

## SCHEDULING NOTE

**Title:** UPDATE ON CUMULATIVE EFFECTS OF REGULATION AND RISK PRIORITIZATION INITIATIVES (Public Meeting)

**Purpose:** To provide the Commission with a discussion of cumulative effects of regulation (CER), including the staff's identified lessons learned and possible approaches for implementing the risk prioritization initiative (RPI).

**Scheduled:** May 19, 2015  
9:00 am

**Duration:** Approx. 3 hours

**Location:** Commissioners' Conference Room, 1<sup>st</sup> fl OWFN

**Participants:**

	Presentation
<b><u>External Panel</u></b>	<b>40 mins.*</b>
<b>John Butler</b> , Senior Director of Strategic Programs, Nuclear Energy Institute <u>Topic:</u> Industry Efforts to Address CER	8 mins.*
<b>Mike Meier</b> , VP of Regulatory Affairs, Southern Nuclear <u>Topics:</u> - Licensee Perspectives on CER/RPI - Industry Overview of CER for Emergency Planning (EP) and Security	8 mins.*
<b>Otto Gustafson</b> , Director Regulatory and Performance Improvement, Palisades Nuclear Plant <u>Topic:</u> RPI Pilot Plant Experience	8 mins.*
<b>David Lochbaum</b> , Director, Nuclear Safety Project, Union of Concerned Scientists <u>Topic:</u> Consideration of CER	8 mins.*
<b>Commission Q &amp; A</b>	<b>40 mins.</b>
<b>Break</b>	<b>5 mins.</b>

**NRC Staff Panel**

**50 mins.\***

**Mark Satorius**, Executive Director for Operations

**Lawrence Kokajko**, Director, Division of Policy and Rulemaking,  
Office of Nuclear Reactor Regulation

Topic: Introduction and overview of CER

**Jennifer Uhle**, Deputy Director for Engineering

Office of Nuclear Reactor Regulation

Topic: Overview of RPI

**Steve Ruffin**, Project Manager, NRR/DPR

Topic: Current status of staff's efforts associated CER rulemaking process  
enhancements

**Antonios Zoulis**, Reliability and Risk Engineer, Division of Risk Assessment,  
Office of Nuclear Reactor Regulation

Topic: Lessons learned from pilot program and possible approaches for  
implementing RPI

**Joseph Rivers**, Senior Level Advisor on Security, Division of Security Policy,  
Office of Nuclear Security and Incident Response

Topic: RPI Considerations for EP and Security


**Commission Q & A**

**40 mins.**

**Discussion – Wrap-Up**

**5 mins.**

\*For presentation only and does not include time for Commission Q & As



# Cumulative Effects of Regulation and Risk Prioritization Initiative

John Butler  
Senior Director, Strategic Programs  
Nuclear Energy Institute  
May 19, 2015



# Basic Principle

**“Nuclear safety is advanced when licensees and the staff focus their time, attention, and resources on the issues of greater safety significance at each plant”**

(COMGEA-12-0001/COMWDM-12-0002)

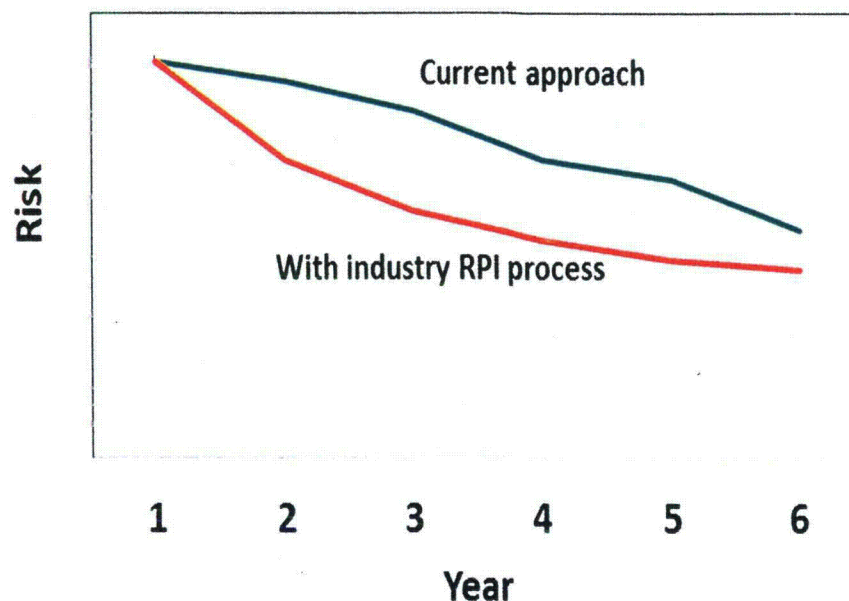
- The risk-informed prioritization method will enable operating plants to prioritize and schedule plant activities on the basis of their importance to plant safety
- The prioritization framework can be adapted by NRC to improve the management of emerging regulatory issues



# Value Proposition of Prioritization

- Prioritization and associated scheduling actions allows plants to implement sooner key plant improvements that have been deferred due to competing regulatory priorities
- Results in faster safety improvements

