the incremental benefits of any modifications to address the issue are further diminished. Finally, in addressing the definition of what constitutes a less than minimal decrease in consequences, a 10% decrease in dose for risk-significant sequences is used as the criterion. This threshold has a basis generally consistent with the 10 CFR 50.59 guidance in NEI 96-07 (Reference 1). It

Deleted: external flooding

Deleted: flooding

Deleted: external flooding

Comment [F74]: Suggest using an example that is more amenable to CDF/LERF determination given the level of implementation of seismic PRAs. External flooding hazard has not yet been developed sufficiently to address state of knowledge and other issues in the same way that seismic has with PSHA and SSHAC. This could be licensees the impression that external flooding is immediately amenable to implementation in RPI without the insights on the current challenges to doing so.

Deleted: external flooding

is widely acknowledged that there are very large and increasing uncertainties going from the Level 1 portion of a PRA study (core damage frequency estimation) to the Level 2 (containment performance) to the Level 3 (offsite dose consequences). A 10% increase in calculated consequence, given the large uncertainties in severe accident dose analysis, is such that it could not be reasonably concluded that the consequences have actually changed. Small changes in inputs and assumptions could easily have more of an effect than a calculated change of 10% change in offsite dose from a severe accident sequence.

Comment [F75]: This should be re-phrased, large uncertainties should not be used as a justification for risk significant determination.

Comment [F76]: In that case, it would appear that a discussion of the inputs and assumptions may be needed to justify the 10% threshold. I.e., does the issue impact those inputs and assumptions?

If information is not readily available, the risk significance should be determined by comparison to other issues evaluated.

In determining if there is more than a minimal decrease in consequences, the first step is to determine which accidents may have their radiological consequences affected as a direct result of the proposed activity. Examples of questions that assist in this determination are:

(1) Will the proposed activity change, i.e., improve, the effectiveness of an action?

(2) Will the proposed activity play a direct role in mitigating the radiological consequences?

In lieu of dose the following should be considered:

- containment bypass
- containment isolation and capacity
- hydrogen
- long-term containment integrity

Question 4: Does the activity result in more than a minimal improvement in the capability of a fission product barrier?

Comment [F77]: As identified in the tabletops, there is the potential for significant overlap between Question 3 and 4. Maybe this should be addressed here.

This evaluation focuses on the fission product barriers—fuel cladding, reactor coolant system boundary and containment. Note that the prior question also indirectly addresses containment. Guidance on barrier definitions and impacts on barriers can be found in 10 CFR 50.59 guidance provided in NEI 96-07 (Reference 1). As discussed in NEI 96-07, each barrier has associated with it specific design basis parameters such as fuel cladding temperature, reactor coolant system cool-down rate, and containment pressure. It is expected to be rare that a proposed activity or regulatory issue will result in an impact on the design basis parameters that can be directly calculated. Rather, judgment is required here in ascertaining whether the improvement is more than minimal. For example, an improved fuel design that significantly reduces the potential for pellet-clad interaction probably meets the threshold for more than minimal. A routine change in fuel management strategy that meets all acceptance criteria does not. An improved reactor coolant pump (RCP) seal design that measurably reduces the likelihood of catastrophic seal failure as well as the leakage rates given loss of seal cooling events is likely to be more than minimal. The addition of an AC-power independent containment spray system to mitigate core damage sequences involving station-blackout also is likely to meet the more than minimal improvement threshold. Changing the median failure pressure of containment from 120 psig by 2 psig will not impact the PRA results and is not more than minimal.

Question 5: Does the Activity Result in more than a minimal improvement in the defense in depth capability or safety margin?

Regulatory Guide 1.174 (Reference 2) provides guidance.

Comment [F78]: Since significant text was added from NEI 96-07 on the above questions, this question should also be fleshed out with relevant text from RG1.174.

Step 3A (determining high, medium, low, or very low safety importance using qualitative approach)

Step 3A uses Table 3-1, combined with the guidance for Step 2, to place a potential action into a safety importance category as follows. The ranges in the first column are based on the SDP ranges for CDF and LERF.

Deleted:

The table is used as follows:

- First determine the existing risk level (CDF or LERF) associated with the issue using available information. This may be quantitative or based on a comparison to a previously evaluated issue. This establishes the relative risk significance. Note that LERF thresholds are one order of magnitude lower than those of CDF.
- Then determine how much the proposed activity would reduce the relative risk. This establishes the importance of the proposed activity.

Note: Grey is used to denote those issues with high relative risk importance for which the proposed activity/action is ineffective. Consideration should be given to identifying an effective activity/action.

The outcomes of Step 3A are:

- high, medium, low, very low importance, OR
- continue to Step 3B, OR
- develop a plan

Note: Step 3B can be used in lieu of Step 3A if appropriate quantitative information is readily available or can be developed.

Comment [F79]: In such case, the flowchart should be modified to reflect the following decision point: what is the best available information to make a decision for a specific issue. If a quantitative approach is readily available or can be reasonably developed, the process should move on to step 3b rather than linger on step 3a and spend additional resources that could be better utilized by using PRA insights for example.

Table 3-1 Matrix by Current Risk and Potential Impact

UB is upper bound of the risk range; Mid is "mid-range" (0.3 times UB); LB is factor of 10 lower than UB[1]

Current Risk associated with Issue	Potential Impact of Action Resolving Issue (Reduction in Risk)				
	None	Very Small/Minimal	Small	Medium	High
	0%	0 to 25%	25 to 50%	50% to 90%	>90%
	Importance				
Green (VL) LB	<Very Low	<Very Low	<Very Low	<Very Low	<Very Low
Green (VL) Mid	Very Low	Very Low	Very Low	Very Low	Very Low
Green (VL) UB	Very Low	Very Low	Very Low	Very Low	Very Low
White (L) LB	Very Low	Very Low	Very Low	Very Low	Very Low
White (L) Mid	Very Low	Very Low	Low	Low	Low
White (L) UB	Very Low	Low	Low	Low	Low
Yellow (M) LB	Very Low	Low	Low	Low	Low
Yellow (M) Mid	Very Low	Low	Medium	Medium	Medium
Yellow (M) UB	Very Low	Medium	Medium	Medium	Medium
Red (H) LB		Medium	Medium	Medium	Medium
Red (H) Mid		High	High	High	High
Red (H) UB		High	High	High	High

[1] The thresholds in the left column are consistent with the SDP and are (in units of per yr), for CDF: Green/White = 10^{-6}, White/Yellow = 10^{-5}, Yellow/Red = 10^{-4}; and for LERF: Green/White = 10^{-7}, White/Yellow = 10^{-6}, Yellow/Red = 10^{-5}.

First, establish the current relative risk significance of the issue so as to establish the appropriate row in Table 3-1.

Second, using below guidance and Table 3-1 establish significance for each of the following:

1. Estimate the relative decrease in frequency of occurrence of a risk-significant accident initiator.
2. Estimate the relative improvement in the availability, reliability, or capability of SSCs or personnel relied upon to mitigate a risk-significant transient, accident, or natural hazard.
3. Estimate the relative decrease in the consequences of a risk-significant accident sequence.
4. Estimate the relative improvement in the capability of a fission product barrier.
5. Estimate the relative improvement in defense-in-depth capability or safety margin.

Below is guidance for addressing the above questions.

Risk-significant accident initiator frequency

The first step is to identify the risk-significant accident initiators that have been evaluated that could be affected by the proposed activity. For regulatory initiated actions, this may have been determined on a generic basis by NRC. This would also be addressed by the GAET evaluation. Then, a determination should be made as to how much the frequency of these accident initiators occurring would change.

Accidents initiators can be divided into categories, for example:

Accident Initiator Categories (Representative)	Risk Significance (VL, L, M, H)	Potential Improvement (VL, L, M, H) or Adverse
Transients initiated by frontline systems		
Transients initiated by support systems		
Primary system integrity loss		
Secondary system integrity loss		

Accident Initiator Categories (Representative)	Risk Significance (VL, L, M, H)	Potential Improvement (VL, L, M, H) or Adverse
Internal flooding		
Internal fires		
Earthquakes		
External flooding		
Tornados and High Winds		
Other External Hazards		
Spent Fuel Pool		
Low Power and Shutdown		

Comment [F80]: Should be added. Discussed in an example in NUMARC 93-01guidance that could be useful in this guidance as well (underlined added):

An SSC could be risk significant for one failure mode and non risk significant for others. An example of an SSC that is risk significant for one failure mode and non-risk significant for another is as follows: Blowdown valves on steam generators perform a safety function to close on isolation. However, the open position function is to maintain water chemistry which is a nonsafety function. Additionally, many SSCs that are functionally important in modes other than power operation, such as shutdown, may be identified by some normally employed analysis methods (e.g., Engineering Analysis, IPE/PRA, etc.). These should be determined by an assessment of their functional importance in other modes and a review of events and failures that have occurred during these modes.

