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Challenges in Risk Management

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Challenging Environment

- Industry
- Standards Organization
- Regulatory Environment
- Academics

Industry Challenges

- Financial Pressure
- Aging Work Force
- Model Maintenance

Financial Pressures

- We've been here before, but not as bad
 - Anyone remember Re-engineering?
- Plant Closures
 - Low cost gas
 - Subsidies
- Delivering the Nuclear Promise
 - Staff reductions
 - Enabled by various initiatives

What is being done

- DNP is broad scale
- Risk Informed Efficiency bulletins related to:
 - Flex in Risk Informed Decision Making
 - 50.69
 - Peer Review F&O Closure Guidance
 - TSTF-425 (Surveillance Frequency Control Program)
 - TSTF-505 (Risk Informed Completion Time)

Aging Workforce

- PRAs require significant judgement
- Substantial generation gap
- Limited academic curriculums
- Few new models under development
- How do we retain knowledge of retiring workforce
 - Can we learn from NRC's grow your own program

Model Maintenance

- Internal Events Model underpins all other models
- Internal Flood Models generally fully integrated with Internal Events Models
- Additional Models
 - Fire
 - Seismic
 - External Floods
 - High Winds
 - Other Unscreened Hazards

Model Maintenance

- Resources needed to maintain models current expanding
- Changes cascade from internal events model to others
- Models getting out of sync
 - May be starting new model revision before other models and existing applications updated

What can we do?

- Model Maintenance
 - Close F&Os in a timely manner
 - Use the F&O Closer Process
 - Critically evaluate model changes to determine if change is a model upgrade

Standards Development Organizations

- External Hazards Screening
- New Standards

External Hazards Screening

- Bar has been raised
 - More detail needed, requires more resources
 - Does this provide any new insights?
 - Are new hazards models providing new risk insights or useful in applications?
- EPRI Methodology Piloted
 - Can resources be saved by doing generic screening?

New Models

- Significant number of plants developing new Hazard Models
 - High Winds/Tornado
 - External Flooding
- Adds complexity
- Are any new risk insights being found?

Standards Organizations

- Ensure there are true risk insights to be gained or application for a hazard model
 - Low Power/Shutdown
 - Spent Fuel Pool
- Hazard Screening without the need to develop a model
 - New Criteria under development
 - Needs to be piloted – is it workable with a reasonable amount of effort?
 - Should we be able to screen internal events?

Focus on the Important Stuff

- Adding complexity doesn't always improve risk insights
- Start with the application in mind – build model to support it
- Inject cost effectiveness into Standards
 - More utility involvement in SDOs is urgently needed

Regulatory Environment

- Changing Regulatory Expectations
- Risk Aggregation

Changing Regulatory Expectations

- Additional External Hazards Assessed
 - Documented Screening Results
- Assessment of Uncertainty
- Capability Category II across the board
- Can't rely on old agreements – don't wait years to submit
 - 50.69
 - TSTF-505
- Approval of All Methods

What can we do?

- Standardized Submittals
 - 50.69 LAR Template
 - Coordinating Committee Review
- Updating TSTF-505 Model Application

What can we do?

- Consider abandoning the TSTF process
 - 50.69 Example
 - Develop industry template
 - Obtain NRC comments – not approval
 - Coordinated submittals by the industry as a whole
 - Adjust template as needed

Risk Aggregation

- Not all Hazard Models are created equal
- Adding “means” can mask risk insights
- Understanding uncertainty and Key assumptions is key
- What does it mean to be slightly over $1E-4$ /year

Treatment of Uncertainty

- Get comfortable with fuzzy success criteria
- Use NUREG-1855 to understand impact of uncertainty and risk insights for the application

NRC Reviews

- Per RG 1.174, staff should rely on the peer review process to focus their review on areas important to the decision
- Need better Risk Informed Decision Making process
 - EPRI is working on this
- Is there a need to approve “All methods”?
 - Limit acceptance to new methods that impact the decision

Academics

- Very few curriculums offer advanced courses in PRA
- Need younger practitioners as the older workforce retires
- Partner with Industry to understand and address needs
- Obtain and use software commonly used in the industry

The Future

- TSTF-505 Moratorium expected to be lifted by end of the year
- TSTF-425 mostly implemented
- 50.69 submittals in progress
- Need effort to identify new applications
 - Risk Informed Emergency Planning
 - Plant Reliability?
 - Security (Cyber and Physical)

The Future

- Need new methods
 - HFE dependencies
 - Equipment qualification impacts
 - Digital Modeling
- RG 1.174 Rev 3
 - Amplifies fuzziness of thresholds
 - Needs guidance on aggregation and risk informed decision making (EPRI work in progress)
- RG 1.200 Revision being started
 - Our opportunity to get engaged
 - What needs to be changed/clarified

Conclusion

- There are a lot of challenges to effective risk management, but also a lot of opportunities
- Leverage our tools to improve cost effectiveness of our plants while improving safety
- Be creative – find new risk management applications
- Seek to understand NRC position and present alternatives that meet their needs



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