



PRA Models, Methods, & Tools, the Next Generation

C.R. (Rick) Grantom P.E.
South Texas Project N.O.C.

Opportunities for Improvement

- PRA Quantification
- Component Modeling
- Data Collection/Disposition
- Supporting Databases
- Support for Risk Informed Applications
- Documentation issues
- User Expertise

What should the next PRA software generation be expected to do?

Why should we improve tools, methods, etc.?

**Be faster,
more accurate,
more transparent,
more comprehensive,
more tractable,
make better use of internet/www...**

In order to:

- support increasing decision-making demands**
- support regulatory and industry needs**
- guard against misuse**
- support current and future plants**
- Improve safety and efficiencies**

So what needs to be done?

What are the issues?

What should be the objectives?

What can be expected?

Next Generation Expectations

- PRA Software should provide graphical view of modeling structures and proper PRA quantification processes for ease of communication
- Quantification engines and PRA documentation & graphic software, and associated databases should be integrated
- Risk models should be fully integrated to allow full and partial aggregate quantifications
- Currently identified technical issues associated with quantification should be resolved (e.g., aggregation, truncation)
- Current risk informed applications should be fully supported by the quantification engines

Next Generation Expectations

- All plant operating states and modes of operations should be supported within the same integrated models
- Allow multiple attributes for plant components based on their function/role in different plant operating states and modes of operation
- Plant components should be identified and cross-referenced in supporting databases to PRA basic events and validated.
- Supporting databases associated with other risk contributors (e.g., fire, flood, human reliability, etc.) should be linked to PRA software

Next Generation Expectations

- Truncation – should become a thing of the past
- Importance Measures – need to develop additional dynamic and absolute measures
- Risk Informed Applications – application specific modules to ensure risk treatments are properly performed and to eliminate error likely situations
- Incorporation of aging factors into equipment reliability
- Time dependent failure rates as opposed to constant failure rates
- Including environmental effects on equipment

Next Generation Expectations

- Need to be able to support COL processes for design, construction, and operational phases for new plants
 - Assess Design Reliability
 - Assess Operational Reliability
- Documentation For PRA inputs
 - audit controls should be incorporated
 - Tied to standards and other guidance documents

Next Generation Expectations

- Software should prevent but also identify and explain errors
- Web Based technical help for common problems
- Web Based user community to identify new technical issues or other user problems
- Software should not do so much that PRA knowledge and capability of users is obviated

Conclusions

- Some good work has already been done, but real challenges exist to meet next generation expectations
- Software improvements need to be able to be incorporated on different software platforms
- Must be part of continuous improvement by practitioners (both NRC and Industry)
- Funding will dictate pace of accomplishment

Conclusions

- Need process for all industry, regulator, and software developers to establish goals, objectives, work scope, priorities, and products possibly a standard for PRA software inputs/outputs, and other “representations” used in in PRA quantification software
- Industry groups and regulator need to team together and take the lead in establishing a forum for stakeholders to meet, determine funding strategies, establish goals, and schedule products to achieve Next Generation Expectations