Risk significance: Risk significance should be based on matrix benchmarks in Table 3-1, which are based on SDP risk significance. Thus, if available using readily available information, accident initiators that are not risk-significant, i.e., minimal or less than minimal, are those:

- contributing less than 1E-6/year and 1E-7/year for CDF and LERF, respectively, OR
- contributing less than 1% of total CDF/LERF (consistent with RG 1.174) ,OR
- contributing to less than 10% change in frequency.

If the proposed activity would not meet one of the above criteria, the risk significance is considered to involve a more than a minimal assessment. If information is not readily available, the risk significance should be determined by comparison to other issues evaluated.

External hazards: Practically, external hazard frequencies cannot be reduced or increased by a plant-initiated or NRC-initiated change. However, the frequency and/or severity might be changed for certain external hazards (such as external flooding) with changes beyond the nuclear power plant site. For example strengthening a dam could reduce the frequency/severity of an external flood that could affect the nuclear power plant site. Such changes can be considered in this process if owned by the licensee. Otherwise changes related to external hazards will be considered in the second question.

Considerations for changes to accident initiator frequencies: The frequency of accident initiators can be changed in several ways, such as:

Considerations	Potential Action Effect?	Potential Improvement (VL, L, M, H) or Adverse?
Changes in maintenance		
Changes in specific SSCs (e.g., installing a more reliable component)		
Changes in materials		
Equipment replacements to address age related degradation		
Changes in redundancy and diversity		
Addition of equipment		
Changes in operating practices		

The industry, the NRC and each plant have programs and practices for managing accident initiator frequency. Existing programs and practices will support determination of changes in frequency (10 CFR 50.59, NFPA 805, age management programs, piping integrity programs, etc.).

Reasonable engineering practices, engineering judgment and PRA techniques, as appropriate, should be used in determining whether the frequency of occurrence of a risk-significant accident initiator would decrease, and by how much, as a result of implementing a proposed activity. A large body of knowledge has been developed in the area of accident frequency and risk-significant sequences through plant-specific and generic studies. This knowledge, where applicable, should be used in determining any decrease in the frequency of occurrence. The effect of a proposed activity on the frequency of a risk significant accident initiator must be *discernible* and *attributable* to the proposed activity in order to exceed the more than minimal decrease standard.

SSCs or Personnel

Similar to accident initiators the availability, reliability, or capability of SSCs or personnel can be changed in several ways, such as:

Considerations	Potential Action Effect?	Potential Improvement (VL, L, M, H) or Adverse?
Changes in maintenance		
Changes in specific SSCs (e.g., installing a more reliable component)		
Changes in materials		
Equipment replacements to address age related degradation		
Changes in redundancy and diversity		
Addition of equipment		
Strengthening of equipment		
Moving equipment (to reduce the impacts of spatial events)		
Eliminating the need for recovery action (RA)		
Improving performance shaping factor related to human performance		
Changes in operating practices		

Consequences: The relative change/impact for the following should be estimated as relevant to the proposed action using guidance in Step 2.

Fission product barriers: Estimate relative change/impact using guidance in Step 2.

Defense-in-depth and safety margin: Estimate relative change/impact using guidance in Step 2.

Step 3B (determining high, medium, low, or very low safety importance using quantitative analyses)

In Step 3B, existing information and new information/analyses (e.g. focused scope analyses as needed), is used to estimate the current risk level associated with the issue and the impact of the proposed actions on reducing risk. Based on the outcome of the assessment a ranking is determined. The types of models possibly available were noted earlier in this document.

4.0 IMPORTANCE CHARACTERIZATION OF OTHER CATEGORIES

Following safety importance characterization (high, medium, low, very low, none), an overall characterization is performed that takes into account additional factors such as emergency planning, security, and radiological protection. The primary objective of this characterization is to capture the significance of the issue that was not already captured under the factors that have already been considered under safety.

4.1 SECURITY

Security importance characterization includes two basic steps: 1) a flowchart series of screening questions to address the "no impact" step; and 2) use of qualitative or quantitative effectiveness estimates to assign high, medium, low, or very low importance to activities that do not screen out in Step 1. For Step 1, the flowcharts in Figures 4.1-1 and 4.1-2 are used. For Step 2, the overall security importance is concluded based on a matrix, provided in Table 4-1.

Step 1 (Screening for any impact)

Complete the flowchart in Figure 4.1-1 and, if appropriate, Figure 4.1-2 to determine the current threat associated with the issue. Note that "risk significant (safety) function" is used in the context of the Maintenance Rule, i.e., as defined in guidance documents such as NUMARC 93-01 (Reference 3).

The IDP should first assess the issue assuming there is no target set impact. Then, a Safeguards qualified IDP should determine if there is an adverse impact on a target set function (noted on Figures 4.1-1 and 4.1-2 with a dashed line). If there is, determine whether it would result in fuel damage and the level of confidence in that determination. If no fuel damage, then determinations from the initial IDP assessment are confirmed. If the current threat associated with the issue is anything other than "None," continue to Step 2.

Comment [F81]: A higher level issue that needs to be addressed: in the IDP discussions at the tabletop, relationship of individual issues with multiple attributes were discussed regardless how an individual issue was characterized/binned. For example, RCP seal LOCA examples were considered for EP, RP, Security as well as for "Safety". This section focuses more at binning the issues upfront. How can the guidance ensure the integrated look is performed regardless of the binning?

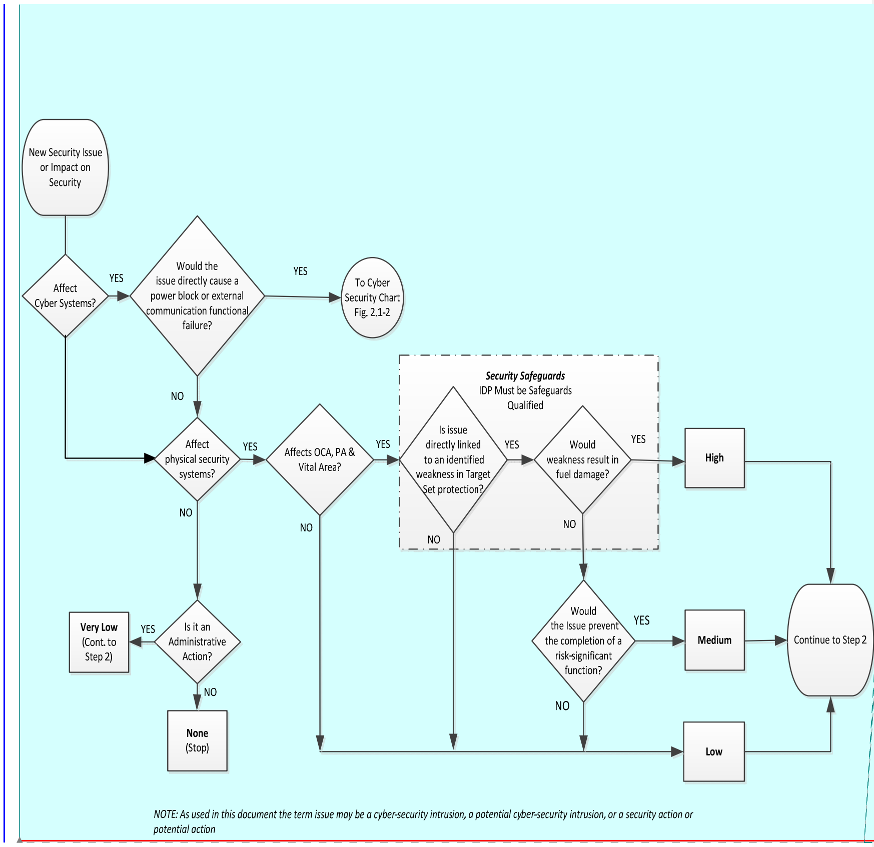
Comment [S82]: How do you prevent double counting of the safety aspects og thses issues? Does the proposed statement make sense?

Comment [M83]: Exposure to design basis threat. Current threat could be interpreted as site specific imminent threat, which would be only applicable immediately prior to an attack. Potential impact of not addressing the issue under a threat environment will likely result in a better assessment. Ask the question if exploited, what's the potential results.

Comment [M84]: Not just CDF but fuel pool impact. There is no deterministic cause and effect to evaluate the delay of security issues. PRA doesn't provide a probability, so risk needs to be based on the potential result of the issue.

Figure 4.1-1

Security Issue Importance Determination – Step 1



Comment [M85]: Where is the "sufficient confidence" which seem even more applicable to security, blocks that are incorporated into the safety flowcharts.

