Technical Basis and Examples of Integrated Risk-Informed Approach Using Qualitative Measures

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Background

In SRM-SECY-12-0081, "Risk-Informed Regulatory Framework for New Reactors" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12296A158), the staff was given the task of providing a more risk-informed approach to determining the significance of inspection findings for new reactors. The staff was specifically instructed to provide "a technical basis for the staff's proposal for the use of deterministic backstops, including examples." This enclosure provides details on the technical basis for the staff's proposal for the use of deterministic backstops with examples. To more accurately reflect the intent of the staff's recommendation in SECY-12-0081 and its proposed approach as described in this paper, the staff has replaced the term "deterministic backstops" with the term "qualitative measures." In providing examples, a method was developed using these principles which represents one possible way in which such a process can be developed to assess Reactor Oversight Process (ROP) Significance Determination Process (SDP) findings. Therefore, it is conceptual in nature and would require additional refinement from the staff with stakeholder involvement before such a concept can be realized in a regulatory environment.

Technical Basis

The technical bases for using qualitative measures are already part of an integrated risk-informed approach with its tenets taken from several sources. The staff initially reviewed the SRM for SECY-98-144 (Revision 1), "White Paper on Risk-Informed, Performance-Based Regulation." SECY-98-144 and Attachment 3, "Significance Determination Process Basis Document," to Inspection Manual Chapter (IMC) 0308, "Reactor Oversight Process (ROP) Basis Document" (ADAMS Accession No. ML071860181), note that a risk-informed approach should consider "other" factors. In the SDP, these other factors have included those which are cited as part of an integrated risk-informed decision-making approach following the tenets of Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis". In addition, the staff followed the contents of SECY-99-007A, "Recommendations for Reactor Oversight Process Improvements (Follow-Up to SECY-99-007)," as a technical basis for the proposed concept of incorporating qualitative measures. In keeping with prior staff requirements memoranda, the proposed program approach for new reactor licensees is intended to maintain compatibility with the existing risk-informed processes currently used in assessing ROP findings for the operating fleet.

The Integrated Risk-Informed Program

In the integrated ROP, the results of two approaches, quantitative risk-based and qualitative traditional deterministic, are blended together to arrive at a risk-informed decision. As with the existing ROP SDP, under the new staff proposal the resultant numerical increases in core damage frequency (ΔCDF) and large early release frequency (ΔLERF) of a finding will be computed to form the quantitative risk result. Analysts will continue to use the most realistic analysis techniques available, engage licensees when necessary, and estimate the ΔCDF and

ΔLERF largely through quantification of the Standardized Plant Analysis Risk (SPAR) models. This quantitative analysis will be augmented with a deterministically based structured qualitative-analysis methodology which can be assessed using simple tools, such as a decision tree or table of element ratings. The tools will be derived from the principles of risk-informed decisionmaking in RG 1.174 and will maintain consistency with regulatory requirements and limits.

The proposed use of a structured and traceable approach follows specific principles of good regulation, e.g., independence, openness, efficiency, clarity, and reliability. The output is a qualitative rating based on levels of degradation or credit given toward the traditional deterministic elements of defense-in-depth, safety margins, condition time, and uncertainty. Uncertainty is captured implicitly by the existence of multiple layers of defense-in-depth and safety margins whose licensing limits are defined below their absolute engineering limits. In choosing guidance for a rating of each element for this illustration, the intent was to minimize overlap of the qualitative assessment with the quantitative one to avoid "double-counting" the degradation or amount of credit toward the final result of a finding. In moving forward with development of this approach, the staff would explicitly define the qualitative factors in a manner that would exclude those elements that have already been accounted for in the risk calculations. For the purpose of this paper, only four outcomes of possible overall qualitative rating were developed to illustrate the feasibility of this methodology. They are "decreased impact," "neutral impact," "increased impact," and "significantly increased impact." For an overall qualitative rating of "neutral impact", the color-band thresholds will be identical to the ones currently employed in the ROP for the operating fleet. The combined aggregate of quantitative risk and the total qualitative rating will be applied to a table which will take both into account in determining the SDP finding's color band.