Concept of RPI  
(not to scale)





# Site-specific Prioritization

- Site-specific prioritization is a fundamental component of actions to address CER
- Enables activities with greatest impact on plant safety to be implemented first
- Value of process was demonstrated during pilot
  - Generic assessment highlights key attributes that impact importance determinations
  - Site-specific evaluation enables unique plant attributes to be taken into account
  - Evaluation of five importance attributes (Safety, Security, Emergency Preparedness, Radiological Protection and Equipment Reliability)



# Prioritization of Emerging Issues

- Importance characterization at a generic level was demonstrated during the industry pilot
  - Process utilizes a panel of industry experts to obtain characterizations of importance
  - Provides an overall assessment and identifies important attributes for consideration in the plant-specific evaluation
- Formation of NRC expert panel to make recommendations on proposed regulatory actions is an important step in efforts to address CER
  - Provides capability to efficiently and effectively characterize importance and identify key attributes
  - Supports efficient and safety-focused use of NRC and industry resources



## Next Steps

- Endorsement of industry prioritization guidance will facilitate industry-wide implementation
- Prioritization of emerging generic issues and rulemakings by NRC expert panel is fully consistent and supportive of Project Aim 2020 objectives
- Establishment of plant-specific implementation schedules for new rules is natural extension of prioritization process
- Expansion to address prioritization of regulatory actions for other business lines should be pursued

# **CER / RPI**

## **Cumulative Effects of Regulation / Risk Prioritization Initiative**

**NRC Commissioner Briefing, May 19, 2015**

**Michael Meier, PhD., Vice President, Regulatory Affairs  
Southern Nuclear Operating Co.**







**The CER/RPI challenge can be summed by:**

**Proper allocation of  
resources improves safety**



# Everyone Agrees: Safety-Focus the Resources

- **UCS, March 14, 2015, letter:**

**“...neither the nuclear industry nor [NRC] has the luxury of excessive resources. Consequently, resources allocated to nonproductive and low priority matters dilute... and distract... misallocation of limited resources can undermine nuclear safety.”**

- **NRC policy:**

- **The NRC should “focus agency resources on activities most important to safety and security.”** *NRC Strategic Plan*

- **The NRC’s “[r]egulatory activities should be consistent with the degree of risk reduction they achieve.”** *Principles of Good Regulation*

- **SNC agrees. Proper allocation of resources improves safety.**

# Pilot Programs

- **Pilots were completed at six different sites across the country**
- **Southern successfully piloted RPI at Hatch**
- **Ranked 20 different projects based on NEI draft guidance**
- **Only a handful of activities (three) were considered for deferral**
- **NRC observed the process**



## **Pilot Programs, cont.**

- **Example of low ranking: Degraded Grid Transformers**
  - **Low ranking: NEI Priority 4**
  - **Very Low Safety Importance**
  - **Very large commitment of resources: people, equipment, design. (large project team required)**
  - **Approximately \$40 million is required to address this issue**
  - **Hatch anticipates submitting commitment change**



# Emergency Preparedness / Security

- **The NEI guidance is robust and requires evaluations of EP and Security**
- **Hatch pilot provides an example of this process working**
  - **Cyber Security implementation, 10 CFR 73.54**
  - **Analyzing this activity resulted in a “medium” for the Cyber Security portion of the analysis**
  - **This resulted in this activity being ranked among the highest priorities**

## **Emergency Preparedness / Security, cont.**

- **The Hatch Cyber Security example gives confidence in the NEI guidance in ensuring that Security impacts are given proper consideration.**
- **EP impacts would work in the same way.**



# Deferred Activities

- **NEI guidance provides the basis for deferred scheduling of activities having low safety significance.**
- **“Backstops” for deferred activities having little or no safety significance already exist.**



# Summary

- **In the current climate, both NRC and industry are compelled to effectively allocate resources.**
- **Everyone is in agreement with the goal: focus resources on safety significant activities.**

# RPI Pilot Plant Experience

## Palisades Power Plant

May 19, 2015





# Introduction

- **Entergy Interest**
  - Cumulative Impact Initiatives
  - 10 Sites with 12 Reactors
  - PWR and BWR designs
  - GE, CE, West, B&W NSSS designs
- **Palisades Selection**
  - Aging Management
  - Risk Informed Initiatives
  - Emergent Industry Issues

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**Operational Excellence.**

# Pilot Application

- **SME Selection**
- **IDP Member Selection**
- **Training**
- **Pilot Schedule**
  - May – Site Lead Trained, Projects Selected
  - June – SME and IDP Members Selected, Process Training
  - July & August – Importance Evaluations
  - September – IDP Importance Review, Aggregation Meetings

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# Aggregation and Scheduling