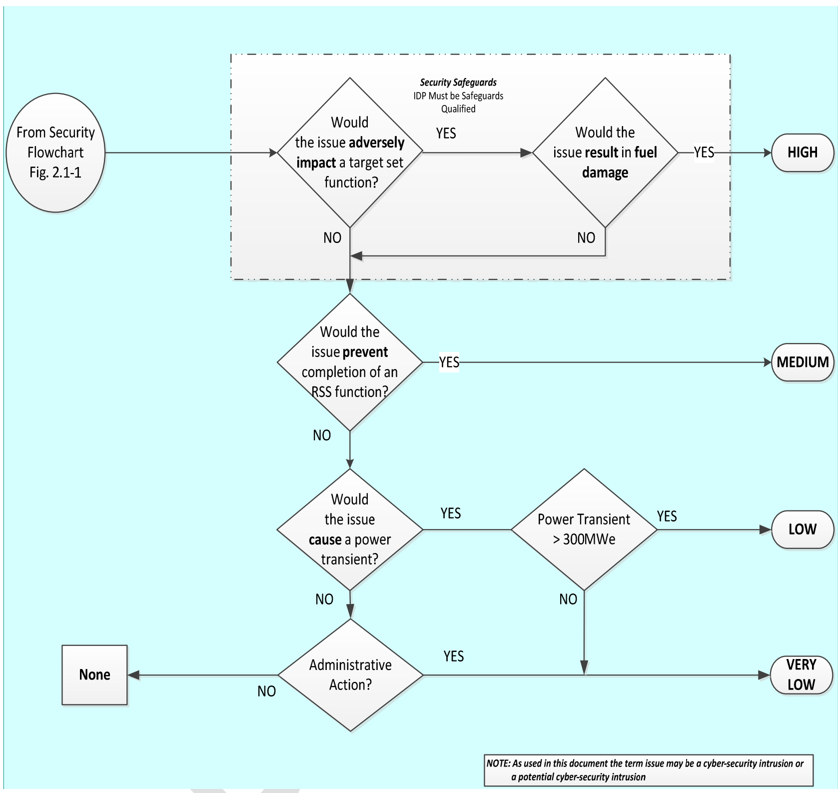
Comment [M86]: It appears that detection and assessment issues would always screen out low.

Comment [M87]: Is there a more detailed flowchart inside the dashed line box?

Field Code Changed

Figure 4.1-2

Cyber Security Importance Determination – Step 1



Comment [M88]: It appears that a Cyber issue with the potential to make the external or internal communication system not function properly goes to none. That wouldn't be appropriate.

Step 2 (Determine issue's security importance)

See Section 4.4.

- It is not clear in the document that measures required for adequate protection are not to undergo the process described in the document.
- The construct for security is based on the construct developed for safety, which utilizes a PRA approach. However, the risk associated with security is a conditional risk (e.g., the probability of an attack is equal to one), as the likelihood of an initiating event is unknown and not random. Consideration should be given to use a different approach for assessing risk for security measures.

  - It is difficult to say if a security measure will impact a target. Could is probably a better word than would.
  - When conditional risk is assessed at a facility for security, the typical PRA approach is not used. In general, path analysis is used, which looks at several layers: detection, assessment, response/interdiction. The timelines help to establish security margins. Early detection and delay features tend to improve the conditional risk.
- When measures are considered to establish a ranking of priorities, safety measures can be prioritized at a level 1. However, security measures can be scored no higher than a level 2. It is not clear that the restriction is appropriate.
- The document should include a discussion of evaluating all measures under consideration for their impacts on safety, security, emergency response, and radiological protection. Addressing these impacts is critical to the overall protection of the public health and safety.
- A statement should be provided that this methodology only applies to new requirements and industry initiatives, and not to existing requirements that are already implemented at the facility.
- It would be helpful to see the methodology applied to security measures. This would allow the methodology to be assessed based on how it is applied, rather than in an abstract form. In addition, the approach should be demonstrated in an exercise that shows how security/safety/emergency response/radiological protection can be assessed in combination to achieve a overall risk-informed prioritization.

Comment [AMZ89]: Comments from Security.

4.2 Emergency Preparedness

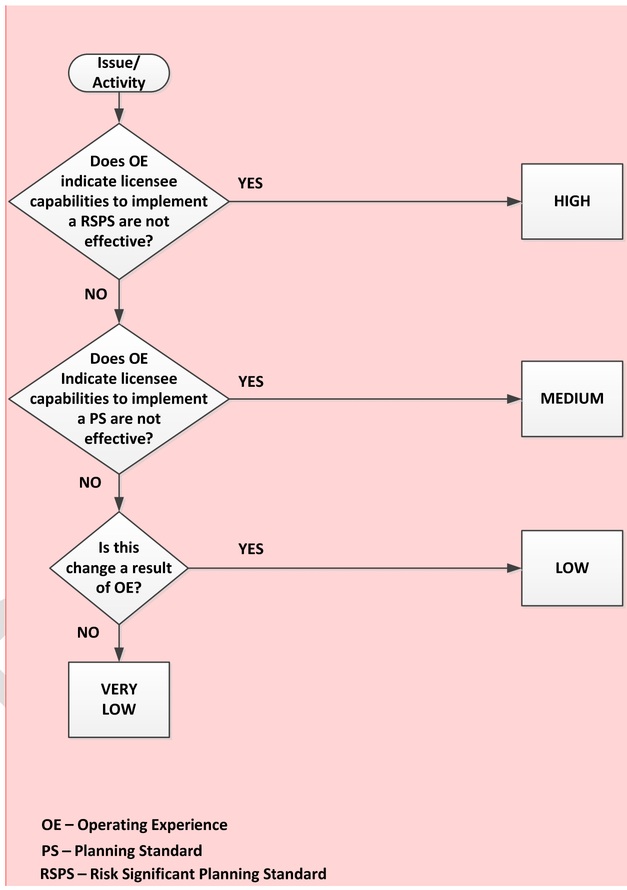
Emergency preparedness (EP) importance characterization includes two basic steps: 1) a flowchart series of screening questions to address the "no impact" step; and 2) use of qualitative or quantitative effectiveness estimates to assign high, medium, low, or very low importance to activities that do not screen out in Step 1. For Step 1, the flowchart in Figure 4.2-1 is used. For Step 2, the overall EP importance is concluded based on a matrix, provided in Table 4-1.

Step 1 (Screening for any impact)

If the issue has no nexus to EP, the EP importance is None. If the issue has any nexus to EP, complete the flowchart in Figure 4.2-1 to determine the current importance associated with the issue. If the current importance associated with the issue is anything other than "None," continue to Step 2.

Figure 4.2-1

EP Issue Importance Determination – Step 1



Operating experience, as used in Figure 4.2-1 includes new information, insights and lessons learned from drills, exercises or actual events at U.S. or foreign nuclear facilities. The decision to include new information or lessons from foreign facilities or sources should be made through a determination of whether the non-US

Comment [AMZ90]: New EP Flow charts were developed. This is no longer up to date.

Comment [F91]: Operating experience is being used in a wider context that traditionally utilized. This is confusing. Suggest defining a different term that encompasses the true intent: insights from either OE (actual use of the term) or new information.

programs are compatible with US EP programs and practices and the information is applicable.

Step 2 (Determine issue's EP importance)

See Section 4.4.

4.3 Radiation Protection

RP importance characterization includes two basic steps: 1) a flowchart series of screening questions to address the "no impact" step; and 2) use of qualitative effectiveness estimates to assign high, medium, low, or very low importance to activities that do not screen out in step 1. For step 1, the flowchart in Figure 4.3-1 is used. For step 2, the overall RP importance is concluded based on a matrix, provided in Table 4-1.

Step 1 (Screening for any impact)

Complete the flowchart in Figure 4.3-1 to determine the current significance (benefit) associated with the issue. If the current significance (benefit) associated with the issue is anything other than "None" or "Reassess," continue to step 2.

Note that the decision diamonds entitled "Cost Benefit Achieved" represent the actions taken to assess the projected benefit (e.g., dose savings) achieved by the proposed issue vs. the projected level of effort required, including monetary impact. Site specific monetary values should be used during this assessment.

