

NRC Response to Potential Nuclear Material Loss

FCIX, June 9-10, 2015

Bruce W. Moran

Senior Safeguards Analyst

Office of Nuclear Material Safety and Safeguards

U.S. Nuclear Regulatory Commission

NRC Strategic Plan

Strategic Objective

- Ensure the protection of nuclear facilities and radioactive materials.
- Nuclear facilities and radioactive materials are protected against hostile intent by:
 - Control of access to facilities and materials
 - Controls on radioactive materials
- Controls to prevent those with hostile intent from:
 - Damaging a nuclear facility producing significant release of radioactive material
 - Obtaining radioactive material for malevolent use

Physical Protection

- Protects radioactive materials and facilities from outsider threats
- Protects against insiders removing radioactive materials from the facility
 - Coordinates with material control and accounting

Material Control and Accounting

- Protects against the insider threat
 - Authorized movements by authorized persons
 - Nuclear material in authorized locations
 - Confirms material not stolen or diverted
- Can also identify
 - Accumulation in process lines (hold-up)
 - Operational mistakes

Material Control and Accounting

- **Assessment**
 - Program component effectiveness
 - Detect before malevolent act
 - Assure physical protection system effectiveness
 - Other causes of theft indicators
 - Operational process upset,
 - Lack of effective nuclear material management controls, or
 - Mistakes in documentation

Material Control and Accounting

10 CFR Part 74.11(a),

- If any item has been determined to be potentially lost, regardless of size, the licensee must notify the NRC Operations Center within 1 hour of discovery of
 - The potential loss or theft or other unlawful diversion of special nuclear material which the licensee is licensed to possess
 - Any incident in which an attempt has been made to commit a theft or unlawful diversion of special nuclear material.

Material Control and Accounting

10 CFR 74.31, 33, 43, and 59

- Loss exceeding control limits
 - Inform the Director of NMSS
 - Time period specified for the type and quantity of material
 - 10 CFR Part 74
 - Fundamental Nuclear Material Control Plan.

Material Control and Accounting

- Evidence of theft or diversion act
 - Loss of an item
 - Loss exceeding process control limits
 - Loss exceeding statistical limits
- Before the potential loss is reported
 - Licensee actions to locate the nuclear material within the facility
- Investigations to resolve the potential loss could take hours to weeks

Loss of Nuclear Material Item

- Loss of item could be:
 - Insider theft not caught by the physical protection system
 - Diversion of nuclear material in preparation for theft
 - Preparations for radiological incident,
- Alternatively, the potential loss could be
 - An approved item movement not correctly recorded

Loss of Nuclear Material Item

- **Fundamental Nuclear Material Control Plans**
 - Procedure and times for investigating missing items
 - If missing item not found, reported within 1 h
 - Licensee activities to locate the item must remain on-going to determine cause
- **NRC response to the notification must be based on**
 - Type and quantity of nuclear material
 - Status of the licensee's investigation

Loss of Non-Item Nuclear Material

- Loss of nuclear material could be
 - Removal of part or all of the nuclear material from items
 - Removal of nuclear material from the process
 - Theft not caught by physical protection system
 - Diversion for later theft or a radiological incident
- The loss of control could also be
 - A process upset with accumulation of nuclear material
 - Incorrectly performed accountability

Loss of Non-Item Nuclear Material

- Determination of process losses and inventory differences
 - Affected by variations in process operations
 - Nuclear material measurement uncertainties
 - Among others.
- Statistical control limits give confidence
 - High likelihood of an actual loss

Loss of Non-Item Nuclear Material

- When loss cannot be reconciled
 - Reported to Director of NMSS
 - Licensee activities must remain on-going to determine cause
- The NRC response to the notification must be based on
 - Type and quantity of nuclear material
 - Status of the licensee's continuing investigation

Unresolvable Potential Loss

- Theft must be considered a real possibility
- Established procedures initiated by NRC
 - Notify other Federal agencies about the loss
 - Communicate appropriate information to Congress, the public, and other external stakeholders
 - Meet domestic and international reporting obligations
- Assistance of other Federal agencies requested
 - With agreement of the licensee or Agreement State
 - To assist in the search and recovery of the nuclear material