## Priority Assignment Examples

Issue	Category	Importance Category					NEI Priority	Palisades Priority
		Safety	Emergency Planning	Radiation Protection	Security	Reliability		
Additional High Head Diesel Driven Aux Feedwater Pump	Regulatory	Medium	None	None	Very Low	None	2	1
Incipient Detection for Cable Spreading, electrical equipment room	Regulatory	Medium	None	None	None	None	2	2
Cooling Tower E-30B Replacement due to Aging	Plant Improvement	Very Low	None	None	None	High	2	4
Combine EOPs and SAMGs into one Procedure	Regulatory	Low	Very Low	None	None	None	3	7
Replace Refueling Machine Control Consoles due to Aging	Plant Improvement	None	None	None	None	Low	4	8
Install Permanent Personnel Fall Protection at Rx Cavity Tilt	Plant Improvement	None	None	Medium	None	None	4	11
Reliable Spent Fuel Pool Instrumentation Installation	Regulatory	Very Low	None	None	None	None	4	12
Develop and install an electrical open phase detection and isolation	Regulatory	Very Low	None	None	None	None	5	18
Replace pressurizer heater breakers due to Accelerated Aging from Elevated Ambient Temperatures	Plant Improvement	None	None	None	None	None	5	19

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# Aggregation and Scheduling

## Schedule Completion Dates Assignment Examples

Issue	Plant Condition	Current Schedule	Pilot Scheduled	Comments
Additional Diesel Driven Auxiliary Feedwater Pump (NFPA-805)	Outage	MAY 2017	MAY 2017	First left train outage to support modification implementation is 1R25.
Incipient Detection in Cable Spreading and Electrical Equipment Room (NFPA-805)	On-Line	OCT 2016	JUN 2016	Discuss with fleet projects the ability to move up modification implementation to before Jun 2016.
Cooling Tower E-30B Replacement (Aging)	Outage	MAY 2017	MAY 2017	
Combine Emergency Operating Procedures and Severe Accident Management Guidelines into one Procedure (Fukushima)	On-Line	DEC 2016	JUN 2016	
Replace Refueling Machine Control Consoles (Aging)	Outage	MAY 2017	MAY 2017	
Permanent Personnel Fall Protection Install at Rx Cavity Tilt Pit (Personnel Safety)	Outage	OCT 2015	OCT 2015	Resources available to complete in 1R24 without impacting higher priority projects.
Reliable Spent Fuel Pool Instrumentation Installation (Fukushima)	On-Line	JAN 2015	DEC 2017	Project is currently designed and funded for installation in 2015
Install Electrical Open Phase Detection and Isolation (NRC Bulletin)	Outage	MAY 2017	NOV 2018	Isolation function placed in service after 18 months of monitoring. Consider exemption to not install isolation function.
Replace Pressurizer Heater Breakers (Aging)	On-Line	MAR 2015	JUN 2019	

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# Summary

- Issue characterization evaluations provided a systematic approach using PRA insights to consistently determine the importance of projects .
- Characterization evaluations completed by SMEs and reviewed by site senior leadership provides valuable input used to make risk informed decisions on project priority.
- The project aggregation through pairwise comparison of project benefits aids in maintaining a risk reduction focus when allocating limited resources.
- IDP meetings provided a venue for station senior leadership to align priorities including key members of the plant health committee.
- The NEI process provides a common platform for the industry and the NRC staff to discuss the risk benefits of individual issues/projects.

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# **Cumulative Effects of Regulation Risk Prioritization Initiative**

**David Lochbaum**

**Director, Nuclear Safety Project**

**[www.ucsusa.org](http://www.ucsusa.org)**

**May 19, 2015**



# **Benefit Already Obtained**

**Like Notices of Enforcement Discretion two decades ago and Safety Culture more recently, the public discussions between NRC and industry about Cumulative Effects of Regulation and Risk Prioritization Initiative have increased awareness and understanding of the key issues.**

# **Goal is Admirable**

***NRC staff observed: “In many of the demonstration pilots, there is at least one plant initiative that ranked higher than other regulatory activities due to a “High” rating in Reliability and “Very Low” rating in Safety. In such instances, a licensee may defer a regulatory activity due to the higher ranking of a reliability-related plant initiative.”***

**Neither NRC nor industry has infinite resources. Proper prioritization of items allows both to properly allocate limited resources.**



# **The Challenge**

**How can CER / RPI be used, but not abused?**

**NEI-14-10 provides solid guidance on how to properly prioritize issues.**

**UCS recommends two things to better guard against abuses:**

- 1. Additional ranking factor**
- 2. Better definition of the risk factors**

# **Additional Ranking Factor**

## **NRC comments from its observations of pilot efforts:**

***“The potential process for deferral and elimination of low risk regulatory activities was not exercised by any licensee during the demonstration pilots.” and***

***“The process in the NEI draft guidance could result in continual deferral or delay of corrective actions.” and***

***“... the pilot activities did not demonstrate the NEI process for future periodic updates or the inclusion of additional or emerging issues.”***





Red Rusty Boric Acid Deposits on Vessel Flange (12RFO)



Date	Action
3/21/90	Service structure mod initiated
9/27/93	Service structure mod canceled
5/27/94	Service structure mod initiated
3/27/95	Service structure mod tabled
1/07/97	Service structure mod deferred to next outage
9/17/98	Service structure mod deferred to next outage
3/26/04	Reactor restarted after RPV head replaced



