Overview of NEI Prioritization and Scheduling Initiative

Gerald Loignon, SCE&G
Purpose

• Provide some background and an overview of the process
• Discuss the interface with Security (both physical and cyber)
A plant-specific approach to implementation of regulatory actions would serve to focus licensee and NRC attention more effectively on important safety issues in those cases in which they present higher relative risks and to defer other issues of lower safety significance. If such a prioritization were effected at each plant, it would improve the safety of the fleet and would also enable licensees to manage their resources and work in a more effective and efficient manner.

Industry’s proposal is to enhance safety by promoting the use of the risk significance of current and emerging reactor issues in an integrated manner and on a plant-specific basis when prioritizing regulatory actions, in order to recognize that each operating nuclear power plant faces unique contributors to risk.
Timeline for Process Development

- Generic tabletops at NRC (Nov – Dec 2013)
- Plant-specific tabletops (Feb – Mar 2014)
- Generic Assessment Expert Team tabletops (May 2014)
- Plant-specific pilots at six sites (Summer 2014)
- Follow-up tabletops on EP, RP and Security (September 2014)
- Guidance revised to incorporate lessons learned; Issued as NEI 14-10 (November 2014)
Overview of Prioritization Approach

• Nuclear safety impact is the primary focus
• SDP thresholds are used (reverse perspective)
• Regulatory issues and plant-initiated activities are characterized into broad categories spanning a decade of risk
• Screening questions are risk-informed adaptations of NEI 96-07 (10 CFR 50.59) guidance
• Definition of “more than minimal” is consistent with RG 1.174 and 50.59 guidance
• Cost/benefit and personnel burden reduction are possible tie-breakers or adjustments at the end of the process.
Generic Importance Characterization of Regulatory Issue (Industry Expert Team)

Plant-Specific Importance Characterization of Regulatory Issue (Plant IDP)

Plant-Specific Importance Characterization of Important Non-regulatory Activities and Modifications (Plant IDP)

Plant-specific risk information

Aggregate Importances to Determine Overall Priority

Assess resources in relation to Priority and propose safety-focused schedule

IDP Approval

Provide to NRC

Implement

Periodically update based on company business plan (~annually) and emerging issues
Key Elements and Features of Prioritization

• Generic characterization of regulatory issues by expert team
  – Problem statement and potential solutions
  – Assignment of generic priority if appropriate
  – Considerations for plant-specific prioritization

• Plant-specific evaluation

• Formal plant review by Integrated Decision-making Panel like 50.65, 50.69, RITS 5b
What gets prioritized?

- Actions addressing regulatory issues and findings
- Plant-initiated actions addressing equipment with safety implications
- Other issues and activities, as identified by resource peaks in the business plan
What does NOT get prioritized?

- General O&M, facilities maintenance, etc.
- Immediate action necessary for continued safe operation
- Immediate repairs necessary for continued power production
Importance Characterization

• 5 categories
  – Nuclear Safety
  – Security (both physical and cyber)
  – Emergency Preparedness
  – Radiological Protection
  – Reliability of SSCs
Safety Importance Characterization

- Step 1: No Impact or Adverse Impact?
- Step 2: Minimal Impact?
- Step 3A: Relative Impact versus Current Relative Risk
  - Very Low
  - Low
  - Medium
  - High
- Step 3B: Quantitative
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 = \(10^{-5}\)

<table>
<thead>
<tr>
<th>Current Risk associated with Issue</th>
<th>Potential Impact of Action Resolving Issue (Reduction in Risk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Very Small/Minimal</td>
</tr>
<tr>
<td>0%</td>
<td>0 to 25%</td>
</tr>
</tbody>
</table>

### 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   | Medium   |
| Red (H) Mid    | High     | High     | High     | High     | High     |
| Red (H) UB     | High     | High     | High     | High     | High     |
Security, EP & RP Importance Characterization

• Captures nexus with nuclear and public safety
• 2-step process following Safety importance characterization:
  – Step 1: What is the relative significance?
    • flowchart
  – Step 2: How effective is the proposed measure to address it?
    • matrix
Security Importance – Step 1

1. New Physical or Cyber Security Issue?
   - Yes: Affects a Security Key Function?
     - Yes: Can Compensatory Measures address the effect?
       - Yes: Generally, compensatory measures are temporary and not expected to remain long-term.
       - No: Can Compensatory Measures remain in effect until the issue or impact is resolved?
         - Yes: Is this an Administrative Action?
           - Yes: Is it cost beneficial to maintain comp measure?
             - Yes: Is the issue directly linked to a weakness in Target Set protection?
               - Yes: High
               - No: Medium
             - No: Low
           - No: Very Low
         - No: None
     - No: None
   - No: None
### Security, EP, RP

