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## Re-inventing Risk Informed Decision Making

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Roy Linthicum  
Chairman  
Risk Management Committee

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## Key Issues

- Risk Informed Defense-in-Depth
- Risk Communication

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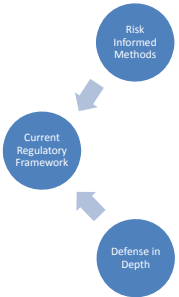
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## Current Framework



The current regulatory framework uses Risk Informed and defense in depth concepts independently with the most conservative position typically being used in the final decision (e.g., BTP 8.8 alternate AC sources)

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## Risk Informed Framework

A Risk informed Regulatory Framework needs to be built on the basic principles outlined in Regulatory Guide 1.174

Does the change meet current regulations unless it is related to an exemption?

Is the change consistent with Defense in Depth?

Does the change maintain sufficient margins?

Integrated Decision Making

Is the proposed Increase in CDF and risk small?

What Surveillances are being implemented to monitor the change?

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## Desired Risk Informed Framework

- To appropriately Risk Inform regulatory activities, risk insights need to be integrated into defense-in-depth concepts.
- PRA can be used to systematically evaluate defense-in-depth

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## Risk Informing Defense-in-Depth Concept

Defense-in-Depth	Related PRA Insights
Redundancy	Number of Failures Required
Diversity	Common Cause Failure Importance
Barriers	Accident Sequences CDF LERF
Safety Margin	Success Criteria and Uncertainty for Dominant Contributors

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## The Elephant in the Room

- Who's afraid of the big bad wolf...?
- Uncertainty
  - Healthy respect for uncertainty ...yes.
  - Rigorous identification and treatment of uncertainties ... of course.
  - Identify specific areas of key uncertainty... definitely.
  - Pursue research and other mathematical tools to reduce uncertainties in these key areas ... for sure.
  - This is not a reason to increase conservatism via DID preservation.
    - It doesn't accomplish what we fool ourselves into believing
    - It's actually counter to what we are after – True Risk Informed Decision Making.

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## Success Criteria/Safety Margin

- Must be realistic
- Margin should be known to assess importance of uncertainty
- Areas with small margins should be explored to determine impact of changes to avoid over reliance on computer simulation

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## Change Desired

- Implementation guidance for Licensees and NRC for Risk-Informing DID
  - Less focus on numerical results
  - Highlight Risk Insights
- Licensee Submittals should integrate DID and PRA Insights
- NRC staff perform integrated reviews

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## Risk Communications

- PRA practitioners speak a foreign language:
  - Cutsets
  - Importance Measures
  - CDF
  - LERF
  - Human Error Probabilities
- PRA practitioners need to speak in plant terms:
  - Accident Sequences
  - Improvement Areas
  - Operator Actions

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## Conclusions

- Industry and NRC need to collaborate on implementation guidance for DID
- PRA practitioners need to change our vocabulary so risk insights can be understood by our primary stakeholders (plant staff)

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