# **Additional Ranking Factor**

**NEI 14-10 defines five factors for the Importance Ranking process:**

- **safety**
- **security**
- **emergency planning**
- **radiation protection**
- **reliability**

**A sixth factor, time, must be added to guard against chronic deferrals.**



# **Defining Risks**

**Risk of what?**

**Non-conforming configuration vs.  
conforming configuration?**

**Interim or compensatory configuration  
vs. fixed configuration?**

**Guidance must better articulate do's  
and don'ts.**

# Defining Risks

<b>Table 4: Comparison Between Industry and NRC Risk Estimates</b>				
<b>Event</b>	<b>Licensee <math>\Delta</math>CDF</b>	<b>NRC <math>\Delta</math>CDF</b>	<b>Risk Difference</b>	<b>Sources</b>
ANO flood protection yellow finding	1.44E-05	1.00E-04	594%	ML14329B209
ANO Stator Drop on Unit 1 yellow finding	4.8E-06	6.0E-05	1,150%	ML14174A832
ANO Stator Drop on Unit 2 yellow finding	1.8E-06	2.8E-05	1,456%	ML14174A832
Browns Ferry Unit 1 RHR Valve red findings	1.0E-06	1.0E-04	9,900%	ML111290482 ML111930432
Fort Calhoun flood protection yellow finding	8.4E-07	3.2E-05	3,710%	ML102800342
Fort Calhoun trip relay contactor white finding	1.0E-06	2.6E-05	2,500%	ML111660027 ML112000064
Indian Point 2 steam generator tube leak red finding	6.6E-06	2.85E-05	332%	ML003770186
Monticello flood protection yellow finding	8.92E-07	3.6E-05	3,936%	ML13233A068 ML13162A776
Oconee safe shutdown facility yellow finding	8.0E-06	1.6E-05	100%	ML102240588
Palo Verde voided ECCS suction line yellow finding	7.0E-06	4.6E-05	557%	ML051010009
Watts Bar flood protection yellow finding	8.15E-09	6.35E-06	77,814%	ML13115A020 ML13071A289



**Cumulative Effects of Regulation / Risk Prioritization can help the NRC staff and industry best allocate limited resources.**

**We support the recommendation to proceed with SECY-15-0050 Option 2.**

**We oppose SECY-15-0050 Option 3 because it is not transparent.**

**Bottom Line**



# **Update on Cumulative Effects of Regulation and Risk Prioritization Initiative**

**Mark Satorius**  
**Executive Director for Operations**  
**May 19, 2015**



# Speakers

- **Jennifer Uhle, Deputy Director for Engineering, Office of Nuclear Reactor Regulation**
- **Lawrence Kokajko, Director, Division of Policy and Rulemaking**
- **Steve Ruffin, Project Manager, Division of Policy and Rulemaking**
- **Antonios Zoulis, Reliability and Risk Analyst, Division of Risk Assessment**
- **Joe Rivers, Senior Level Advisor on Security, Division of Security Policy, Office of Nuclear Security and Incident Response**

# **Responsive to Commission Direction**

- **Provided an update on CER activities for the agency (SRM-SECY-12-0137)**
- **Proposed use of risk insights to prioritize regulatory actions (SRM-COMGEA-12-0001/COMWDM-12-0002)**
- **Merged deliverables into one options paper (SRM-COMSECY-14-0014)**



# **Improving Safety by Addressing CER**

- **Increased public input through all phases of rulemaking**
- **Expanded use of risk insights to focus resources on the most risk-significant issues first**
- **Effectiveness and efficiency gained as a result**

# **Focusing on Items of Greatest Safety Significance**

- **Expanding the use of risk insights in decisionmaking**
  - **RPI complements CER**
  - **If implemented, RPI could provide an effective tool to reduce unnecessary regulatory burden for operating reactor licensees on a generic and plant-specific basis**

# **Improving Cost Estimation Accuracy**

- **Pilot use of contractors to perform independent cost estimates**
- **Update cost benefit guidance (per SECY-14-0002)**