Elements of Qualitative Measures

The elements of defense-in-depth and safety margins were chosen for qualitative measures after evaluating existing criteria contained in the PRA Policy Statement (60 FR 42622); RG 1.174; SECY-97-287, "Final Regulatory Guidance on Risk-Informed Regulation: Policy Issues"; and SECY-99-007A as those that meet the specific qualitative aspects of the ROP and SDP. In addition, elements of technical-specification-related condition time and qualitative credit were added and will be described in the next few sections of this document.

Description and Guidance for Using Qualitative Measures

The details for each element along with conceptual guidance are provided in the following paragraphs. For each element of risk-informed qualitative measure, an individual impact rating will be assessed based on the analyst's judgment using the tables below as a guide. The criteria and definitions for individual impact ratings are as defined below and might not be identical to those of the overall qualitative ratings. To simplify the decision process, the staff limited the number of possible impact ratings while maintaining meaningful differences. An impact rating of "negligibly degraded" would represent a condition that would result in little or no regulatory concern.

Defense-in-Depth

For the purposes of this paper, the staff relies on various existing guidance documents to interpret defense-in-depth. Definitions might be further addressed and refined to be in alignment with the outcome of Fukushima lessons learned activities. The defense-in-depth design philosophy is based on providing successive levels of protection so that health and safety will not wholly depend on any single element of the design, construction, maintenance, or operation of the plant. These levels of protection can be viewed as barriers of potential accident mitigation. The goal in incorporating defense-in-depth practices is that a plant will have greater tolerance to failures and external challenges. As noted in RG 1.174, when a comprehensive risk analysis is not done (or cannot be done), traditional defense-in-depth considerations should be used or maintained to account for uncertainties. The evaluation should consider the intent of the general design criteria, national standards, and engineering principles such as the single-failure criterion. Some elements defined as being part of defense-in-depth include the barriers of the fuel cladding, reactor vessel, reactor coolant, and containment. For fire-protection findings, Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48, "Fire Protection," defines defense-in-depth elements to include fire detection, fire suppression, fire prevention, mitigation, and post-fire safe shutdown. For security concerns, 10 CFR Part 73, "Physical Protection of Plants and Materials," defines defense-in-depth elements to include physical barriers, the alarm system, locks, area access, armaments, surveillance, and communication systems. For shutdown findings, defense-in-depth elements include the key safety functions of decay-heat removal, containment control, inventory control, spent-fuel cooling, reactivity control, and power availability. In assessing any degradation in defense-in-depth, this table for possible rating outcomes should be used:

Number of Defense-in-Depth Barriers Lost or Impacted by the Finding	Impact Rating
None	Negligibly degraded
Impact on any barrier without a complete loss of that barrier	Moderately degraded
Complete loss of only one barrier	Degraded
A loss of more than one barrier	Significantly degraded

Note that in the case of a negligibly degraded defense-in-depth impact rating, it was assumed that the overall qualitative rating would be the baseline rating of *neutral impact*.

Safety Margins

RG 1.174 considers safety margins to be those factors applied to system engineering design parameters in order to account for uncertainty in calculations to fulfill requirements for licensing or design bases. As pointed out in NUREG-1860, "Feasibility Study for a Risk-Informed and Performance-Based Regulatory Structure for Future Plant Licensing," often these margins are used for licensing purposes and the limit falls below the ultimate capacity of a system, structure, or component. In the context of this conceptual approach, the consideration of safety margins would be limited to the maximum value for licensing purposes. To avoid double-counting of the combined impacts of safety margins and defense-in-depth, only safety margins for nonfailed barriers of defense-in-depth will be evaluated for any additional impact. Any further erosion of safety margins for these intact barriers, as well as for systems used to mitigate the loss of these barriers, is qualitatively considered. The choices were limited to allow a simpler staff determination of the degree of erosion of safety margins without the need to perform detailed calculations. For findings that erode safety margins to be at the limit of the defense-in-depth barrier's licensed operability, an impact rating of **SIGNIFICANTLY DEGRADED** is applied. For cases in which there is an impact but some margin remains, an impact rating of **DEGRADED** is applied.