The first decision diamond addresses the issue of "Public Dose," and could include actions such as:

- System modifications improving effluent treatments
- Improved radiation effluent monitoring capabilities (e.g., detector efficiencies)
- Improved sampling techniques (e.g., C-14 sampling vs. branching calculations)

The second decision diamond addresses the issue of "Occupational Exposure" and could include actions, such as:

- Installation of remote monitoring devices in radiological impacted areas (e.g., cameras, dosimetry, other sensors, etc.) that would reduce personnel traffic in the areas
- Modification of High Radiation/Locked High Radiation control systems
- Water chemistry changes impacting source term or personnel exposure

The third decision diamond addresses the issue of "Radioactive Waste" and could include actions, such as:

- Use of higher efficiency filters/resin that could result in more "change-outs"
- The need to remove and dispose/store contaminated equipment or material

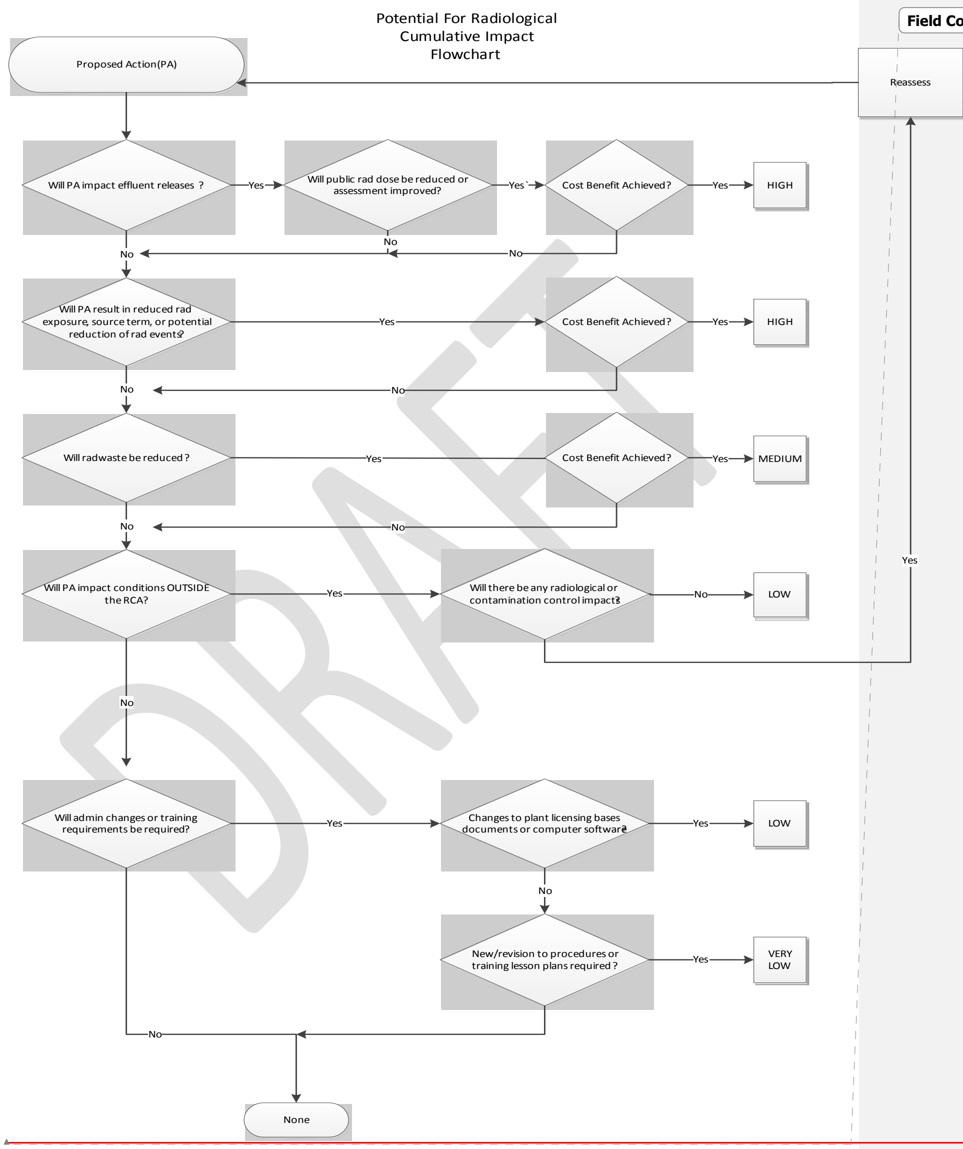
The fourth decision diamond addresses "Control of Radioactive Material" and could include actions such as:

- Potential storage of radioactive material outside of the RCA is needed

- Need for radiography for construction activities outside of the RCA
- Disruption of effluent discharge lines

An outcome of “Reassess” indicates that more information should be gathered to better define the issue/success criteria, come up with a smarter solution (e.g., performance based rule), or otherwise change the proposed action to reduce cost/increase benefit. After reassessing, the process should be re-entered to consider the re-defined issue.

Figure 4.3.1



Field Code Changed

COMMENTS 0n 5/29/2014

1. **The first decision gate should address potential exposure as well as actual doses (i.e.,"Will the public rad dose or the potential for public dose be reduced")**
2. **Reassess still not very clear. Would help to have an example.**
3. **There is no "Reassess" pathway for onsite radiological/occupational radiological issues that don't pass the cost/benefit analysis.**
4. **The way this flow chart works, there is no medium priority unless the PA will reduce radwaste. PAs that impact effluents or rad exposures/sourceterm are either high priority (if they pass the cost/benefit) or low priority (if they fail it).**
5. **How will the cost/benefit assessments be performed is also not clear. Presumably if the NRC has issued new regulations, it has already performed (passed) a cost/benefit or the NRC has redefined adequate protection. How could the licensee's cost/benefit outcome be different?**
6. **Concern that procedures & training issues are only considered at the very low to none category. Sometimes the solution to a more significant radiologically risky event/situation is the implementation of proper procedures and training. For example, if the NRC makes a substantial change to the training rule (50.120), does this automatically make this PA a low priority?**
7. **How is step 2 intended to be applied to the results of this non-PRA screening?**

Formatted: Font: Bold

Formatted: Font: Bold

Comment [AMZ92]: NRC Comments on new RP flowchart.

Formatted: Font: Bold

Deleted: 4.3 RADIATION PROTECTION¶
Note that Radiation protection (RP) importance characterization is generally focused on potential regulatory actions, e.g., rulemaking. The process can be used for plant initiated activities and will require plant staff to consider/perform analyses normally performed by NRC, i.e., backfit and cost-benefit.¶
RP importance characterization includes two basic steps: 1) a flowchart series of screening questions to address the "no impact" step; and 2) use of qualitative or quantitative effectiveness estimates to assign high, medium, low, or very low importance to activities that do not screen out in Step 1. For Step 1, the flowchart in Figure 4.3-1 is used. For Step 2, the overall RP importance is concluded based on a matrix, provided in Table 4-1.¶
Step 1 (Screening for any impact)¶
Complete the flowchart in Figure 4.3-1 to determine the current importance associated with the issue. If the current importance associated with the issue is anything other than "None" or "Reassess," continue to Step 2.¶
The first two decision diamonds address the question of backfit. These questions should be answered commensurate with the NRC's documented response to the backfit questions.¶
As used in Figure 4.3-1, cost-benefit criteria are the criteria used by NRC in the NUREG/BR-0058 (Reference 4) and NUREG/BR-0184 (Reference 5) regulatory analysis guidance for estimation and evaluation of values and impacts. Again, these questions should be answered commensurate with the NRC's documented cost-benefit analysis.¶
An outcome of "Reassess" indicates that more information should be gathered to better define the issue/success criteria, come up with a smarter solution (e.g., performance-based rule), or otherwise change the proposed action to reduce cost/increase benefit. After reassessing, the process should be re-entered to consider the re-defined issue.¶ ... [1]

4.4 Determining Security, EP, and RP Importance

After completing step 1 in Sections 4.1-4.3, if the current importance associated with the issue is anything other than "None," continue to Step 2 using Table 4-1.

The table is used as follows:

- First, note the current ranking/importance from Step 1 in Sections 4.1-4.3 so as to establish the appropriate row in Table 4-1.
- Then, determine how effective the proposed activity will be in resolving the issue. This establishes the overall importance of the proposed activity. Qualitative and quantitative guidelines regarding effectiveness are provided in Table 4-1 and the discussion below.

Table 4-1 Matrix by Current Importance and Potential Impact

Current significance associated with the issue (from Step 1 of Flowcharts)	**Potential Impact of Action Resolving Issue (Effectiveness)**		
	Not Effective	Somewhat Effective	Mostly Effective
	0 to 25%	25 to 80%	>80%
	Overall Importance		
Very Low	Very Low	Very Low	Very Low
Low	Very Low	Very Low	Low
Medium	Very Low	Low	Medium
High	Very Low	Medium	High

Effectiveness relates to the extent to which the full benefit of the proposed change or modification is realized. If there is an available resolution to the issue that would eliminate the concern or significantly mitigate the concern, the "mostly effective" column is appropriate. An action that addresses some but not all aspects of the concern would be considered "somewhat effective." A proposed resolution that leaves significant aspects of the concern unresolved is deemed "not effective." If so, it may be appropriate to look for another resolution, if possible.

4.5 Reliability

Reliability is concerned with issues or activities that have some importance and would not otherwise be appropriately captured in the safety, security, EP, or RP categories. Reliability should capture the importance of the reliability of systems, structures, and components (SSCs) used to generate electricity and the stewardship of the plant site. For example, plant aging management, replacement of equipment whose failure could have an adverse impact on overall plant performance in terms of availability, forced outage, power reduction, or potential for a reactor scram would all be considered in this category.