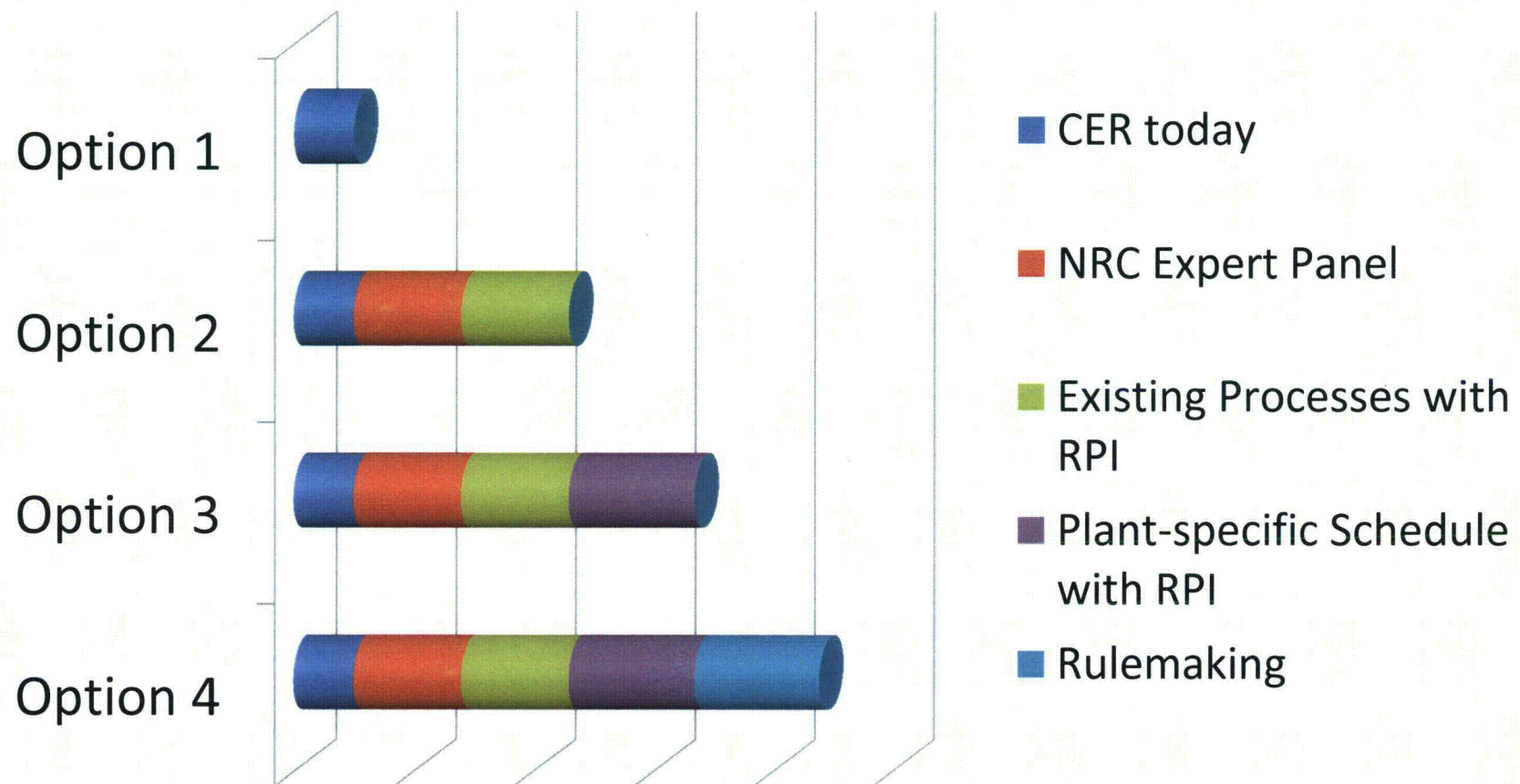
# **NMSS Implemented Additional Improvements**

- **Engaging Agreement States in planning and evaluating initiatives**
- **Maintaining Integrated Schedule and holding quarterly meetings on Fuel Cycle regulatory activities**

# **Additional Staff Work Needed to Implement CER and RPI**

- **Develop infrastructure to support CER and RPI enhancements**
- **Achieve the desired level of quality and accuracy for our regulatory analyses**

# Options for Expanding CER



**Options may be implemented in a phased approach**



# **Improving Safety by Addressing CER (Option 1)**

- **Increasing stakeholder interactions**
- **Publishing supporting guidance concurrent with rules**
- **Requesting specific comment on CER in proposed rules**
- **Developing informed implementation timeframes**

# **Expanding CER to Generic Letters (Option 1)**

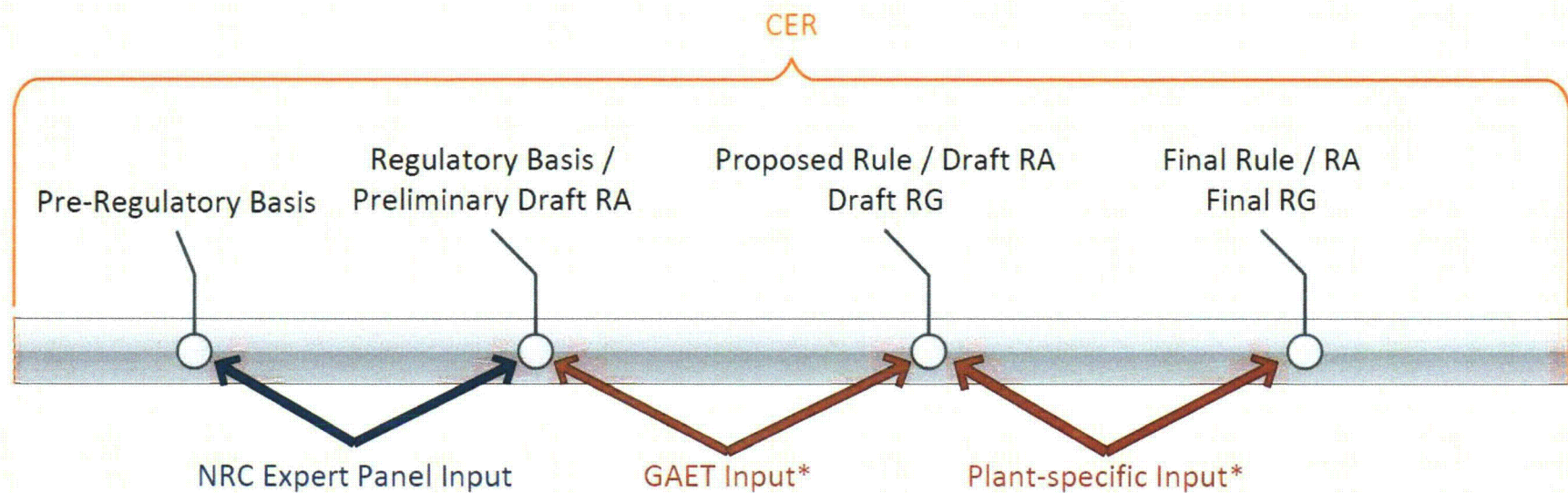
- **Public feedback to expand CER to other regulatory actions**
- **Generic letter process already incorporates most aspects of CER**
- **Including CER questions in Federal Register notice for draft generic letters**