Impact of Safety Margin to Remaining D-I-D Barriers	Impact Rating
No lost margin	Negligibly degraded
Some margin lost	Degraded
At the licensed threshold	Significantly degraded

Condition Time

In the quantitative risk assessment, the staff factors the impact of the amount of time that a performance deficiency has existed using the parameter of exposure time. Staff guidance for crediting and calculating specific exposure times for different performance-deficiency categories is contained in the Risk Assessment Standardization Project (RASP) Handbook (ADAMS Accession No. ML081790322), Volume 1, "Internal Events." Exposure time is related to, but not necessarily identical to, the time that a performance deficiency has existed with consideration given to discovery and repair. Likewise, for the deterministic assessment, the length of time for which the performance deficiency has existed is uniquely addressed here as Condition Time. It is evaluated in comparison with the plant's technical specification outage time. This time is typically from the start of the performance deficiency to the time of discovery of the nonconformance; this time might overlap the exposure time accounted for in the quantitative analysis because of both methods being used to evaluate the impact of a single performance deficiency. It is assessed against the licensing bases contained in the technical specifications:

Condition Time	Impact Rating
Less than the maximum outage time allowed in the technical specifications	Negligibly degraded
From the maximum outage time to twice the maximum outage time allowed in the technical specifications	Degraded
More than twice the outage time allowed in the technical specifications	Significantly degraded

Qualitative Credit

There might be circumstances in which the U.S. Nuclear Regulatory Commission's existing procedures and practices do not avail themselves to providing credit to equipment or operator actions that are capable of reducing the risk significance of performance deficiencies. "Qualitative credit" is included as a risk-informed qualitative measure to accommodate that situation.

During the quantitative evaluation of performance deficiencies, analysts will consider additional equipment or procedures that could mitigate consequences arising from the performance deficiency. A prerequisite for consideration of operator actions, or any other recovery, is that procedures should be in place and properly tested equipment staged to perform the action. However, for qualitative credit, equipment and activities can be assessed as skill-of-the-craft where some limited qualitative credit for performance can be given beyond that which was accounted for in the quantitative analysis. Possible examples include the use of tested and operable equipment with guidance provided by the Technical Support Center or other experienced personnel on its use. Equipment and guidance originally intended for use in events described in Section B.5.b. of the February 25, 2002, Interim Compensatory Measures (ICM) Order (EA-02-026) can also be considered if they are applicable to mitigating the conditions from the particular assessed performance deficiency. To avoid double-counting, application of qualitative credit should only be considered for those cases for which it wasn’t previously factored into the quantitative analysis and it cannot be used as a whole substitute for a complete loss of more than one defense-in-depth barrier. The restriction in scope of credit is inherent because of the high degree of uncertainty involved in crediting this kind of recovery.

Qualitative Credit	Impact Rating
Staged and tested equipment with sufficient guidance for operation which hasn’t been credited in the quantitative analysis.	Credit
Otherwise	No credit

Use of the Qualitative Methodology and Aggregation of the Final Result

The qualitative measure results for each element can be applied either to a decision tree or a table format as shown in Table 1 of this enclosure. The result will be the qualitative rating which is applied with the quantitative rating shown in Table 2 of this enclosure to yield the color band of the SDP finding.

New Reactor Examples of Integrated Risk-Informed Approach Using Qualitative Measures

The examples in this section involve new reactor designs and are not findings at actual plants. These postulated performance deficiencies are drawn from accumulated experience gained with the ROP for the existing operating fleet and some of the results of the tabletop exercises which were done for SRM-SECY-10-0121, “Modifying the Risk-Informed Regulatory Guidance for New Reactors” (ADAMS Accession No. ML110610166), and described in SECY-12-0081. The purpose of these examples is to show how both the quantitative and qualitative programs will work together in producing color findings for new reactor designs.

1. Loss of One Turbine-Driven EFW Pump for the United States Advanced Pressurized Water Reactor (USAPWR) Design

a) Description

The emergency feed water system (EFWS) is designed to remove reactor core decay heat and reactor coolant system sensible heat through the steam generators after transient conditions or postulated accidents such as a reactor trip, a loss of main feedwater, a main steam-line break, a feedwater-line break, a loss of offsite power (LOOP), a small-break loss-of-coolant accident (LOCA), a station blackout (SBO), an anticipated transient without scram (ATWS), or a steam-generator tube rupture (SGTR). The EFWS is not normally used during normal plant startups and cooldowns. The EFWS consists of two motor-driven pumps, two steam-turbine-driven pumps, two emergency feedwater pits, piping, valves, and associated instrumentation.

