



The NRC Regulatory Framework and Implementation of MC&A Safeguards

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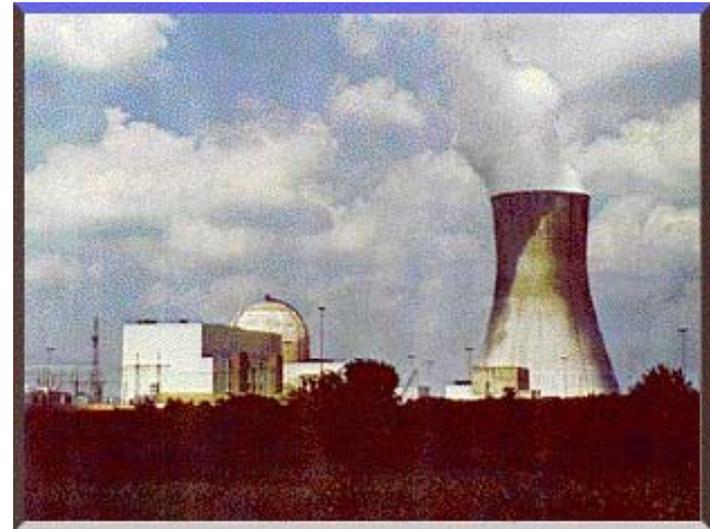
Nuclear Renaissance

- Demand for electricity is growing worldwide
- “Green” energy source in that it emits very little carbon dioxide
- Nuclear power very likely to be called on to meet future energy requirements worldwide



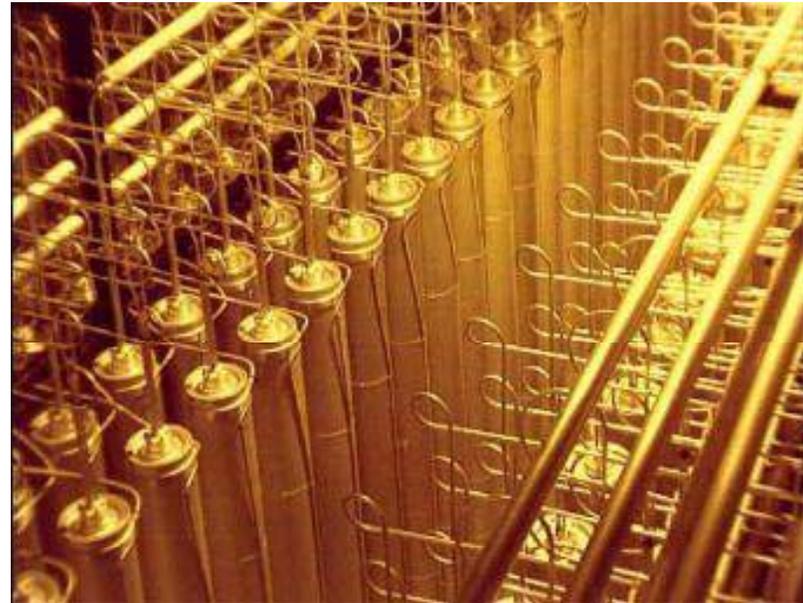
Nuclear Renaissance in the U.S.

- Power Plants
 - Nine applications received for 15 new nuclear power plants
 - Three or 4 more applications expected soon
 - In addition to the 104 nuclear power plants currently operating



Nuclear Renaissance in the U.S.

- Enrichment
 - Two new centrifuge uranium enrichment facilities under construction
 - Two more applications expected, one centrifuge and one laser





Nuclear Renaissance in the U.S.

- Mining and Milling
 - Approximately two dozen new applications for uranium milling and in situ recovery facilities are expected in the near future.
- The expansion of nuclear power is not limited to the U.S.
 - The NRC has received requests for assistance from over 40 countries that are considering establishing nuclear power programs for the first time.

Obstacles to Nuclear Renaissance

- Cost
- Public concerns
 - *Fear of nuclear proliferation*
 - *Nuclear safety concerns*
 - *Fear of nuclear terrorism*
 - *Radioactive waste disposal*
- Maintaining safe operation of existing facilities while spending resources necessary to build new facilities

Nuclear Renaissance

- Maintaining effective programs that will ensure safe and secure operations and safeguard nuclear material is essential if the nuclear renaissance is to survive to maturity.
- A nuclear event anywhere – an accident, nuclear explosion, dirty bomb – would have enormous consequences for the entire nuclear industry worldwide.





