Risk Communication Within a Risk-Informed Regulatory Decision Making Environment

J. Marble, N. Siu, K. Coyne

U.S. Nuclear Regulatory Commission

Wednesday, June 27, 2012

PSAM11 & ESREL 2012

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Outline

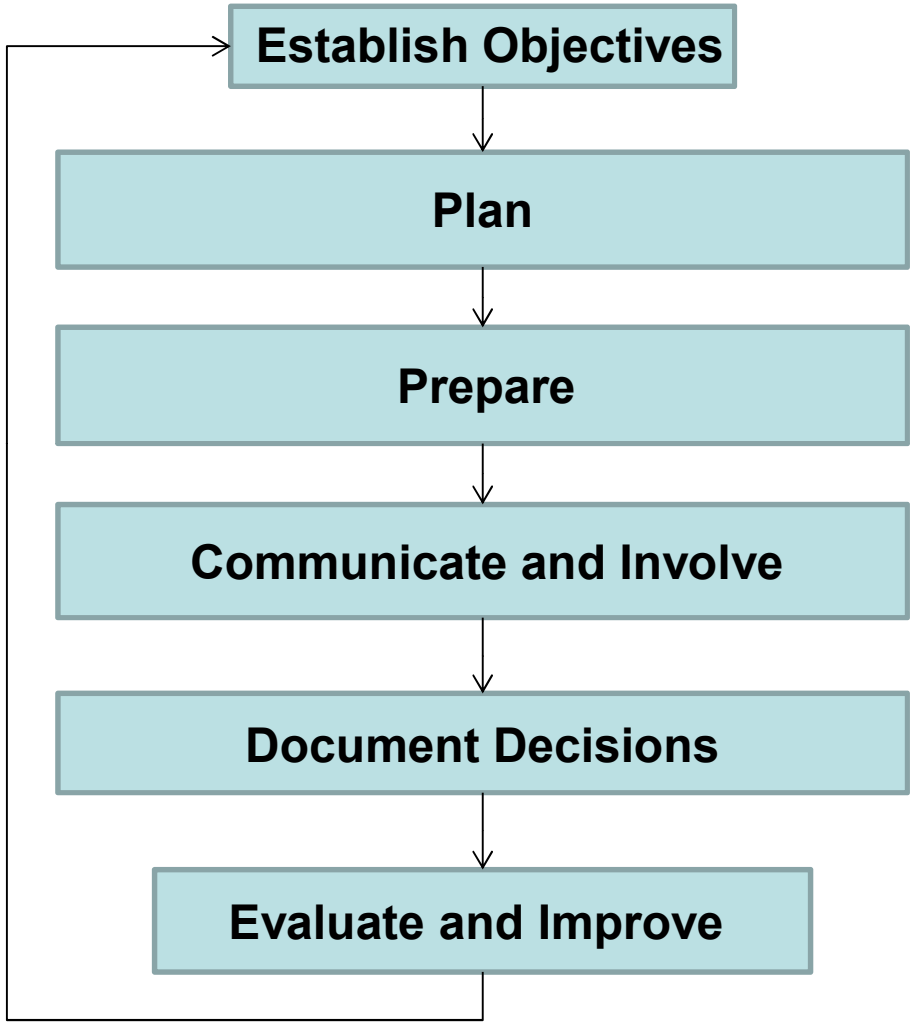
- Purpose of paper
- Internal risk communication at the NRC
- Risk Informed Decision-Making at the NRC
- Potential communication challenges
- Case studies
  - Decision problems
  - Data gathering
  - Results
- Conclusions

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Purpose of Paper

- Examine risk communication challenges unique to internal decision making (within the context of risk-informed regulation)
- Identify key issues requiring further study and guidance development

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment



NRC Guidelines for Internal Risk Communication (NUREG/BR-0318)

Chapters

1. Defining risk communication
2. Determining objectives
3. Understanding internal stakeholders
4. Building credibility
5. Developing key messages
6. Communicating to NRC audiences
7. Ensuring transparency
8. Implementing two-way communication
9. Avoiding miscommunication
10. Building consensus
11. Evaluating effectiveness

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Risk-Informed Decision-Making at the NRC

- Licensing basis changes (e.g., RG 1.174)
- Significance Determination Process (IMC 0609)
- Cost-Benefit Analysis (Regulatory Analysis, Backfit Analysis, SAMAs/SAMDAs)
- Notices of Enforcement Discretion

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Potential Challenges

Communication of:

- Possibilities and probabilities [and avoidance of oversimplifying heuristics]
- Realism/trustworthiness of results/insights (due to rarity of events)
  - Scenarios beyond design basis
  - Reliance on models and expert judgment [caution with DM intuition, modeling that challenges core beliefs]
  - Appropriateness of screening
  - Impact of uncertainties
- Technical information from multiple disciplines [with potentially different technical cultures]
- Appropriate use of risk information [including potential for and planning for misuse, potential for disenfranchising disciplines, over-enthusiasm as well as skepticism]

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Case Studies

- Purpose: explore previously identified potential challenges in a current setting using realistic examples
- Problem areas/decision problems
  - Updated seismic hazard/regulatory action
  - New reactors and risk metrics/modifications to existing guidance
  - Fuel cycle facility oversight/risk-informing process
- One-hour, guided interviews

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Case Studies

- Focus Areas
  - Screening of new vulnerabilities (GI-199)
  - Extension of existing processes to new technologies (risk metrics for new reactors)
  - Modifying existing practices for well understood facilities (fuel cycle facility oversight)
- Selected Senior Level Advisors across multiple program areas (materials, new reactors, operating reactors)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Overall Findings

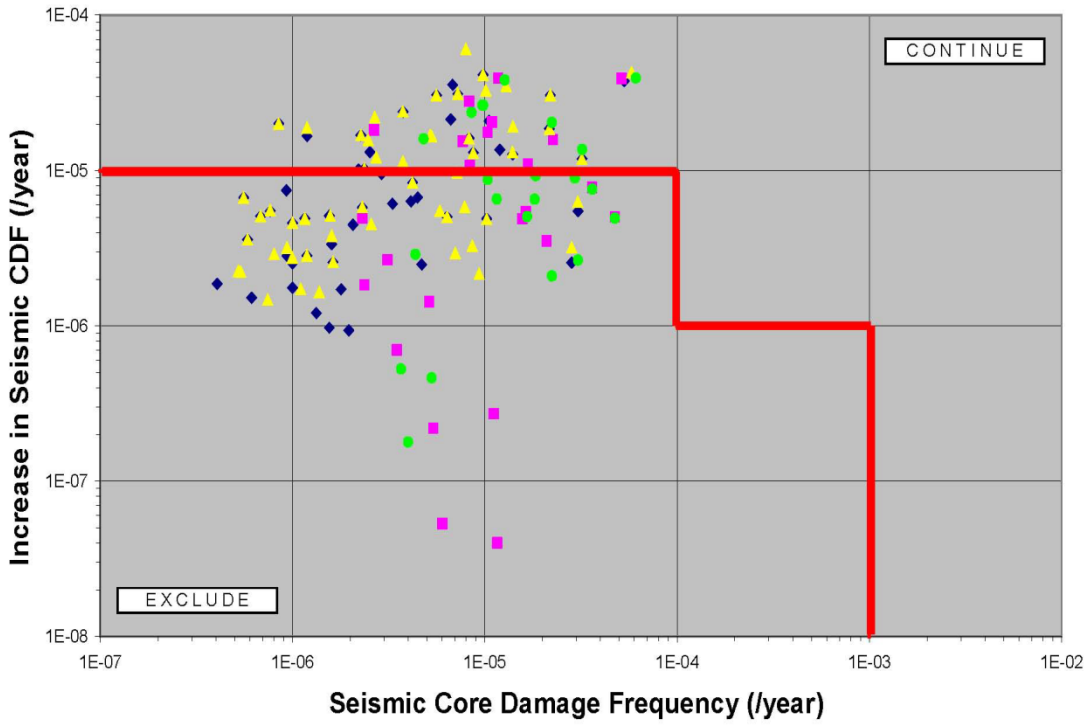
Generally, interviewees

- expressed consistent views on process challenges;
- have not experienced some “classical” risk communication issues, e.g.,
  - NRC decision-makers had a good understanding of probabilities, "risk“ concepts, and the value of risk assessments
- acknowledged continuing challenge to effectively communicate uncertainties

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Good Practices

- Provide multiple ways to communicate information:



U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Process Challenges

- Need to educate Decision-Makers
  - Multiple organizational layers of Decision-makers
  - Decision-makers potentially change over time
- Allow information "Soak time"
- Expect limited attention, multitasking

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Tools/Approaches

- Multiple communication modes
- Concrete examples
- Establishing rapport/Decision-Maker trust/confidence