A regulatory need for this category is evidenced in the existence of performance indicators (PIs) under NRC's Reactor Oversight Process that include measures of unplanned scrams and unplanned power changes. Exceeding a threshold for a PI might indicate existence of an issue that will become one of some safety importance and could result in the plant being placed in a column of the Action Matrix with heightened regulatory scrutiny.

Reliability importance characterization includes two basic steps: 1) a series of screening questions to address the "no impact" step; and 2) use of qualitative effectiveness estimates to assign high, medium, low, or very low importance to activities that do not screen out in Step 1. For Step 2, the overall Life Cycle Management importance is concluded based on a matrix, provided in Table 4-2.

Step 1 (Screening for any impact)

The screening on any impact addresses the following set of questions:

For the proposed activity or issue:

1. ☐ YES ☐ NO Is there a significant risk of SSC failure?

2. ☐ YES ☐ NO Is there a significant replacement lead time?

3. ☐ YES ☐ NO Is there an obsolescence issue?

4. ☐ YES ☐ NO Is there an impact on plant reliability?

5. ☐ YES ☐ NO Is there an impact on SSC or personnel availability due to frequency of preventive maintenance?

If ALL the responses are NO, issue or activity screens to NO IMPACT and Reliability Importance is None.

If ANY response is YES, continue on to Step 2.

Comment [F93]: It's not fully clear yet that this section will be beneficial to the structure of the guidance. This seems to include activities outside the purview of the NRC and provide a framework in which the NRC would essentially approve prioritization (including deferral) of regulatory activities based on issues other than public and worker safety. In addition, the other attributes should already cover both regulatory and plant-initiated activities with a nexus with safety.

Guidance on addressing the above questions is provided below.

Question 1: Is there a significant risk of SSC failure?

In answering this question, the first step is to identify the likelihood of the SSC failing. Is failure imminent, i.e., there have been early warning signs, the SSC has already failed and a temporary repair has been put in place, etc.? (Temporary means more than a compensatory action, but not the same as permanent solution). This is expected to be a qualitative assessment using engineering evaluations; however, a plant-specific calculation may be used to evaluate a potential SSC failure in a quantitative sense.

Next, identify the results of the failure. Will the SSC failure result in a transient, a precursor to a transient, a condition that would make a subsequent transient complicated, etc.?

Question 2: Is there a significant replacement lead time?

In answering this question, consider the lead time required for engineering, procurement, fabrication, and installation of a replacement, as applicable. If there is a spare part in the plant warehouse or readily available within a pre-determined distance for the specific site, there is likely not a significant replacement lead time. If significant engineering, procurement or fabrication work must be done, there may be a significant replacement lead time.

Question 3: Is there an obsolescence issue?

In answering this question, consider the impacts of obsolescence that may complicate or compound the time frames cited in response to Question 2, above. If the current SSC cannot be replaced with another SSC that is current technology, form, fit, etc., then the lead times will need to be adjusted accordingly.

Question 4: Is there an impact on plant reliability?

In answering this question, consider both negative and positive impacts of the proposed activity or issue on plant reliability. Will it force a reduction in power or take the plant offline? Could SSC failure result in an unplanned reactor scram or significant plant transient? Is SSC failure more likely during extreme weather events? Will the proposed activity allow the plant to continue to reliably stay online?

Question 5: Is there an impact on SSC or personnel availability due to frequency of preventive maintenance?

In answering this question, for an SSC, consider total out-of-service time that is added due to increased frequency of preventive maintenance or out-of-service time that can be saved with decreased need for preventive maintenance. For personnel, consider whether the proposed activity will decrease the need for preventive maintenance and free personnel resources to address other maintenance needs. Alternately, consider whether NOT implementing the proposed activity will have a significant impact on personnel availability to address other maintenance needs.

Step 2 (Determine issue's reliability importance)

If any response in Step 1 is "yes," determine the timeframe for initial action to prevent unacceptable impacts on reliability, e.g., when personnel must begin the associated engineering process, procurement process, or work scheduling process. The applicable process with the longest lead time for the proposed activity should be used to establish the timeframe for initial action. Thus, the procurement of long lead time equipment might be considered a "short" time frame for action in some cases. Then, using Table 4-2:

- First, note the timeframe for initial action so as to establish the appropriate row in Table 4-2. Table 4-2 uses operating cycles to delineate time frames, thus the actual time frame will vary from plant to plant, e.g., 18 month or 24 month operating cycle. If the plant in question is on an 18 month operating cycle and has an issue for which the initial action must be taken within 20 months to prevent unacceptable impacts on reliability, then the time frame for action is "short," i.e., less than 36 months or 2 operating cycles. If the same plant has an issue for which the initial action must be taken within 40 months to prevent unacceptable impacts on reliability, then the time frame for action is "long," i.e., greater than or equal to 36 months or 2 operating cycles.

- Next, determine the potential impact of the proposed activity in resolving the issue. This is characterized as the duration of (unplanned) plant outage avoided by resolving the issue. Table 4-2 expresses outage duration in Days (≤13 days), Weeks (14 days – 59 days), and Months (≥60 days). This establishes the overall importance of the proposed activity. If the issue in question, left unresolved, would result in a potential unplanned outage of 35 days, then the potential impact of action resolving the issue is in the third column of Table 4-2 corresponding with a duration of plant outage avoided equal to "weeks." Depending on the time frame for action identified above, the resulting importance would be Low or Medium.

Table 4-2 Matrix by Urgency and Potential Impact			
Time frame (in operating cycles) for action associated with the issue	**Potential Impact of Action Resolving Issue (Duration of Plant Outage Avoided)**		
	Day(s)	Week(s)	Month(s)
	Importance		
Long (≥ 2)	Very Low	Low	Medium
Short (< 2)	Low	Medium	High

5.0 AGGREGATION TO DETERMINE PRIORITY

After the plant IDP has assigned each issue a level of importance (high, medium, low, very low, or none) in each of the five categories (Safety, Security, EP, RP, and Reliability), the following criteria are used to assign the issue a priority level from 1 to 5. Prioritization and scheduling will be periodically updated based on plant-specific planning, e.g., annually in conjunction with updates to the business plan.

The overall philosophy behind the priority scheme givegiven below is based on the objective to focus application of licensee's resources to those changes that have the most benefit to the public safety. The prioritization scheme provides relatively higher weight on issues that are known to directly influence the metrics such as CDF and LERF that are directly correlated to public safety. To that extent, all issues, irrespective of whether they are related Security, EP, Rad Protection, or availability will be captured under Safety. However, the prioritization scheme also recognizes the need to prevent overlooking important issues that may not directly correlate to the the key metrics that pertain to safety and yet have an overall contribution to safety. Consequently, a High in Safety has been equated to two Highs in Security, EP, RP, and the plant availability component of Reliability.

Priority 1

- Issue defined by NRC as adequate protection, OR
- High for Safety, OR
- Two or more Highs for any of the four other categories (Security, EP, RP, Reliability)

Priority 2

- Medium for Safety, OR
- One High for any of the four other categories, OR
- Two or more Mediums for any of the four other categories

Priority 3

- Low for Safety, OR
- One Medium for any of the four other categories, OR
- Two or more Lows for any of the four other categories

Priority 4

Comment [S94]: The document should provide some high-rationale on on the basis for these priorities. An example paragraph for illustration is suggested.

Deleted: t

Deleted: metrices

Deleted: the

Deleted:)

Comment [S95]: Should note somewhere that the CDF saving of the Reliability is captured under Safety?

- Very Low for safety, OR
- One Low for any of the four other categories

Priority 5

- Does not meet any of the criteria for Priorities 1 through 4

5.1 Regulatory Process for Adjusting Licensing/Regulatory Schedules

As a result of the aggregation described in Section 5.0, each plant may have bins with several Priority 1-5 issues. Priority designation will be an input into the work management and scheduling process for the business plan.

Scheduling

Generally, activities will be implemented as soon as practical considering the next available scheduled outage, if an outage is needed – based on priority. Parallel implementation of lower priorities is permitted providing it does not result in deferral of implementation of higher priorities.

- Sufficient resources (financial and skilled personnel) should be dedicated to Priority 1 activities such that they will be implemented as soon as possible considering the next available scheduled outage, if an outage is necessary to complete the activity.
- Priority 2 activities should be implemented after all Priority 1 activities are implemented, unless the resources needed for a Priority 2 activity are sufficiently small that it does not impact the scheduling of any Priority 1 activity.
- Priority 3 activities should be implemented after all Priority 1 and Priority 2 activities are implemented, unless the resources needed for a Priority 3 activity are sufficiently small that it does not impact the scheduling of any Priority 1 and Priority 2 activities.
- Priority 4 activities should be implemented after all Priority 1, Priority 2, and Priority 3 activities are implemented, unless the resources needed for a Priority 4 are sufficiently small that it does not impact the scheduling of any Priority 1, Priority 2, and Priority 3 activities.
- Priority 5 would not be normally scheduled under this process.