# **Exploring the Use of an NRC Expert Panel (Option 2)**

- **Make recommendations to prioritize (or eliminate) regulatory actions across operating reactors business line through expanded use of risk insights**
- **Ensure NRC's resources and skill sets are focused on the items of highest safety significance**



# Increasing Interaction During Rulemaking



- NRC, Industry, and Public
- NRC
- Industry

\* Plants may choose not to apply Generic Assessment or Plant-Specific Initiatives (voluntary)

# **Additional Considerations for Expert Panel**

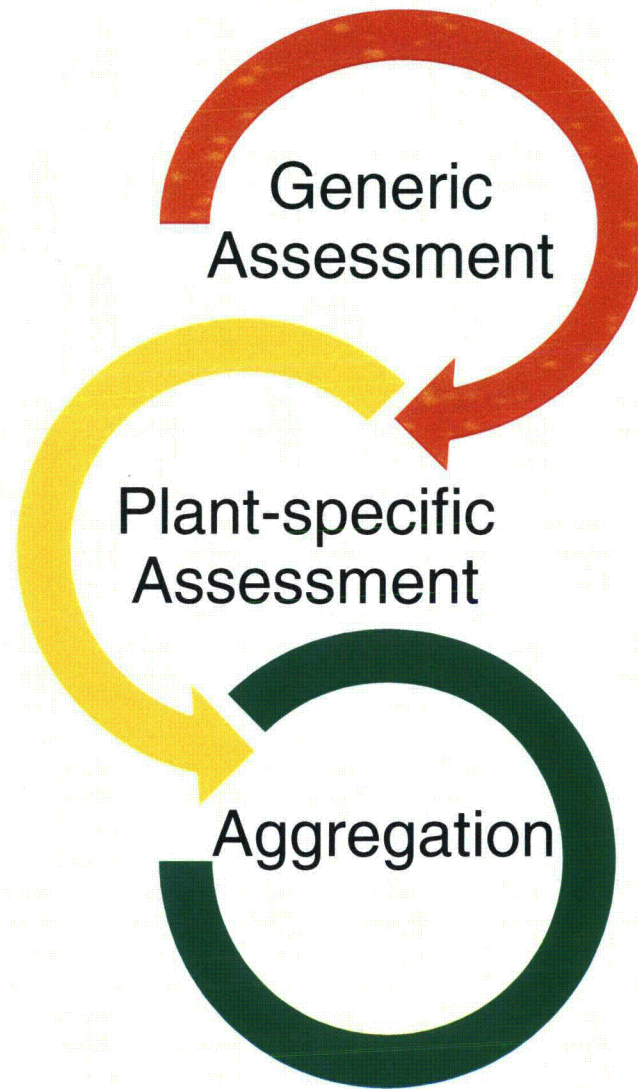
- **Concept not fully defined**
- **Charter would need to be established**
- **Schedule for regulatory actions could lengthen**

