Risk-Informed Licensing Applications

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U.S.NRC
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Original Risk-Informed Applications

- **In-service Testing:** RG 1.175 An Approach for Plant-Specific, Risk-Informed Decision making: In-service Testing. *Partially subsumed into Risk-Informed Technical specifications*
- **Graded Quality Assurance:** RG 1.176 An Approach for Plant-Specific, Risk-Informed Decisionmaking: Graded Quality Assurance. *Became 50.69*
- **Technical Specifications**: RG 1.177 An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications.
- **In-service Inspection**: RG 1.178 An Approach for Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping

Risk-Informed Technical Specifications 1/2

- Generic, bounding, and low risk estimates can sometimes be used with, as applicable,
  - Demonstration of applicability to a plant
  - Use of 50.65(a)(4) program to manage risk.
- Risk Informed Technical Specifications changes based generally on generic risk
  - End state modification (Initiative 1 and 3)
  - Missed Surveillances (Initiative 2)
  - Limited modification for 3.0.3 Action and completion times for selected Technical Specifications (Initiative 6)

Risk-Informed Technical Specifications 2/2

- Use of detailed, plant specific PRA results that can approach RG 1.174 acceptance guidelines requires confidence in plant specific PRA model
- Integrated Leak Rate Test frequency extension
- Programs to change technical specifications based on detailed plant specific PRA results
  - Relocation of Surveillance intervals to licensee controlled documents (Initiative 5b)
  - Flexible completion times based on real-time risk evaluation (Initiative 4b)

Risk-Informed In-service Inspections

- Risk-Informed In-service Inspection (RG 1.178)
  - Relocated and reduced the number of Class 1 and Class 2 weld inspections
- Additional changes to in-service inspections requested and accepted
  - Extended RCP flywheel inspection interval from 10 to 20 years
  - Extended Reactor Vessel weld and internals inspections from 10 to 20 year
  - Extended Vessel nozzle weld inspections from 10 to 20 years

Risk-Informed Rules

- 50.44 Combustible gas control for large dry containments
- 50.65 Requirements for monitoring the effectiveness of maintenance at nuclear power plants
- 50.69 Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors
- 50.61a Alternative Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock
- 50.48(c) National Fire Protection Association Standard NFPA 805.

