

**P12: Use of PSA in Optimizing Resource
Allocation for Operation of Exelon NPPs**

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presentation by

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Objectives:

- Review the ways PSA is used to allocate resources at Exelon NPPs
- Suggest potential extensions of current applications

Definitions:

- “Operations” includes Modification Design, Maintenance, Licensing, along with Operator Control of Power.
 - Everything required for power generation
- Resources includes money, time, physical equipment

More Definitions:

- “Optimize” – not a rigorous mathematical study.
 - Qualitative use of PSA for
 - Decreasing money spent
 - Decreasing risk
 - Increasing MWe
- Inherent Assumption: increased risk increases cost over long term
 - Safe operation is profitable operation over long term

Examples of Cost of Risky Operation:

- Increased time spent with Regulator
- Increased time spent with Public
- Increased time shutdown (lose MWe)
 - At worst – permanent early shutdown
- Increased costs of maintenance
 - Small problems get bigger
 - Increased dose/access problems
- Increased cost from radiation release

Role of PSA:

- PSA provides indication of changes in risk associated with changes in
 - Design
 - Operation
 - Maintenance
- Guidance in resource allocation
 - “Objective” information
 - “Risk Informed”
 - Is change “too risky”?

Examples: Design

- Currently used more to say “yes” to modifications
 - Verify minimal risk increase/no PSA impact
 - Installation of time delay relays in diesel start logic – relays more reliable than diesels
- Also say “no” to modifications
 - Demonstrate “fictitious” risk benefit to cancel mod
 - Manual bypass valve in emergency boration
- Or identify “low cost” risk reductions
 - Long-term risk improvement
 - Portable backup to instrument air

Examples: Operation

- Part of normal work planning
 - For NRC “Maintenance Rule” regulation
 - Justify risk acceptable for on-line maintenance
 - Example: High Pressure Safety Injection
- Justify risk acceptable for continued operation
 - Technical Spec changes or Missed surveillances
 - Decay heat removal system unavailable at power
- Key is identify “protected” equipment to keep Defense-in-Depth
- Prioritize training
- Additional detail in later session

Examples: Maintenance

- Part of work planning
 - For NRC “Maintenance Rule” regulation
 - Work days vs. 24 hours
 - Guidance on order of restoration
 - Decay heat removal vs. Low Pressure Injection
 - Guidance on “work bundling”
 - Combine pump and valve work

Possible Future Uses of PSA

- Design –
 - Part of rigorous cost-benefit
- Operations –
 - Flexible Technical Specifications
- Maintenance –
 - Part of work instructions