# **Nuclear safety is advanced when we focus on issues of greatest safety significance**

- **Risk-informed prioritization focuses resources**



# What is Risk-informed Prioritization?

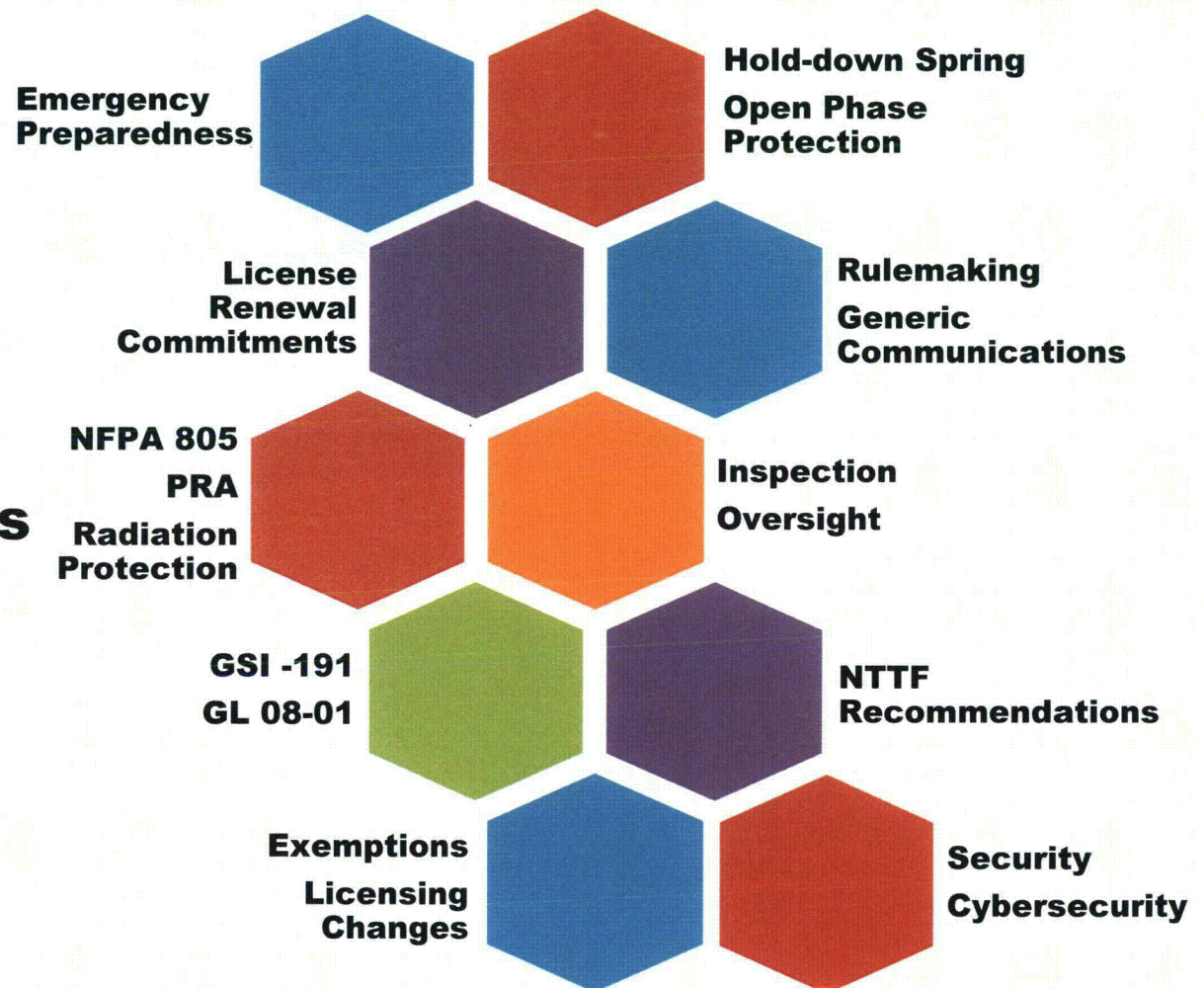


# **Engaging Stakeholders**

- **Public/Industry Interactions**
- **COMSECY to merge CER & RPI**
- **Demonstration Pilots**

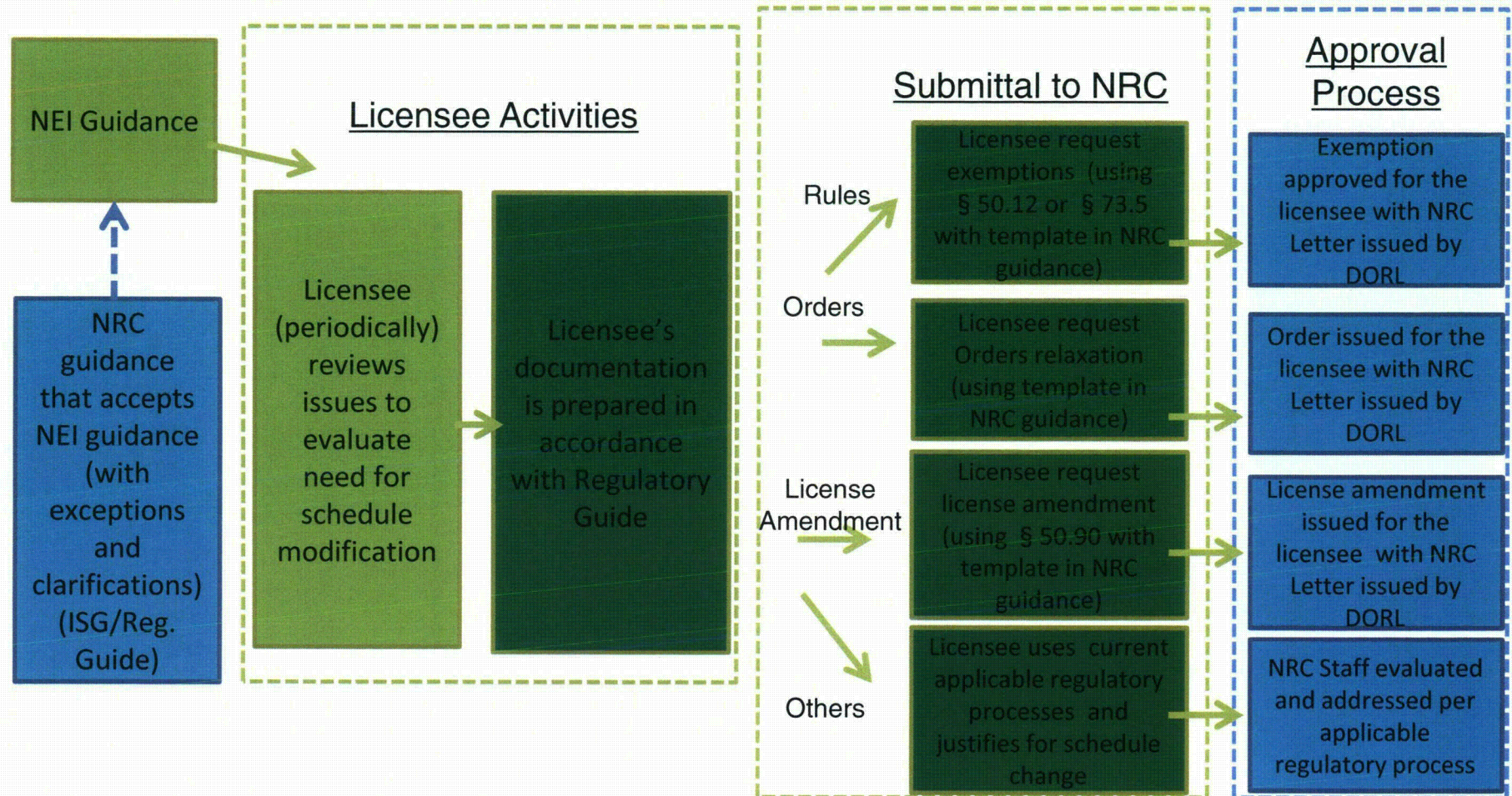
# Demonstration Pilots address issues across Offices and Divisions