NRC Goals

- Safety Goal: Ensure adequate protection of public health and safety and the environment.
- Security Goal (including Safeguards): Ensure adequate protection in the secure use and management of radioactive materials.
- Requires adequate and effective safety, security, and safeguards programs working within an established regulatory framework

Fundamentals of NRC Regulation





Regulatory Framework

- Regulations, Guidance, and Standards
- Licensing, Certification, and Decommissioning
- Oversight
 - Inspection
 - Periodic Performance Assessment
 - Enforcement

Enforcement

- Failure to operate safely and securely and to safeguard nuclear materials is subject to enforcement action.
- Enforcement action is taken in response to violation of NRC requirements.
 - Possible civil penalty, with the amount commensurate with the severity level of the violation
 - Statutory authority to take licensing action

Regulatory Framework

- Regulatory framework is not static
 - Events assessment
 - Issues with generic implications described in information notices that are published and widely disseminated
- Support for Decisions
 - Research activities
 - Formal risk assessment



MC&A Program

Purpose

- Control and account for special nuclear material at fixed sites and document the transfer of special nuclear material.
- Control and account for source material at enrichment facilities.

Objectives

- Ensure that the licensee has implemented and maintains systems that can detect and protect against loss, theft or diversion of SNM.
- Ensure that if loss, theft or diversion does occur, the licensee's MC&A system triggers timely detection, response, and recovery operations.
- Meet international reporting obligations.

Risk-Informed/Performance-Based

- Graded safeguards - relative to material
 - Stricter requirements for facilities with more desirable SNM
 - More frequent and more intensive inspection and review for facilities with more desirable SNM
- Focus on those aspects of licensee performance that are crucial to protecting material against loss, theft, or diversion
 - Use of risk insights, engineering analysis, and judgment
- Controlling the level of risk to acceptable levels in accordance with the requirements



MC&A Performance Goals

- No substantiated loss of an SNM item
- No substantiated inventory difference (ID, or MUF) when compared with normal expected performance and judged to be caused by theft or diversion (applies to processing facilities)
- No substantiated unauthorized enrichment or production of SNM (specific to enrichment facilities)
- No substantiated breakdown of the MC&A system that significantly weakens the protection against theft, loss, or diversion of SNM

MC&A Inspection Goals

Primary goal

- Ensure that the licensee's MC&A system adequately detects and protects against the loss, theft, or diversion of the special nuclear material (SNM) that the licensee is authorized to possess, store, and utilize at its facility.

Secondary goal

- Ensure that if loss, theft, or diversion does occur, the licensee's MC&A system triggers timely detection, response, and recovery operations.