b) Postulated Performance Deficiency and Exposure Time

A performance deficiency caused by improper testing and maintenance by the licensee results in the undetected unavailability of turbine-driven EFW pump A (RPP-001A) for a period of 3 months leading up to the discovery of failure. An extent-of-condition evaluation concluded that a degraded condition might have existed on the other turbine-driven pump RPP-001D, but the pump had tested satisfactorily. All other pumps were available during that 3-month period.

c) Quantitative Risk Analysis

The USAPWR SPAR model was quantified with basic events EFW-TDP-FR-001A, EFW-TDP-FS-001A, and EFW-TDP-TM-001A set to logical TRUE with consideration of potential common-cause failure. The resultant annualized ΔCDF for the three month exposure time is estimated to be 7.7×10^{-6} per year, a numeric **WHITE** finding.

d) Qualitative Measures

(1) Defense-in-Depth

For the USAPWR, the loss of a single EFWS pump would impact decay-heat removal but would not result in the complete loss of a single barrier of defense-in-depth. This would result in a defense-in-depth impact rating of **MODERATELY DEGRADED**.

(2) Safety Margins

For this example, a potential extent-of-condition degradation existed for the other pump, which would degrade safety margins, but not at the regulatory limit. Therefore, safety margins would have an impact rating of **DEGRADED**.

(3) Condition Time

Because the condition time is more than twice the maximum allowable outage time in technical specifications, the impact rating is **SIGNIFICANTLY DEGRADED**.

(4) Qualitative Credit

For the purpose of this example, two illustrative cases will be considered:

a. The licensee did not present any additional recoveries that can be credited, which would produce an impact rating of **NO CREDIT**.

b. The licensee presented an alternate source pump which, although it was staged and maintained, was not credited in the risk analysis. This will result in a rating of **CREDIT**.

e) Conclusion

(1) No qualitative credit

Using Table 1, the qualitative rating is **INCREASED IMPACT.** Applying this qualitative rating with the estimated ΔCDF of 7.7×10^{-6} per year to Table 2 yields an overall determination for this performance deficiency of **YELLOW**.

(2) Qualitative credit

Using Table 1, the qualitative rating is **NEUTRAL IMPACT.** Applying this qualitative rating with the estimated ΔCDF of 7.7×10^{-6} per year to Table 2 yields an overall determination for this performance deficiency of **WHITE**.

2. Failure of Valves to the Passive Residual Heat Removal (PRHR) Heat Exchanger in the AP1000 Design

a) Description

The operating PRHR heat exchanger is designed to remove sufficient heat, in conjunction with available inventory in the steam generators, to cool the reactor coolant system. The PRHR heat exchanger also prevents water relief through the pressurizer safety valves during loss of main feedwater or a main feed-line break. The passive heat exchanger is mounted inside the in-containment refueling water storage tank (IRWST) and is isolated by one normally open motor-operated valve from the hot leg and two normally shut (fail-open) air-operated valves (AOVs) in parallel to the cold leg.

b) Postulated Performance Deficiency and Exposure Time

A performance deficiency by a licensee causes air-operated valves V108A and V108B not to be able to open during a postulated transient. This will render the cold-leg outlet of the PRHR heat exchanger inoperable. It is assumed that this performance deficiency was not detected by the licensee for an entire operating cycle, which limits the SDP exposure time to 1 year. For this example, the performance deficiency might be programmatic and impact valves in other systems.

c) Quantitative Risk Analysis

The AP1000 SPAR model was quantified with basic events PRH-AOV-CC-V108A and PRH-AOV-CC-V108B set to logical TRUE. The resultant ΔCDF is estimated to be 2.84×10^{-6} per year, a numeric **WHITE** finding.

d) Qualitative Measures

(1) Defense-in-Depth

For the AP1000, the PRHR heat exchanger itself is a single barrier of defense-in-depth. Therefore the defense-in-depth impact rating is **DEGRADED**.

(2) Safety Margins

For this example, the performance deficiency was initially discovered in AOV V108A/B. There is an impact to the safety margins of the remaining barriers to defense-in-depth, but it is less than the licensed safety margin, which will result in an impact rating of **DEGRADED.**

(3) Condition Time

It is assumed that this exposure period will exceed Section 3.5 of the Technical Specifications by more than double. The maximum 1-year condition time would produce a rating of **SIGNIFICANTLY DEGRADED**.