**Importance – Step 2**

<table>
<thead>
<tr>
<th>Importance</th>
<th>Current significance associated with the issue (from Step 1 Flowcharts)</th>
<th>Potential Impact of Action Resolving Issue (Effectiveness)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very Low</td>
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<td>Very Low</td>
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<td>Low</td>
<td>Very Low</td>
<td>Very Low</td>
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<tr>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Medium</td>
<td>Very Low</td>
<td>Low</td>
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<tr>
<td></td>
<td></td>
<td>Medium</td>
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<tr>
<td>High</td>
<td>Very Low</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
</tr>
</tbody>
</table>

- **Potential Impact:**
  - Not Effective
  - Somewhat Effective
  - Mostly Effective
  - Not Effective: 0 to 25%
  - Somewhat Effective: 25 to 80%
  - Mostly Effective: >80%
Reliability Importance Characterization

- Concerned with reliability of SSCs (safety-related or power generation)
  - aging management, availability, forced outage, power reduction, or potential for a reactor scram
- Forward looking with strong nexus with Safety
- Performance indicators (PIs) under ROP include measures of unplanned scrams and unplanned power changes; MSPI
- Exceeding a threshold for a PI could result in the plant being placed in a column of the Action Matrix with heightened regulatory scrutiny.
Criteria to assign priority level

- **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
Criteria to assign priority level (cont.)

• 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
  – 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
Adjusting Licensing/Regulatory Schedules

• Assessment results used to support existing processes for re-scheduling
• Process an exemption request per 10 CFR 50.12 or 52.7
• Use commitment change process as described in NEI 99-04, Rev. 0, Guidelines for Managing NRC Commitment Changes
Safety Importance – Step 1

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.
Safety Importance – Step 2

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.
Safety Importance – Step 3A

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}.

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<th>Potential Impact of Action Resolving Issue (Reduction in Risk)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>None</td>
</tr>
<tr>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

### Importance

<table>
<thead>
<tr>
<th>Green (VL) LB</th>
<th>Very Low</th>
<th>Very Low</th>
<th>Very Low</th>
<th>Very Low</th>
<th>Very Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green (VL) Mid</td>
<td>Very Low</td>
<td>Very Low</td>
<td>Very Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>Green (VL) UB</td>
<td>Very Low</td>
<td>Very Low</td>
<td>Very Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>White (L) LB</td>
<td>Very Low</td>
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<td>Very Low</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>White (L) Mid</td>
<td>Very Low</td>
<td>Very Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>White (L) UB</td>
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<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Yellow (M) LB</td>
<td>Very Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Yellow (M) Mid</td>
<td>Very Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Yellow (M) UB</td>
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<td>Medium</td>
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<tr>
<td>Red (H) LB</td>
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<td>Medium</td>
</tr>
<tr>
<td>Red (H) Mid</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
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</table>
Safety Importance – Step 3B

Safety Importance determination using quantitative analyses

<table>
<thead>
<tr>
<th>Category</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH:</td>
<td>$\Delta CDF &gt; 1E-4 /\text{yr}$, or $\Delta LERF &gt; 1E-5 /\text{yr}$</td>
</tr>
<tr>
<td>MEDIUM:</td>
<td>$1E-4 /\text{yr} \geq \Delta CDF &gt; 1E-5 /\text{yr}$, or $1E-5 /\text{yr} \geq \Delta LERF &gt; 1E-6 /\text{yr}$</td>
</tr>
<tr>
<td>LOW:</td>
<td>$1E-5 /\text{yr} \geq \Delta CDF &gt; 1E-6 /\text{yr}$, or $1E-6 /\text{yr} \geq \Delta LERF &gt; 1E-7 /\text{yr}$</td>
</tr>
<tr>
<td>VERY LOW:</td>
<td>$\Delta CDF \leq 1E-6 /\text{yr}$, or $\Delta LERF \leq 1E-07 /\text{yr}$</td>
</tr>
</tbody>
</table>
Reliability Importance – Step 1

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.
## Reliability Importance – Step 2

### Table 4-2 Matrix by Urgency and Characterization

<table>
<thead>
<tr>
<th>Time frame (in operating cycles) for action associated with the issue</th>
<th>Characterization of Issue or SSC</th>
<th>Safety/Risk Significant SSC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SSCs or Issues with Nexus to Safety</td>
<td>Potential for Rx Trip or Unplanned Shutdown/Power Reduction</td>
</tr>
<tr>
<td>Long (≥ 2)</td>
<td>Very Low</td>
<td>Low</td>
</tr>
<tr>
<td>Short (&lt; 2)</td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

*Importance*