

From Policy to Performance

NRC Risk Policy for Waste Management

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Overview

- Background
- NRC's 1995 PRA Policy Statement
- Risk Management Regulatory Framework
- Low-Level Waste Regulations

Background

- Safety regulation is ultimately concerned with risk.
- Must address the “risk triplet”
 - What can go wrong?
 - How likely is it?
 - What are the consequences?
- Risk assessment is a tool for evaluating the risk triplet.

Background (cont'd)

- Most of the original regulations, guidance and requirements:
 - Based largely on deterministic analyses
 - Implemented by prescriptive requirements
- NRC objective of “no undue risk to public health and safety”
 - For reactors, probabilities not systematically quantified until 1975 (WASH-1400)
 - High-Level Waste and Transportation also had risk assessment in use in the ‘70s

NRC's 1995 PRA Policy Statement

“The use of [Probabilistic Risk Assessment (PRA)] technology should be increased in all regulatory matters to the extent supported by the state of the art in PRA methods and data, and in a manner that complements the NRC’s deterministic approach and supports the NRC’s traditional defense-in-depth philosophy.” (60 Fed Register 42622)

Risk Management Regulatory Framework

- Definition of terms in 1999 including:
 - Risk insights
 - Risk informed
 - Performance-based
- Several initiatives as guidance was updated or regulations were modified to make them more risk-informed, performance-based (e.g., the regulations for the decommissioning criteria)

Risk Management Regulatory Framework (cont'd)

- NUREG-2150 (2012), “A Proposed Risk Management Regulatory Framework” evaluates the progress in most arenas.
- For low-level waste, the following major findings were provided in NUREG-2150:
 - IMPLICIT use of risk-informed, performance-based
 - Applying comprehensive risk management techniques challenging due to events in the future
 - IMPLICIT consideration of defense-in-depth

Risk Management Regulatory Framework (cont'd)

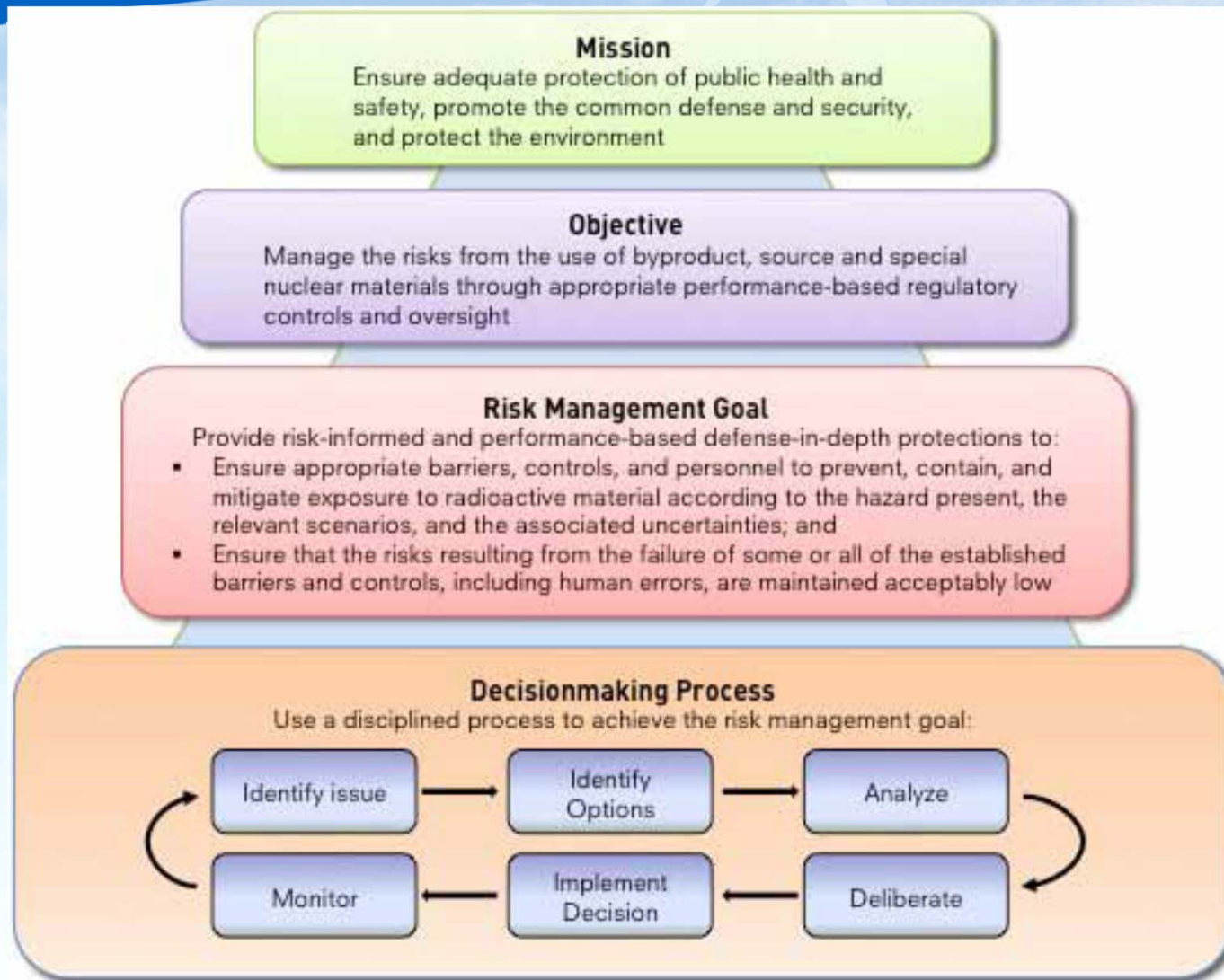


Figure 5-1 A Proposed Risk Management Regulatory Framework

Risk Management Regulatory Framework (cont'd)

- NUREG-2150 recommendations emphasized:
 - More explicit use of risk-informed, performance-based approach
 - More explicit use of defense-in-depth
 - Consideration of uncertainties
 - Stakeholder involvement in establishing Risk Management policy

Low-Level Waste Regulations

- Originally promulgated in 1981
- Concepts section – 10 CFR 61.7 – provides overview of regulatory strategy
- Mix of prescriptive and performance-based regulations
- Early guidance was either deterministic or prescriptive
- NUREG-1573 provides guidance on the performance assessment aspects for the off-site dose performance objective

Low-Level Waste Regulations (cont'd)

- Utilization of 10 CFR Part 61 in Waste Incidental to Reprocessing
- Guidance in NUREG-1854 for staff to focus reviews on those assumptions (scenarios, radionuclide inventories, features, events, processes, etc.) that drive the risk.
- Criteria of Waste Incidental to Reprocessing points to risk-informed approach with practical approach of “highly radioactive radionuclides”

Low-Level Waste Regulations (cont'd)

- Revisions to 10 CFR Part 61:
 - More explicit use of risk-informed, performance-based approaches
 - Explicit consideration of defense-in-depth
 - Incorporation of the safety case concept
 - Require an inadvertent intruder assessment
 - Allow site-specific waste-acceptance criteria
 - Require performance assessments and inadvertent intruder assessments be updated at closure

Low-Level Waste Regulations (cont'd)

- NUREG-2175 expands on guidance in NUREG-1573 and NUREG-1854
- Addresses the changes in the rule
- Will be published final with the rule

Concluding Remarks

- Low-level waste is one area that has had risk assessment implicit from the start
- Work can always be done to more explicitly utilize the tools in decision-making