

Technical and Regulatory Issues Facing NPPs

Leveraging Global Experience

1-2 June 2016 - Hosted by Exelon - Exelon Headquarters, Chase Towers, IL, US

Preliminary List of Issues (generated at the Workshop)

Notes:

1. These issues were generated by members of the Organizing Committee who attended the Workshop. They are based on the presentations and discussions, and represent a 'laundry list' of ideas and are not meant to denote final results or conclusions.
2. As mentioned in the objectives of the Workshops, these lists will be further developed over the course of the other Regional Workshops, by input received by internal and external stakeholders into a final report to inform the World Nuclear Association Working Groups and other national and international organizations in their future program of work.
3. Issues have been categorized into 3 basic areas: Technical, Regulatory and Economics/Politics.

We understand issues may overlap certain areas or may belong in a different one than has been initially chosen at this stage on the categorization of specific issues.
4. We recognize that this list will need to be re-structured in the future to better organize like topics, sub-categorize issues within their respective areas, and determine whether or not work has been done in the past, is underway or planned and what organizations are or should have responsibility for taking action.

Technical

Existing Plants / LTO:

Ageing Management

- Ageing management – prioritization based on risk informed decision
- Approach to license renewal (how long can we go).
- LTO needs ageing management, knowledge management and change management (transitions to manage as well from new licensing to construction, from construction to operation, from operation to definitive shutdown & decommissioning)
- Effects of ageing need to be considered for LTAM and inclusion in long term plans.

Evolution/Adaption

- FLEX, Upgrades, Modifications and Innovation (The plan of the plan)
- Rethink operation – without compromising safety but degree of flexibility and innovation
- Flex operation increasingly required (but detrimental to profitability!) – EPRI working on this

Performance

- Review of individual Facilities and components for condition based status
- Maintenance programs, Time vs condition based maintenance, transition to modified condition based maintenance and common sense run to maintenance (Failure) criteria.
- Can we make current existing equipment performance data bases share or can we collect to a new data base?
- Predictive Maintenance the future of an optimum performer.
- Continuous safety improvement generally obtained through PSR (Canada, Europe...) as per IAEA standards
- Making the 10 year outage just another outage.

New Build

- Maintain safety, quality and compliance even if schedule and costs have to suffer
- Introduce Construction Optimization Engineering into future planning.
- Construction, early pre-planning, virtual design.
- Smart construction, taking advantage of ingenuity across all industry.

Research/Innovation

Learning from other technologies

- Cross-over technology, innovation as it applies from other industries to strengthen the nuclear model.

- NASA like project control utilizing next generation enterprise control rooms, connectivity applications and execution templates with robotic surveillance capabilities will be needed for future mega project success.

Funding innovation

- Innovation needed: good initiatives in the US s.a. venture capital (Bill Gates and other), DOE politics (see GAIN: Gateway to Accelerated Innovation in Nuclear)

Thinking the future

- Next phase process and tooling
- Innovation across all areas!!!
- Identify the next level of Testing
- Next phase of shipping utilizing land, sea and air

Cross-cutting issues

Supply Chain

- Attention to be paid to the supply chain (Quality, Safety culture – cf INPO programme for SC to supply chain)
- Critical Path, Near Critical, Preparatory Path and approach to supply chain feed and bleed will need consideration and inclusion into the overall planning.
- Education of construction partners, making sure your partner as a firm grasp on modular open top construction vs stick build. Taking lessons learned and applying them prior instead of during project execution is key. Twenty years of experience exists make no excuses.

Knowledge management

- Issue of nuclear workforce and knowledge management
- The best use of engineering handbooks
- Sustain the knowledge base, in particular at fleet level through OG

Existing and new build – mutual interest

- Lessons learned and operational experience, are needed for new build so issues of the past are not repeated. Unfortunately in new designs this seems to be a significant issue, a balance must be considered so new construction can be performed economically and transversely operations can also be maintained at or greater than the current best running units >94% capacity factor.
- Safety analysis based on sound engineering principles.
- Continuous improvement using research results, inspections and operating experience
- Maintenance modeling make sure old and new can be maintained in an optimum fashion.
- What is the true critical path? [New Build as well as outages]
- Specification, how do you want your old plant to perform and do you want your new plant to be better or do you just want to save money and take a chance!
- New Build and current fleet go together (what is good/bad for one is good/bad for the other)

- Approaches to the execution of new construction and life extension both are the difference between success and failure. The template for success exists and needs to be used!

Codes and Standards

- Apply equivalence instead of convergence for codes and standards (convergence not realistic) ; so far there are more divergence than convergence (from ASME perspective)
- Code Standardization, can it be done?

Regulatory [Safety, Security and Environment]

Licensing and Permitting

- Regulatory information sharing among regulators;
- Permitting can be a huge obstacle, some internal issues may take years to resolve all must be factored in to the plan
- Importance of Predictability and certainty of the regulatory regime for New Build
- Use of graded approach (in the licensing)
- Challenges in L&P: lack of standardization; unpredictability, even in technical areas (see Japan)
- Need for coordination of industry and regulator
- Overall planning and other challenges, such as water permits (ex. Oyster Creek)

Others

- Next phase of inspection equipment, what is needed and what is the plan?
- How regulatory entities respond to the changing nuclear environment.

Economics / Politics

- Nuclear promise: NEI has developed bulletins for efficiency (red/blue/green as regard the necessity of their implementation); 'clean energy standard' to be developed; as per June 2,2016 61 out of 100 plants are licensed for 60 years; For NB, NEI is establishing a strategic plan for deployment of SMRs

Economics

- New build challenges commercial viability vs design balancing and the economics of safety and reliability (All is needed).
- 60 and 80 year plans
- Lower Manufacturing costs and the regional reinvigoration of the supply chain will be needed.
- Distribution of risks among stakeholders

Politics

- Need to develop policies that will prevent premature closing
- Market reform needed [NB not immune either] = same market flaws here in the US than in Europe (such as leading to negative prices)
- Work with policy makers to recognize Nuclear = Asset
- Sphere of influence should include the public
- Nuclear value = Energy, Economy, Environment (EEE)
- In the US, 80% of the US plants should be extended up to 80 years to meet CO2 expectations
- Weird situation, where, at the same time, Licenses are renewed and plants have to shutdown for market conditions!
- Do not speak on deregulated market, but on market regulated in a wrong way !
- Future Energy plan how will it look.
- Question: should NP to be part of the energy mix/part of the future - need for a National Strategy
- Public Information and heightened public relations plans need to be part of future plans.
- Next phase security, with the current world atmosphere will need consideration
- Regional politics, laws and regulations that are working against common sense application and secure base-load for a bright future this applies to all countries but seems to be manifesting itself frequently in the United States.
- Spent Fuel planning and overall waste disposal. Where, when and how.