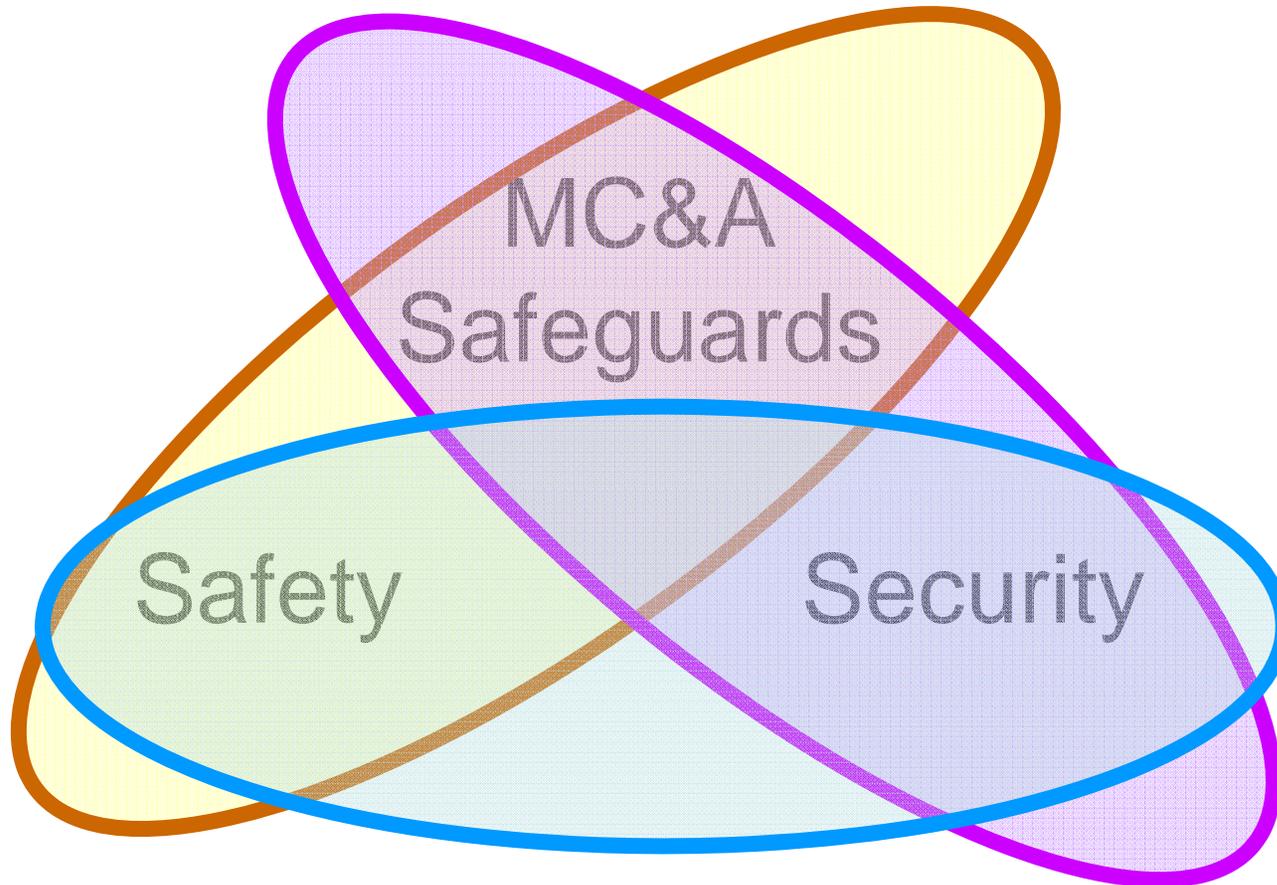
Basic NRC Safeguards Approach

- Maintain complete records of all nuclear material transactions, including shipments, receipts, discards, inventory, etc.
- Establish and follow procedures for accounting and control.
- Perform periodic physical inventory (annual or semi-annual) with distinct cut-off between inventory periods.
- Resolve any differences between book and physical inventories.
- Report all shipments and receipts and the results of physical inventory (the material balance) to the national nuclear material database.
- Report any loss of special nuclear material greater than 1 gram.

Additional Safeguards Requirements

Fuel manufacturing and uranium enrichment facilities:

- Personnel are trained and qualified.
- All special nuclear material that is received, shipped, discarded, or inventoried is measured.
- Quality of measurements is controlled.
- Items containing special nuclear material are monitored and controlled between inventory listings.
- Special nuclear material is monitored during processing using statistical quality control techniques.



Safety-Security-Safeguards

- Safety, security, and safeguards are often addressed as totally independent systems.
- Cooperation can be constrained by organizational boundaries.
- Communication between safety, security, and safeguards staff can be inadequate.



Safety-Security-Safeguards

- Requires full cooperation and communication
 - Exhibit strong S-S-S culture
 - Support through organizational structure
 - Factor in trade-offs in seeking “net best risk”
 - Demonstrated achievement of S-S-S
 - Facilitated by an effective regulatory framework
- Authority to possess nuclear material and operate a domestic nuclear facility licensed or certified by the NRC is contingent on establishing and maintaining effective safety, security, and safeguards programs.



NRC Values Openness

- “Nuclear regulation is the public’s business.”
 - Williams Anders, 1st Chairman of NRC, 1975
- NRC organizational effectiveness objective: NRC appropriately informs and involves stakeholders in the regulatory process.
- NRC Strategy: Provide for meaningful stakeholder involvement in decision-making without disclosing classified, safeguards, proprietary, and sensitive unclassified information.

Openness and Transparency

- Effective safety, security, and safeguards depend on transparency.
- Nuclear material records must be open and transparent to the inspector.
- The public needs confidence that controls are effective.
- Transparency and openness are essential to ensuring that facilities operate safely and that material is not diverted to hostile use.

Threat Reducing Policies

- Adherence to international laws and treaties to safeguard nuclear material and to operate nuclear facilities safely
- Effective safety, security, and safeguards programs, that are open and transparent, before acquisition of nuclear technology or material
- Effective regulatory framework
- Sharing of operating experience and “best practices” to strengthen safety, security, and safeguards