(4) Qualitative Credit

It is assumed for this example that the licensee has a separate means of remotely opening the valves. However, there is no procedure to carry this out and it is directed only by the Technical Support Center after its activation. It was not modeled in the quantitative analysis. This would produce a rating of **CREDIT**.

e) Conclusion

Applying these impact ratings to Table 1, the combined qualitative rating is **INCREASED IMPACT.** Applying the result to Table 2 with a ΔCDF of 2.84 x 10^{-6} per year yields a color determination of **YELLOW.** This finding is driven by the 1-year condition time. If the Condition Time were reduced to 1 month, the impact rating of Condition Time would be **DEGRADED**, which will result in a qualitative rating of **NEUTRAL IMPACT** and a **WHITE** color determination.

3. Failure of the RCIC Train for the Advanced Boiling Water Reactor (ABWR)

a) Description

The reactor-core isolation cooling (RCIC) System has the dual function of providing (1) high-pressure emergency core-cooling system (ECCS) flow following a postulated LOCA and (2) reactor-coolant inventory control for reactor isolation transients. The RCIC System consists of a single steam-turbine-driven pump which provides a diverse makeup source during loss of all alternating current (ac) power.

b) Postulated Performance Deficiency and Exposure Time

A performance deficiency by a licensee causes loss of the RCIC train, which goes unnoticed for one quarter, assuming a 3-month surveillance interval. Because of the nature of the performance deficiency, a great deal of uncertainty exists about operator recovery. Despite no extent of condition being found, there still exists a potential for this performance deficiency to manifest itself in interactions with other components in both remaining trains of the high-pressure core flood (HPCF) system.

c) Quantitative Risk Analysis

The ABWR SPAR model was quantified with basic events RCI-TDP-FR-TRAIN, RCI-TDP-FS-RSTRT, RCI-TDP-FS-TRAIN, and RCI-TDP-TM-TRAIN set to logical TRUE. The resultant Conditional Core Damage Probability (CCDP) for the 3-month period is annualized to a ΔCDF of 5.3 x 10^{-8} per year, a numeric **GREEN** finding.

d) Qualitative Risk Analysis

(1) Defense-in-Depth

Because there is impact to one element of defense-in-depth, an impact rating of **MODERATELY DEGRADED** was applied.

(2) Safety Margins

Because none of the safety margins of the other intact elements of defense-in-depth are affected, an impact rating of **NEGLIGIBLY DEGRADED** was applied.

(3) Condition Time

It is assumed that a 1-month condition time for RCIC is more than twice the outage time allowed by the technical specifications. Therefore an impact rating of **SIGNIFICANTLY DEGRADED** was applied.

(4) Qualitative Credit

Qualitative Credit was not considered for this case, which has a rating of **NO CREDIT**.

e) Conclusion

The quantitative result for ΔCDF is estimated to be 5.3×10^{-8} per year. For this case, the qualitative result is **NEUTRAL IMPACT**. From Table 2, the overall determination for this type of performance deficiency remains from the quantitative result of **GREEN**.

Conclusions on Methodology and Implementation Issues

The methodology that is outlined in this paper is presented as a concept to demonstrate how an approach using qualitative measures can be used to illustrate practical examples. The overall approach the staff proposes is to consider using a structured rating system for those qualitative elements which normally constitute the deterministic part of the integrated risk-informed SDP to arrive at a threshold color. This maintains the SDP fundamental attributes of objectivity and scrutability (openness) in that it is intended to provide a clear framework for decision logic that remains consistent across applicable findings. In considering this approach for integration into the framework, the staff notes that specific details of this structured rating system need to be developed and addressed in the following areas.

Selecting elements of qualitative measures

The list of elements of qualitative measures presented in this paper is conceptual and is intended to be used in developing the prior examples. In order to implement a program using qualitative measures, the staff will need to define and establish a comprehensive list of qualitative-measure elements which are compatible with the SDP.

Defining impact rating thresholds

Once the list of qualitative measures elements is established, a series of resulting impact ratings, rules on application guidance, and thresholds need to be developed for use. The staff would take into account areas of differences within the reactor types as well as the thresholds for parameters.

Establishing levels of combined qualitative ratings

A more detailed decision logic framework needs to be developed to arrive at a combined qualitative rating. At this point, the staff needs to balance the impact with potential quantitative results to ensure consistency.