If an activity continues to be subject to deferral, after deferring to the third operating cycle, licensees should decide whether to begin implementation by the end of the next planned refueling outage or submit a request, using the appropriate licensing process, to eliminate the action. Licensees should document this decision with the prioritization document package for the activity.

Comment [F96]: Not clear why this category should exist, especially for regulatory actions.

Comment [F97]: There is not sufficient guidance to understand this process and potential incentive for continuous deferral. The process is also not limited to lower risk activities, which is a concern. If a Priority 2 activity is deferred multiple times (e.g., due to personnel availability or because of re-prioritizing of emergent issues) would it be an appropriate candidate for elimination. It is not clear that elimination of regulatory activities is appropriate through RPI and consistent with Commission guidance discussed in public meetings on this effort.

Tie-Breakers within Priority Level

Plant-specific processes for decision analysis may be used to determine which activities within a priority level are completed first. For example, if a plant prioritizes 10 activities and has no Priority 1, two Priority 2, four Priority 3, three Priority 4, and one Priority 5, then, the IDP may need to determine which of the Priority 3 and Priority 4 activities get implemented first. The decision analysis may include consideration of:

- Resource allocation (skilled personnel, financial)
- Cost-Benefit ratio
- An approach similar to severe accident mitigation alternatives evaluations under license renewal
- Plant-specific processes or decision analysis tools.

Adjusting Licensing/Regulatory Schedules

After assessing an issue using the scheduling and tie-breaking guidance above, if it is determined that the priority of an issue is such that it should be re-scheduled, i.e., deferred, the licensee should enter the appropriate existing process for changing licensing and regulatory schedules. If the schedule to be changed is captured in a regulation, the licensee would process an exemption request per 10 CFR 50.12 or 52.7, as applicable. If the schedule to be changed is captured in a commitment, the licensee would follow the commitment change process as described in NEI 99-04, Rev. 0, *Guidelines for Managing NRC Commitment Changes* (Reference 6).

Additional guidelines

1. An immediate action necessary for continued safe operation (e.g., to support NRC finding of adequate protection, or to restore compliance with a Technical Specification, or to resolve an environmental compliance issue with an adverse effect on public health and safety, or to remove a threat to personnel safety) should not use the prioritization process.

2. Immediate repairs necessary for continued power production (e.g., replace damaged main transformer) would not use the prioritization process. Implementation should not adversely impact the scheduling of Priority 1 activities.

Comment [F98]: This is critical guidance and should be included upfront. I.e., resources should not be used to justify risk significance of adequate protection regulatory activities.

Deleted: <#>Other non-compliance issues, e.g., inspection findings, are within the scope of prioritization activities. Correction of the non-compliance should be scheduled consistent with the safety significance of the action. The results of the prioritization process may be used as justification for not correcting the issue at the first available opportunity.¶

Comment [F99]: This would seem to obviate the need for the reliability attribute if a nexus with safety can be established using the other attributes. Otherwise, it is not clear that this category of items should receive higher priority than other activities under 1.

6.0 REFERENCES

1. NEI 96-07, Guidelines for 10 CFR 50.59 Implementation, Revision 1, November 2000

2. Regulatory Guide 1.174, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis, Revision 2, May 2011

3. NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 4A, April 2011

4. NUREG/BR-0058, Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission, Revision 4, September 2004

5. NUREG/BR-0184, Regulatory Analysis Technical Evaluation Handbook, January 1997

6. NEI 99-04, Guidelines for Managing NRC Commitment Changes, Revision 0, July 1999

APPENDIX A – EXAMPLES OF SAFETY IMPORTANCE DETERMINATION

Comment [F100]: Expect additional examples to be added from insights obtained in the demonstration pilots.

EXAMPLE 1: INSTALLATION OF IMPROVED REACTOR COOLANT PUMP SEAL DESIGN

Issue: The installation of an improved reactor coolant pump (RCP) seal design (e.g., Byron-Jackson or Flowserve N-9000) could:

- improve system and plant performance, e.g., thermal-hydraulic stability of leakoff/bleedoff flows
- reduce forced shutdowns and reduce transition risk
- potentially reduce likelihood of spontaneous RCP seal LOCAs
- enhance performance during loss of RCP seal cooling and station blackout events

Success criteria: Cost-effective change that improves overall RCP seal performance, improves plant availability, while also improving plant coping capability for loss of all RCP seal cooling events including station blackout scenarios.

References:

1. WCAP-15603-A, Rev. 1 (non-proprietary) (WOG 2000 RCP seal model)
2. WCAP-16175-NP-A, Rev. 0, (RCP seal failure model for CE NSSS)
3. NUREG-1560 (IPE insights) and NUREG-1742 (IPEEE insights)
4. Data NUREGs including NUREG/CR-6928, NUREG/CR-5750, and in particular NUREG/CR-6582 (PWR primary system leaks including RCP seal leakage events)
5. Plant-specific RCP seal design information and PRA insights

Evaluation:

Step 1 (No impact assessment):

Does the proposed activity or issue:

1. ■ **YES** ☐ NO Result in an impact on the frequency of occurrence of a risk significant accident initiator?

Justification: Catastrophic RCP seal failures in the past have caused reactor coolant system (RCS) leakages beyond normal make-up capability, leading to small LOCAs, so response is **YES**.

2. ■ **YES** ☐ NO Result in an impact on the availability, reliability, or capability of SSCs or personnel relied upon to mitigate a risk significant transient, accident, or natural hazard?

Justification: A low-leakage RCP seal would enhance mitigation capability for loss of RCP seal cooling events including loss of component cooling water initiators, loss of service water or raw water initiators, and station blackout scenarios, so response is **YES.**

3. ☐ YES ■ **NO** Result in an impact on the consequences of a risk significant accident sequence?

Justification: Consistent with 10 CFR 50.59 evaluations, this question asks whether the issue would potentially reduce radiological consequences (dose) given an accident. The improved RCP seal design generally does not *directly* reduce fission product source term (e.g., containment performance) or off-site doses given an accident (e.g., protective actions), so the response is **NO.**

4. ■ **YES** ☐ NO Result in an impact on the capability of a fission product barrier?

Justification: The improved RCP seal design could potentially reduce RCS leakage rates given a loss of RCP seal cooling initiator, therefore, the response is **YES**.

5. ■ **YES** ☐ NO Result in an impact on defense-in-depth capability or impact in safety margin?

Justification: The improved RCP seal design potentially increases the coping time for station blackout sequences, and provides defense against some loss of support system initiators that otherwise are assumed to lead to core damage (e.g., unmitigated loss of component cooling water in some PWRs), so the response is **YES.** (There is no apparent impact in safety margin as typically defined).

Based on the above evaluation, at least one of the questions was answered in the affirmative and the process moves to Step 2.

Step 2 (More than minimal impact assessment):

Does the proposed activity or issue:

1. ☐ YES ■ **NO** Result in more than a minimal decrease in frequency of occurrence of a risk significant accident initiator?

Justification: Review of several operating experience data reports including NUREG/CR-6928, NUREG/CR-5750, and NUREG/CR-6582 indicates that there have been no RCP seal LOCAs in over 30 years. Therefore, the reduction in small LOCA frequency is judged to be minimal in comparison to all other contributors, so the response is **NO.**

2. ■ **YES** ☐ NO Result in more than a minimal improvement in the availability, reliability, or capability of SSCs or personnel relied upon to mitigate a risk significant transient, accident, or natural hazard?

Justification: From WCAP-15603-A Rev. 1, the conditional probability of RCS leakage greater than 21 gpm/RCP for Westinghouse seals with qualified O-rings given loss of seal cooling is about 0.21. From BNL-72341-2004 for BJ N-9000 seal designs, the values are:

- 10^{-4} conditional probability of failure for < 4 hr
- 10^{-3} conditional probability of failure for > 4 hr

(dependent on closing bleedoff line and tripping RCPs)

Therefore, there is a more-than-minimal improvement in capability, and the response is **YES.**

3. ☐ YES ■ **NO** Result in more than a minimal decrease in the consequences of a risk significant accident sequence?

Justification: As discussed in Step 1, there is no impact on radiological consequences, so the response is **NO.**

4. ■ **YES** ☐ NO Result in more than a minimal improvement in the capability of a fission product barrier?

Justification: Given a loss of RCP seal cooling event, the RCS leakage rates with the enhanced seal design are considerably less than the existing design, so the response is **YES.**

5. ■ **YES** ☐ NO Result in more than a minimal improvement in defense-in-depth capability or improvement in safety margin?

Justification: The substantial reduction in probability of RCP seal LOCA provides significant defense against loss of RCP seal cooling initiators and station blackout, so the response is **YES**. (There is no apparent improvement in safety margin as typically defined).

Based on the above evaluation, at least one of the questions was answered in the affirmative and the process moves to Step 3.

