

Quantitative Risk Assessment of the New York State-Licensed Radioactive Waste Disposal Area (SDA)

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Purpose of Presentation

To share with the Board a first-of-a-kind application of a quantitative risk assessment (QRA) to the performance assessment of a nuclear waste facility

Previous and Ongoing Applications

- **Engineered systems: nuclear power plants, chemical and petroleum facilities, aerospace systems, transportation systems, etc.**
- **Natural systems: earthquakes, hurricanes, asteroids, tsunamis, climate change, etc.**
- **Other: animal importation, major project costs, terrorism, food safety, etc.**

Why QRA?

- **Exposure and quantification of threats and consequences**
- **Roadmap for contributors and their importance to risk**
- **Greatly enhanced basis for making the right decision for managing risk**

Fundamentals of QRA

- **Triplet definition of risk as the basic framework (scenarios, likelihoods, consequences)**
- **Scenarios that link initial conditions or system disturbances with possible consequences considering intervening events**
- **Quantification of uncertainties**

Fundamentals of QRA (cont'd)

- **Definition of probability based on the credibility of a hypothesis and the supporting evidence**
- **Information processing rooted in the fundamental rules of logic and in particular, Bayes theorem**

Form of the Results

QRA results generally take the form of an event frequency and the uncertainty in that frequency (probability of frequency concept)

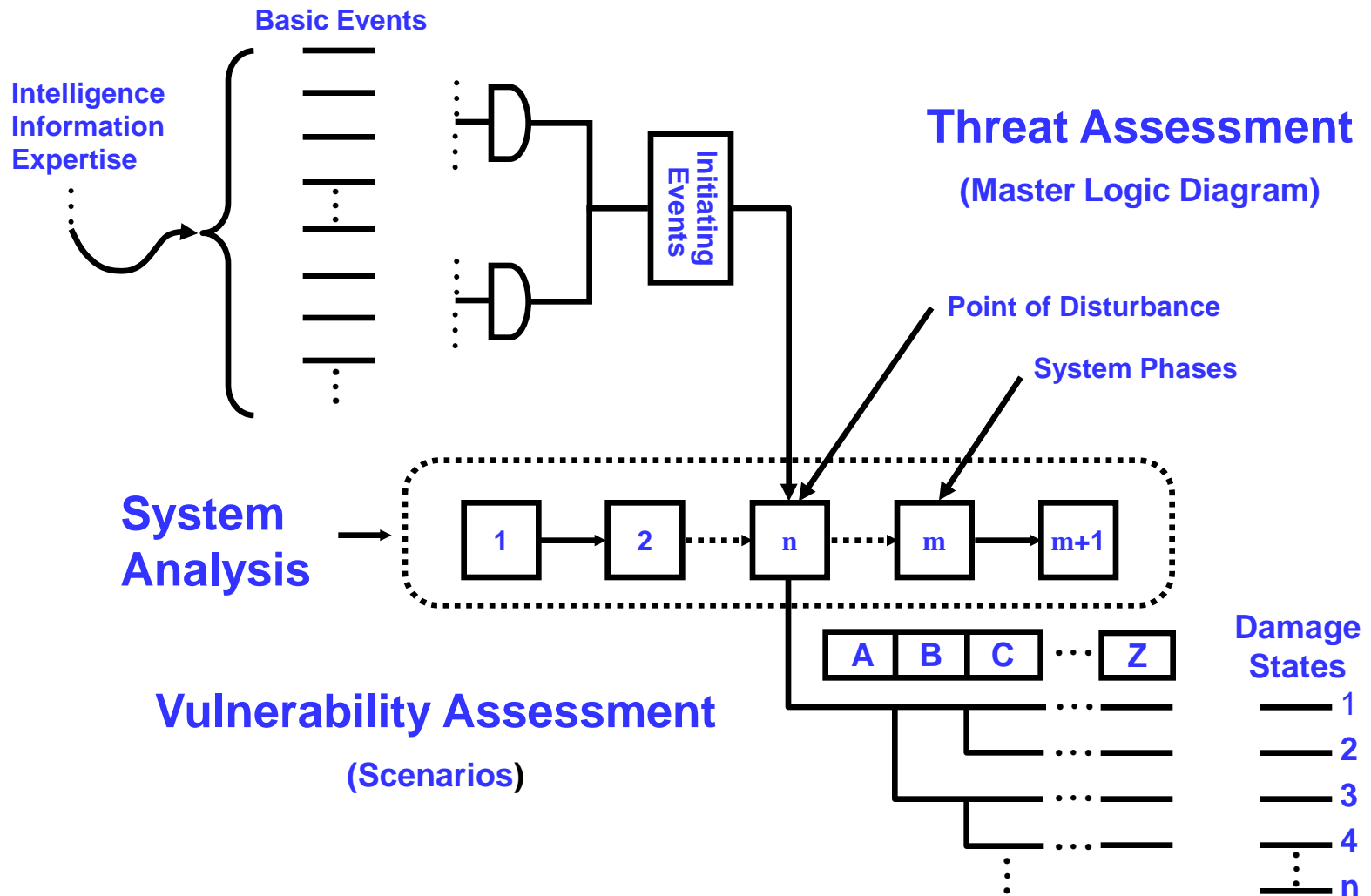
Predicting the Future

A QRA does not tell you “when” an event will occur, but it will tell you with uncertainty how often it might occur, thus providing insights on the “when” question

SIX STEP PROCESS TO QRA

- Define the system and its success state(s)
- Identify and characterize the sources of danger
- Develop “what can go wrong” scenarios and their “consequences”
- Quantify scenario “likelihoods”
- Integrate scenarios into measures of total system risk
- Interpret the results for risk management

Linking of Threats and Consequences



Quantitative Risk Assessment of a Nuclear Waste Repository