Implementation

If directed to develop qualitative measures, the staff will develop a detailed plan that incorporates stakeholder participation and comments. The rationale for making the combined assessment using an approach similar to Table 2 will also be considered.

Table 1 Qualitative Measures and Qualitative Rating

Defense-in-Depth	Safety Margins	Condition Time	Qualitative Credit	Qualitative Rating
Negligibly Degraded				Neutral Impact
Moderately Degraded	Negligibly Degraded	Negligibly Degraded	Credit	Reduced Impact
			No Credit	Reduced Impact
		Degraded	Credit	Reduced Impact
			No Credit	Neutral Impact
		Significantly Degraded	Credit	Reduced Impact
			No Credit	Neutral Impact
	Degraded	Negligibly Degraded	Credit	Reduced Impact
			No Credit	Neutral Impact
		Degraded	Credit	Neutral Impact
			No Credit	Neutral Impact
		Significantly Degraded	Credit	Neutral Impact
			No Credit	Increased Impact
	Significantly Degraded	Negligibly Degraded	Credit	Neutral Impact
			No Credit	Neutral Impact
		Degraded	Credit	Neutral Impact
			No Credit	Increased Impact
		Significantly Degraded	Credit	Increased Impact
			No Credit	Increased Impact

Table 1 Qualitative Measures and Qualitative Rating (continued)

Defense-in-Depth	Safety Margins	Condition Time	Qualitative Credit	Qualitative Rating
Degraded	Negligibly Degraded	Negligibly Degraded	Credit	Reduced Impact
			No Credit	Neutral Impact
		Degraded	Credit	Neutral Impact
			No Credit	Neutral Impact
		Significantly Degraded	Credit	Neutral Impact
			No Credit	Neutral Impact
	Degraded	Negligibly Degraded	Credit	Neutral Impact
			No Credit	Neutral Impact
		Degraded	Credit	Neutral Impact
			No Credit	Increased Impact
		Significantly Degraded	Credit	Increased Impact
			No Credit	Increased Impact
	Significantly Degraded	Negligibly Degraded	Credit	Neutral Impact
			No Credit	Increased Impact
		Degraded	Credit	Increased Impact
			No Credit	Increased Impact
		Significantly Degraded	Credit	Increased Impact
			No Credit	Significantly Increased Impact

Table 1 Qualitative Measures and Qualitative Rating (continued)

Defense-in-Depth	Safety Margins	Condition Time	Qualitative Credit	Qualitative Rating
Significantly Degraded	Negligibly Degraded	Negligibly Degraded	Credit	Neutral Impact
			No Credit	Neutral Impact
		Degraded	Credit	Neutral Impact
			No Credit	Increased Impact
		Significantly Degraded	Credit	Increased Impact
			No Credit	Increased Impact
	Degraded	Negligibly Degraded	Credit	Increased Impact
			No Credit	Increased Impact
		Degraded	Credit	Increased Impact
			No Credit	Increased Impact
		Significantly Degraded	Credit	Increased Impact
			No Credit	Significantly Increased Impact
	Significantly Degraded	Negligibly Degraded	Credit	Increased Impact
			No Credit	Increased Impact
		Degraded	Credit	Increased Impact
			No Credit	Significantly Increased Impact
		Significantly Degraded	Credit	Significantly Increased Impact
			No Credit	Significantly Increased Impact

Table 2 Integrated Quantitative and Qualitative Rating

Aggregate qualitative degradation rating →

ΔCDF (CCDP normalized to 1 year) →	$\Delta CDF < 10^{-6}$	$10^{-6} \le \Delta CDF < 10^{-5}$	$10^{-5} \le \Delta CDF < 10^{-4}$	$\Delta CDF \ge 10^{-4}$
ΔLERF (CLERP normalized to 1 year) →	$\Delta LERF < 10^{-7}$	$10^{-7} \le \Delta LERF < 10^{-6}$	$10^{-6} \le \Delta LERF < 10^{-5}$	$\Delta LERF \ge 10^{-5}$
Qualitative Rating ↓				
Reduced Impact	**Green**	**Green**	**White**	**Yellow**
Neutral Impact		**White**	**Yellow**	**Red**
Increased Impact	**White**	**Yellow**	**Red**	**Red**
Significantly Increased Impact	**Yellow**	**Red**	**Red**	**Red**