

Perspectives on PSA

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Back to PSA 2013

- **Frustration over slow progress**
 - Too many people focus on the P of PRA. It's the accident scenarios that provide the most benefit
 - Use of quality PRAs could have helped to prioritize the NRC's Fukushima recommendations in a more holistic manner
 - PRAs have shown that the plant risk profile is plant-specific. Yet, in our regulations, we don't always account for this insight
- **Industry's frustration**
 - Expensive NFPA 805 applications and NRC review out of control

A Setback: Requiring Plant-Specific PRAs

- **COMGA14-0002 / COMWDM14-0002**
 - **Operating reactor licensees should submit summary plant-specific PRA information delineating the dominant risk contributors**
 - **The required PRA summaries should be available within ten years of the issuance of the SRM associated with this memorandum**
- **Commission disapproved (August 1, 2014)**
- **NRC Staff (SECY-13-0132; December 6, 2014)**
 - **“It is unlikely that the safety benefits of plant-specific assessments would meet the “substantial increase in overall protection” threshold in the backfit rule (10 CFR 50.109)”**

A Hope: Risk Prioritization Initiative

- **COMGEA-12-0001 / COMWDM-12-0002**
 - **Enhance safety by applying probabilistic risk assessment to determine the risk significance of current and emerging reactor issues in an integrated manner and on a plant-specific basis.**
 - **An additional benefit would be that licensees would be incentivized to develop high-quality PRAs that would support enhanced safety now and into the future.**

Risk Prioritization Initiative

- **Option 2 (voluntary)**
 - Establish pilot of an NRC expert panel to characterize and prioritize regulatory actions using risk insights
 - Scheduling would be based on existing processes augmented with risk information
 - Staff recommends approval

- **Option 3 (voluntary)**
 - Prospective rules/orders that allow for licensees to submit plant-specific implementation schedules using a risk-informed prioritization process
 - Staff recommends pilot

ACRS Letter, March 11, 2015

- 1. We endorse the staff's recommendations to implement Option 2 and to proceed with a trial application of Option 3.**
- 2. The staff should explicitly include risk information as an input to decisions and priorities for proposed regulatory actions regardless of the Commission's decisions about specific options or approaches presented in this SECY paper.**
- 3. A challenging aspect of the proposed risk-informed prioritization process involves the methods by which risk information and other metrics will be used to develop consistent measures of the significance of issues that affect plant safety, security, emergency preparedness, radiation protection, and equipment reliability. If the Commission endorses a prioritization process, the staff should expedite development of regulatory guidance for its use and reviews.**

More Hope: Risk-Management Regulatory Framework (NUREG-2150)