Step 3A (Qualitative assessment)

Table 3-1 is used as a job aid in performing a qualitative (or semi-quantitative) assessment of the issue. If this were a generic characterization and prioritization, relevant industry-wide information on the relative risk associated with spontaneous RCP seal LOCAs, loss of RCP seal cooling initiators, and station blackout from internally and externally initiated events would be useful. If this were a plant-specific prioritization, risk insights from the plant-specific PRA would be used in the process. Generic risk insights could help inform the plant-specific evaluation where the PRA lacks completeness for some external initiators.

Table 3-1 is a two-dimensional matrix that requires as input an order-of-magnitude estimate of the existing level of risk associated with the issue or activity, as well as the potential impact (i.e. effectiveness) resulting from implementation of the change in terms of an approximate measure in the percent reduction in risk associated with resolving the issue.

Existing level of risk: For a plant-specific evaluation, a tabulation of the contribution to CDF and/or LERF from support system initiators and station blackout from internally and externally initiated events would provide and upper bound level of risk. If the PRA model results explicitly provide the risk importance from RCP seal LOCAs this would provide a better estimate. A generic evaluation is given here.

Since the spontaneous RCP seal LOCA frequency has been screened out as relatively low, this aspect will not be evaluated. This is supported by a number of industry studies including the MSPI cross-comparison study in WCAP-16464-NP that indicates that small LOCA contribution to CDF is in the mid-10^{-7} to mid-10^{-6} /yr range, only a small fraction of which is attributable to spontaneous RCP seal

LOCA given no such LOCAs in the past 30 years. Hence, this aspect alone would place the issue in the Very Low importance band (below 10^{-6} /yr CDF for the existing level of risk in the first column of Table 3-1) regardless of the potential impact of the plant modification.

For consequential LOCAs from loss of RCP seal cooling, a number of references including NUREG-1560 and NUREG-1742 (IPE and IPEEE summary reports) or other more recent regulatory impact studies and CDF/risk compilations are useful. Typically for Westinghouse PWRs with total CDFs in the 10^{-5} to mid-10^{-4} /yr range, consequential RCP seal LOCAs are found to contribute some 10s of percent to CDF. Hence, the existing level of risk would probably lie in the lower to mid-level "Yellow" band in the first column of Table 3-1.

Potential risk reduction: Implementation of the low-leakage RCP seal design would reduce the conditional probability of catastrophic seal LOCA by one to two orders of magnitude. In effect, the potential impact in Table 3-1 would be in the "High" column (> 90%).

Importance (generic): The combination of the existing level of risk ("yellow") with the potential impact (high) would place this issue at least in the Low priority band and potentially in the Medium importance band for safety. Given the incompleteness in industry-wide PRAs for all externally-initiated events, a Medium importance for safety (generically) would seem appropriate. Based on plant-specific design and operational considerations, the plant-specific importance could be the same, lower or higher than the generic importance characterization for safety described here.

Step 3B (Quantitative assessment)

The full quantitative assessment, if necessary, would typically be performed on a plant-specific basis. For example, plant risk analysts could make changes directly to the plant-specific PRA models. In this particular example, the RCP seal LOCA models would be reviewed and appropriate changes made to basic event probabilities, coping times, loss of offsite power/station blackout convolution integrals and other supporting PRA models. A direct calculation of the changes in CDF and LERF would be performed. Given uncertainty or incompleteness of the model (e.g., some external initiators not included), some adjustment to the overall results may be necessary.

EXAMPLE 2: SAMG & EOP INTEGRATION

Issue: SAMG & EOP Integration (Fukushima NTTF Recommendation #8)

The regulation would have the following provisions:

- have strategies and guidance for mitigating the consequences of severe accidents
- integrate event and accident mitigating procedures
- identify command and control roles, responsibilities, and authorities during the progression of an event or accident
- conduct related drills, exercises or both
- provide training
- incorporate severe accident situations in written examinations and operating tests for all types of operators.

Success criteria: Cost-effective change that results in improved plant staff performance during beyond-design basis accidents including severe accidents

References:

1. Proposed Rule, Docket # NRC-2012-0031, Onsite Emergency Response Capabilities, 78 FR 68774, November 15, 2013.
2. USNRC, Onsite Emergency Response Capabilities, Regulatory Basis to Address Nuclear Regulatory Commission Near-Term Task Force (NTTF) Recommendation 8, October 1, 2013, (noticed as 78 FR 63901, October 25, 2013).
3. ACRS Subcommittee on Plant Operations and Fire Protection, transcripts of meeting on February 6, 2013 (ML13063A403).
4. NEI Anthony R. Pietrangelo comment on Draft Regulatory Basis, March 19, 2013 (ML13079A822).
5. Memorandum to Charles L. Miller (NRC) from Timothy J. Kobetz (NRC), Temporary Instruction 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines" Results," June 6, 2011 (ML11154A109).
6. NEI slides, Industry Perspective on NRC NTTF Recommendation 8 Proposed Rule and Regulatory Basis, November 19, 2013 (ML13330B717).
7. BWROG & PWROG slides, Update on Owners' Groups Activities – NTTF Recommendation 8, November 19, 2013 (ML13330B714).

Evaluation:

Step 1 (No impact assessment):

Does the proposed activity or issue:

1. ☐ YES ■ **NO** Result in an impact on the frequency of occurrence of a risk significant accident initiator?

Justification: The activity could potentially improve plant staff response to severe accidents, but would not by itself directly impact accident initiator frequency, so the response is **NO.**

2. ■ **YES** ☐ NO Result in an impact on the availability, reliability, or capability of SSCs or personnel relied upon to mitigate a risk significant transient, accident, or natural hazard?

Justification: The activity could potentially improve plant staff response to severe accidents and thereby potentially reduce the likelihood or consequences of radiological releases, so the response is **YES.**

3. ■ **YES** ☐ NO Result in an impact on the consequences of a risk significant accident sequence?

Justification: As discussed in the response to Question 2, improving staff performance during severe accidents could potentially result in reduced radiological releases and thereby impact offsite consequences, so the response is **YES.**

4. ☐ YES ■ **NO** Result in an impact on the capability of a fission product barrier?

Justification: The activity impacts plant staff performance but does NOT *directly* impact the reliability, availability, or performance of equipment used in severe accident management, nor would it directly affect or modify the performance of fuel cladding, RCS integrity, and containment systems, so the response is **NO**.

5. ■ **YES** ☐ NO Result in an impact on defense-in-depth capability or impact in safety margin?

Justification: The activity impacts plant staff performance during severe accidents and therefore may strengthen somewhat the balance of accident prevention and mitigation, so the response is **YES.** (There is no apparent impact in safety margin as typically defined).

Based on the above evaluation, at least one of the questions was answered in the affirmative and the process moves to Step 2.

Step 2 (More than minimal impact assessment):

Does the proposed activity or issue:

1. ☐ YES ■ **NO** Result in more than a minimal decrease in frequency of occurrence of a risk significant accident initiator?

Justification: As discussed in Step 1, there is no impact on the frequency of occurrence of a risk significant initiator, so the response is **NO.**

2. ☐ YES ■ **NO** Result in more than a minimal improvement in the availability, reliability, or capability of SSCs or personnel relied upon to mitigate a risk significant transient, accident, or natural hazard?

Justification: As discussed in the Regulatory Basis for NTTF #8, procedures and guidelines already exist for severe accident management based on implementation of Generic Letter 88-20, Supplement 2. Furthermore, on a generic basis, SAMGs have been implemented at all plant sites, plant personnel have been trained, and periodic drills/exercises on the use of the SAMGs are conducted. Of the six provisions identified above under Issue, only the provision for written examinations and operating tests for all types of operators is, in effect, not currently performed. This provision is primarily for inspection purposes rather than necessarily for performance improvement. Furthermore, given the generally fixed amount of operator training time, implementation of this provision may cause dilution of operator focus from more risk-significant transients and accidents. Thus, on a generic basis, it is concluded that the response is **NO.** However, NRC inspections under TI 2515/184 have found plant-by-plant deficiencies. Hence, for a plant-specific evaluation, this question may be answered **YES** if there remains a significant deficiency and more than a minimal improvement in personnel performance results from the implementation of the activity.

3. ☐ YES ■ **NO** Result in more than a minimal decrease in the consequences of a risk significant accident sequence?

Justification: As discussed in the response to Question 2, SAMGs have been implemented at all plant sites. Thus, on a generic basis, it is concluded that the response is **NO** regarding more than a minimal improvement in defense-in-depth capability. However, on a plant-specific basis, this question may be answered **YES** as discussed under Question 2.

4. ☐ YES ■ **NO** Result in more than a minimal improvement in the capability of a fission product barrier?

Justification: As discussed in Step 1, there is no impact on the capability of fission product barriers, so the response is **NO.**

5. ☐ YES ■ **NO** Result in more than a minimal improvement in defense-in-depth capability or improvement in safety margin?