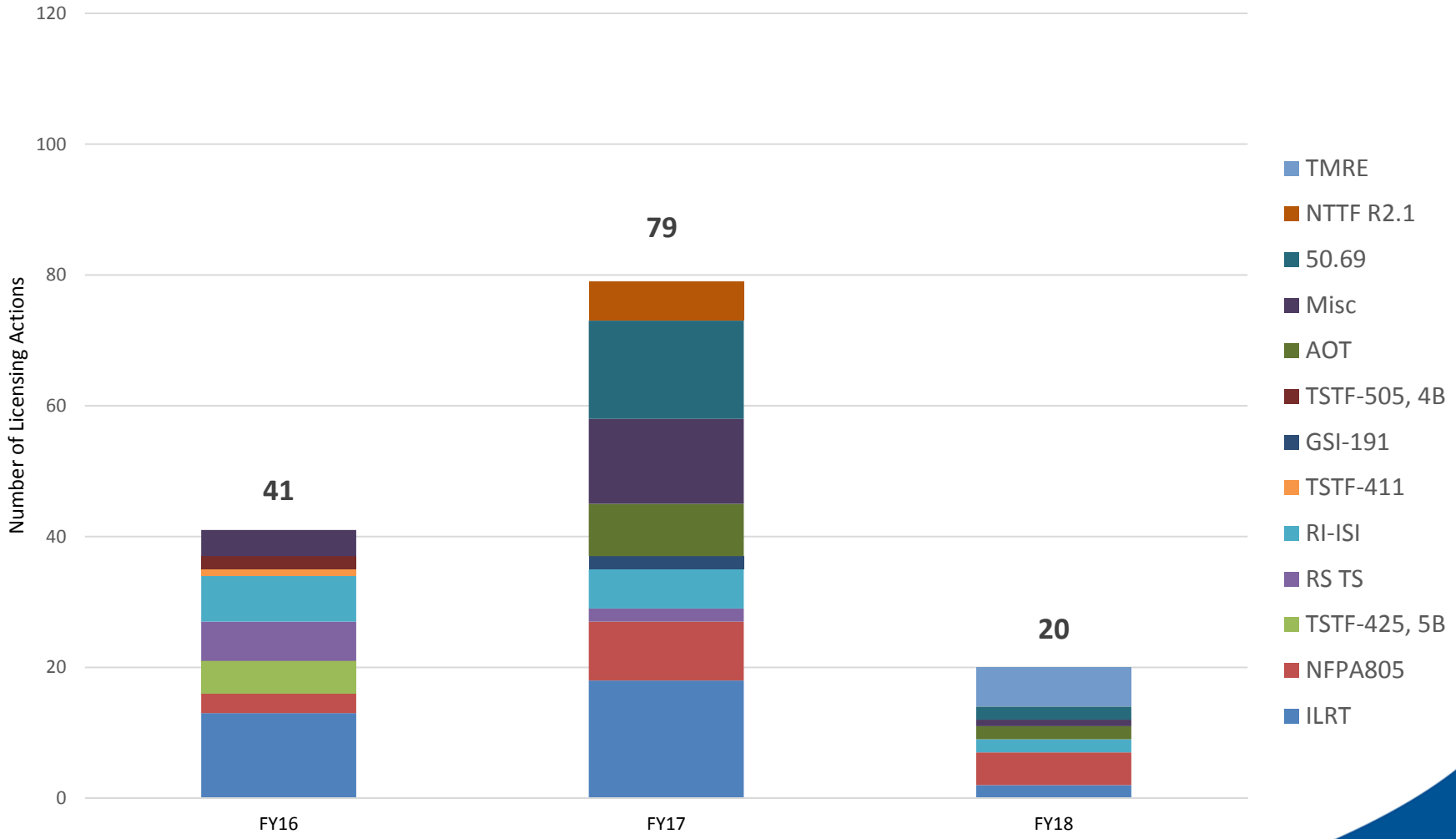
Risk-Informed Application Reviews

- Goal is to have short review times
  - Achieved for fixed-scope applications
  - Expected for 50.69 and 4b LARs with improved PRA technical acceptability processes
  - Using deviations extends the review
- External events screening/PRAs to support licensee programs vary by application types
  - Screening risk evaluations have been successful when applicable and
  - PRA models may sometimes be needed for less conservative decisions

Risk-Informed Application Reviews

- 45 LARs approved during 2017, most less than 11 months
- 40 LARs approved during 2016, many less than 12 months but including 14 NFPA-805 LARs
- Programmatic LAR and safety evaluation development have impacted industry and NRC workloads and schedules
  - 4b program development has been complex
  - External events need to be systematically considered in 50.69 and 4b programs

Risk-Informed Licensing Actions Received from FY16-FY18



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Risk-Informed Application Preliminary Estimates

Internal Events Only 50.69	Change in Approach (Already has 50.69)	New External Events PRA
Limerick – 670	Vogtle[1] – 650	Palo Verde[2] – 875
Point Beach[5] - 850		Brunswick[3] - 1350
Duane Arnold – 650		
Byron/Braidwood – 610		
Peach Bottom – 694		
Harris[4] -		

1 – Vogtle already has 50.69 and is adding an SPRA
2 – Palo Verde includes an SPRA
3 – Brunswick includes a Flooding and High Winds PRA
4 – Harris is currently undergoing acceptance review
5 – Point Beach was an early submittal and the original LAR included High Winds PRA

Conclusions

- License risk-informed programs to use the PRA to make future changes without prior staff review are becoming more prevalent
- Some of these applications use risk results to make changes up to the RG 1.174 acceptance guidelines
- *RG 1.174: The more emphasis put on the risk insights and on PRA results in the decision-making process, the more requirements have to be placed on the PRA in terms of both scope an how well the risk and the change in risk are assessed.*
- PRAs determined to be acceptable for past application may need to be improved, and the improvement demonstrated, for new applications