- **Inspection and Oversight**
- **Rulemaking**
- **Licensing**
- **Generic Issues and Communications**
- **Emergency Preparedness**
- **Radiation Protection**
- **Security**





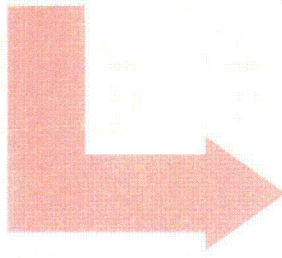
# Augmenting Existing Processes with Risk Insights (Option 2)



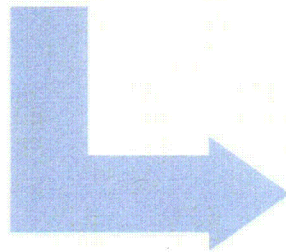


# **Developing Plant-specific Schedules for Rules (Option 3)**

**Proposed Rule**



**Licensees utilize the regulatory guide that endorses the risk prioritization methodology**



**Licensees could submit during the comment period of a proposed NRC regulation, a proposed plant-specific schedule to be codified in the text of the final regulation.**

# **Developing a Rule To Implement RPI Process (Option 4)**

- **Would allow scheduling flexibility for current and future regulations**
- **Would include a backstop to ensure issues are not continuously deferred**



# **Additional Considerations**

- **Inspection, oversight and enforcement process could be impacted**
- **Additional resources would be needed to develop infrastructure**

# **Challenges to Risk-Informing Security and Emergency Preparedness/Incident Response**

- **Difficult to measure true risk due to uncertainty and lack of randomness of initiating events**
- **Focus on conditional risk and consequences**
- **Preparedness and response focus on mitigation of consequences, so address one element of risk**
- **Ongoing efforts to identify ways to better risk-inform security**

# **Additional Considerations for Risk Informing Security**

- **Need to use the correct risk model**
- **Timely detection and adequate delay are critical for security success**
- **Need to understand how security risk relates to safety risk**
- **Must be able to produce analytic results that are reproducible**



# **Staff Recommendations**

- **Augment existing processes with a risk-informed prioritization**
- **Explore an internal expert panel expanding the use of risk insights**
- **Pilot use of plant-specific implementation schedules for new rules**

# **Conclusions**

- **Several CER process enhancements already implemented**
- **Staff is recommending additional enhancements to better focus NRC and licensee resources on safety**

# Acronyms

**CER – Cumulative Effects of Regulation**  
**DORL – Division of Operating Reactor Licensing**  
**GAET – Generic Assessment Expert Team**  
**GL – Generic Letter**  
**GSI – Generic Safety Issue**  
**ISG – Interim Staff Guidance**  
**NEI – Nuclear Energy Institute**  
**NFPA – National Fire Protection Association**  
**NMSS – Office of Nuclear Material Safety and Safeguards**  
**NRC – Nuclear Regulatory Commission**  
**NTTF – Near-Term Task Force**  
**PRA – Probabilistic Risk Assessment**  
**RA – Regulatory Analysis**  
**RG – Regulatory Guide**  
**RIC – Regulatory Information Conference**  
**RPI – Risk Prioritization Initiative**  
**SRM – Staff Requirements Memorandum**