Justification: As discussed in the response to Question 2, SAMGs have been implemented at all plant sites. Thus, on a generic basis, it is concluded that the response is **NO** regarding more than a minimal improvement in defense-in-depth capability. However, on a plant-specific basis, this question may be answered **YES** as discussed under Question 2. (There is no apparent impact in safety margin as typically defined).

Based on the above *generic* evaluation, where none of the questions was answered in the affirmative, the activity would screen out, and the generic characterization process would stop. The activity would be characterized generically as Very Low importance for safety. However, as the generic characterization serves as an input to a *plant-specific* assessment, it is possible that a plant-specific evaluation would continue forward. Depending on plant-specific circumstances regarding the fullness of SAMG implementation, training and periodic drills, a different conclusion regarding "minimal improvement" for one or more questions could be reached and the process would then continue to Step 3A and/or 3B.

Step 3A (Qualitative assessment—plant-specific only)

Given that the *generic* characterization is Very Low, this step would be performed on a plant-specific basis only for those plants that met one or more criteria for "more than minimal improvement" under Step 2.

Table 3-1 is used as a job aid in performing a qualitative (or semi-quantitative) assessment of the issue.

Existing level of risk: Insights from the plant-specific PRA could be used to assess the existing level of risk in terms of metrics such as CDF and LERF. The analysts would need to be familiar with the degree to which SAMG/EDMGs actions have been credited in the PRA model. Generally, very few (if any) operator actions associated with SAMGs/EDMGs are credited in the Level 1 PRA for mitigating accidents prior to core damage. Thus, LERF and long term containment integrity may be the metrics mainly impacted by crediting such operator actions. If the PRA model is not complete because not all external events have been considered, adjustments may be necessary.

Potential risk reduction: Some judgment will be necessary regarding the assumption of the potential risk reduction by implementing NTTF #8. Given that all plant sites have implemented SAMGs/EDMGs, then it is a matter of assessing to what degree having a regulatory requirement for procedure maintenance and training could impact operator performance. From Table 3-1, it is reasonable to presume that the regulatory requirement would *not* be 90% or greater effective in improving operator performance, or that at the other extreme there is no improvement whatsoever given that the plant-specific evaluation passed Step 2. Hence, this could help narrow down the potential impact/effectiveness to perhaps the low to medium range columns, for example. At most, the difference between the selection of "low" or "medium" for potential impact would be one level of importance for safety Low versus Very Low, etc.).

Step 3B (Quantitative assessment—plant-specific only)

Alternatively, it may be decided that the PRA models could be used directly in the determination of the risk change. Again, there are generally only a handful of operator actions related to SAMG/EDMG. The human reliability analysis generally would quantify the operator error rate using performance shaping factors (PSF) that adjust the baseline human error probability (HEP). Many of the PSFs such as control room indication or environment are not affected by implementation of the integrated EOPs/SAMGs. Training and the quality of procedures are the most likely PSFs to be affected by the regulatory requirement. One possibility would be to re-quantify the PSFs assuming better (or worse) conditions, revise the HEP and basic event probabilities, and re-quantify the PRA model. It is possible that the PRA model of record assumes ideal conditions so a SAMG program deficiency could mean higher HEPs as the baseline. The difference in LERF thus would reflect the potential improvement resulting from the implementation of the rule on a plant-specific basis.

4.3 Radiation Protection

Note that Radiation protection (RP) importance characterization is generally focused on potential regulatory actions, e.g., rulemaking. The process can be used for plant initiated activities and will require plant staff to consider/perform analyses normally performed by NRC, i.e., backfit and cost-benefit.

RP importance characterization includes two basic steps: 1) a flowchart series of screening questions to address the "no impact" step; and 2) use of qualitative or quantitative effectiveness estimates to assign high, medium, low, or very low importance to activities that do not screen out in Step 1. For Step 1, the flowchart in Figure 4.3-1 is used. For Step 2, the overall RP importance is concluded based on a matrix, provided in Table 4-1.

Step 1 (Screening for any impact)

Complete the flowchart in Figure 4.3-1 to determine the current importance associated with the issue. If the current importance associated with the issue is anything other than "None" or "Reassess," continue to Step 2.

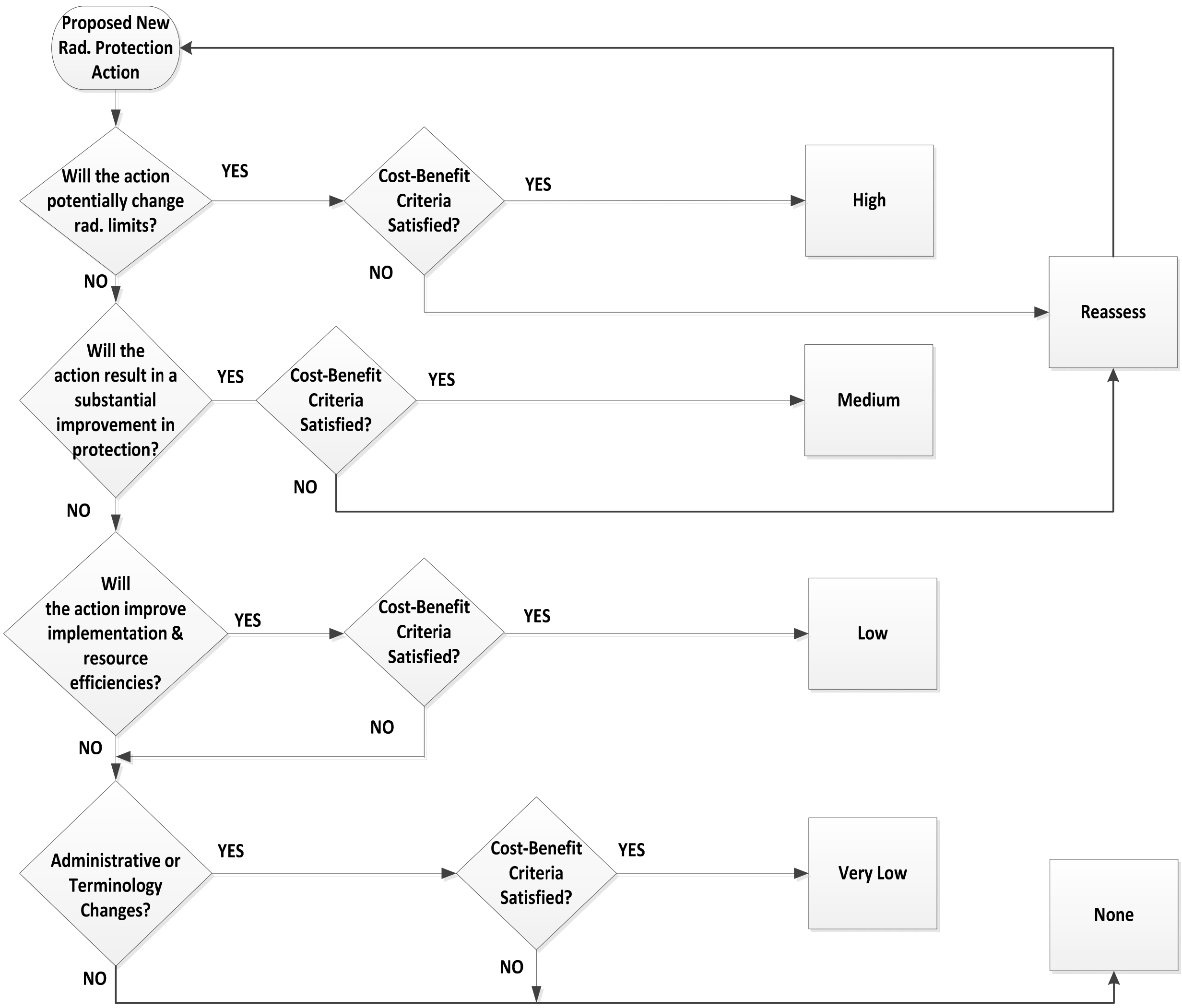
The first two decision diamonds address the question of backfit. These questions should be answered commensurate with the NRC's documented response to the backfit questions.

As used in Figure 4.3-1, cost-benefit criteria are the criteria used by NRC in the NUREG/BR-0058 (Reference 4) and NUREG/BR-0184 (Reference 5) regulatory analysis guidance for estimation and evaluation of values and impacts. Again, these questions should be answered commensurate with the NRC's documented cost-benefit analysis.

An outcome of "Reassess" indicates that more information should be gathered to better define the issue/success criteria, come up with a smarter solution (e.g., performance-based rule), or otherwise change the proposed action to reduce cost/increase benefit. After reassessing, the process should be re-entered to consider the re-defined issue.

Figure 4.3-1

RP Issue Importance Determination – Step 1



Step 2 (Determine issue's RP importance)

See Section 4.4.