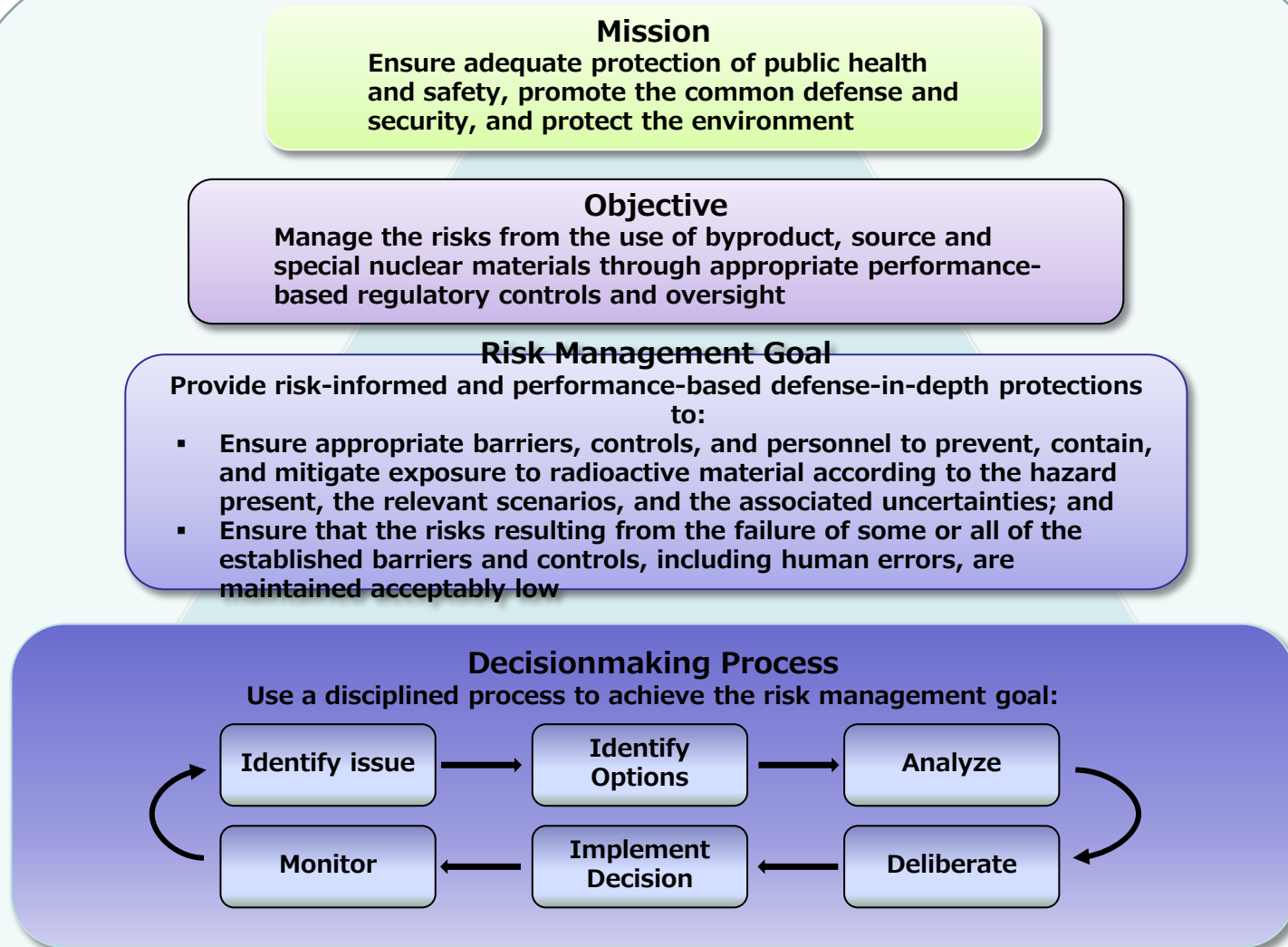


Figure ES-1 Proposed Risk Management Regulatory Framework

Power Reactor Option 2 – Voluntary Alternative Risk-Informed Licensing Basis

- **Maintain existing generic regulatory structure**
- **Rule would allow licensees with quality PRAs to apply for approval of a licensing basis supporting a performance-based, risk-informed alternative to certain deterministic regulations of low-safety significance**
- **Licensees would search for and mitigate plant-specific risk vulnerabilities**

NRC Staff presentation to ACRS subcommittee, 2/20/15

Multi-unit Issues

- **U.S.A.**
 - **Currently at most 3 units**
 - **Vogtle will have 4**
 - **Adjacent sites: Salem 1&2 and Hope Creek (3 total); Nine Mile Point 1&2 and FitzPatrick (3 total)**
- **Canada**
 - **Pickering: 6**
 - **Darlington: 4**
 - **Bruce Power: 8**
- **Japan**
 - **Kashiwazaki-Kariwa: 7**

Current Situation

- **General Design Criterion 5: Structures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units.**
- **U.S. Safety Goals are applied to single units.**
- **PRAs, with few exceptions, are performed for single units.**

CNSC Workshop

November 17-20, 2014

- **MUPSA Infrastructure**
 - Lack of experience and guidance for performing MUPSA
- **Selection of Initiating Events**
 - Most external events involve multi-unit challenges
- **Accident Sequence Modeling**
 - Need to account for multi-unit dependencies including functional, human, and spatial dependencies
 - Need to consider the timing of releases from different units
- **Site Based Risk Metrics**
 - Need for additional risk metrics beyond CDF and LERF to fully express the risk profile of a multi-unit site

CNSC Workshop (continued)

- **Accident Progression and Source term Characterization**
 - **Need to define new release categories that adequately describe the releases from multi-unit accidents. This includes release magnitudes, energies, and timing from reactor units, spent fuel storage, and other radiological sources**
- **Evaluation of Radiological Consequences**
 - **Includes consideration of different points of release from the plant, possible differences in time of release, and release energies for plume rise considerations.**
- **Site-Based Safety Goals**
 - **Need to define multi-unit site based acceptance criteria for evaluating the integrated risks from a multi-unit site PSA**