


Computer Modeling

Christopher Kelley
Senior Director, Security, Exelon

Rob White
Director – Nuclear Security & Emergency Preparedness, Xcel Energy


William Guthrie
Security Performance Oversight Manager
PSEG Nuclear

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Modeling Process

Chris Kelley
Senior Director - Security, Exelon




Security Use of Modeling Tools

The industry is beginning to use computer modeling and simulation software to assist security managers in decision making

Examples Include:

- System Configuration
- Protective Strategy development or improvement
- Pathway analysis



Facility Characterization

- Goal is to gather sufficient validated data to provide a facility description that supports subsequent risk-informed decision-making
- Includes both the structural (e.g., building, SSCs) and topographic elements (e.g., roads, water features, terrain) of the facility
- Also includes a representation (e.g., physical location size, etc.) of all components of the security system.



Facility Characterization Elements

- Virtual Environment
 - Infrastructure
 - SSC's
 - Terrain/Elevations
- Delay Systems
 - Perimeter
 - Delay barriers
 - Doors




Facility Characterization Elements

- Detection Systems
 - Assessment
 - Alarms
 - CCTVs
- Response Force
 - Posts
 - Patrols
 - Equipment



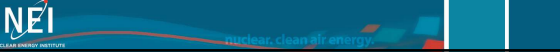
Performance Data Library

- Detection Probability Library
 - NEI Library vs. System Data Library
- Detection Probability
- Defeat Time for Barriers
 - NEI Library vs. System Data Library
- Weapons Hit/Kill Probability
 - Program site weapons systems




Analysis Process

- Define Proposed Change
 - What change is being considered – Move position, eliminate position, add position
- Perform Analysis
 - Results of Tabletop, FOF Exercises, Limited Scope Drills, Computer Modeling indicate an improvement opportunity
 - You can tabletop proposed change, run limited scope and FOF exercises and use computer modeling to validate



Security Use of Modeling Tools

Prior to the development of the simulation and modeling tools, Security Protective Strategy decisions required that SME's developed plans, conducted Table-top Exercises, Limited Scope Exercises and FOF Exercises to validate a plan or change. Multiple exercises are time consuming, can create unsafe conditions, include artificialities that are difficult to simulate and are expensive requiring large numbers of personnel to conduct.



Security Use of Modeling Tools

- Using Modeling and Simulation tools, provides Security Managers the ability to model changes for effectiveness without the safety, artificiality and cost constraints
- Hundreds of simulations can be conducted within hours providing impact of the change or enhancement
- If the results are acceptable, then “boots on the ground exercises” can be conducted to validate the change or enhancement



50.54(p) Preparation

Bill Guthrie,
Security Performance Oversight Manager
PSEG Nuclear




Analysis Process

- Define Proposed Change
 - What change is being considered – Move position, eliminate position, add position
 - Add Barrier, move barrier or eliminate barrier
- Perform Analysis
 - Review 73.55 performance requirements to determine what is affected by the proposed change and define what the 50.54(p) analysis should focus on.
 - Results of Tabletop, FOF Exercises, Limited Scope Drills, Computer Modeling indicate an improvement opportunity
 - You can tabletop proposed change, run limited scope and FOF exercises and use computer modeling to validate




Implementation Process

- Define Implementation Program
 - Develop Change Management/Project Plan
 - Use NEI 11-08 and 73.55 performance requirements to outline the analysis needed to demonstrate how the change does not reduce the effectiveness of protective strategy or day-to-day operations
- Document and Submit Change
 - Use appropriate process (e.g. internal 50.54(p) review) to determine regulatory or licensing impact.
 - Submit to NRC within 60 days of implementation if a commitment is changed.




Key Points

- Computer simulation/modeling is a valuable tool for security to assist in validating proposed changes in Protective Strategies or day-to-day operations
- Does Not constitute stand alone justification
- Still requires SME judgment, drill and exercise results and interaction with NRC




Documentation

Rob White
Director – Nuclear Security & Emergency Preparedness
Xcel Energy




Analysis

- Uncertainty analyses
 - Model uncertainties
 - Data uncertainties
 - Performance uncertainties




Analysis

- Sensitive analyses
 - Data/Performance
 - Incrementally decreased “skill-level” of responders to identify the “cliff edge” in outcomes.
 - Defense-in-depth was evaluated by removing the three most effective responders



Documentation

- Analysis and documentation should be commensurate with the complexity of the change
- If submitting Plan change, utilize NEI 11-08. Details (i.e. numerical values) should be maintained at the site and not included in the submittal – summarize results in submittal.



Path Forward

- Socialize and expand use of computer modeling to inform/support decision making for protective strategy changes
- Socialize and expand use of computer modeling to inform/support decision making for 50.54(p) changes
- Introduce into force-on-force process to reduce/eliminate artificialities



Path Forward

- Develop Standard Industry Data Base (NEI Guidance Document)
- Develop Standard Industry 50.54(p) Template for use with Computer Modeling (Attachment to NEI 11-08)
- Develop Process Document for Utilizing Computer Modeling (NEI Guidance Document)



QUESTIONS?