Module 9

Quantifying Late Detection in MC&A

Learning Objective

- **Understand the concept of late detection**

- **Review the statistics used in MC&A**

- **Specify the Pd and timelines for Pd for MC&A elements for item inventories**

- **Review elements of process control (e.g., limits of error on the inventory difference) as they relate to bulk processes.**

- **Specify the timelines and detection thresholds for Pd for MC&A elements for bulk or Processing Operations**

Late Detection – Is it late?

- ## Classic Definition

  "When detection occurs too late to prevent a theft, it is called a late detection or late alarm. Activities or events that may provide late detection usually belong to material control and accountability (MC&A) activities "

  (Evaluating late detection capability against diverse insider adversaries - Sicherman, A. Lawrence Livermore National Lab., CA (USA) Transactions of the American Nuclear Society ; Vol/Issue: 55; 3. international conference on facility operations safeguards interface; 29 Nov - 4 Dec 1987; San Diego, CA (USA); DOE Project)

A better definition???

"When detection occurs too late to prevent a **theft of a significant quantity**, it is called a late detection or late alarm. Activities or events that may provide late detection usually belong to material control and accountability (MC&A) activities "

So sometimes maybe MC&A isn't really late at all?

Discussion –

Contrasting with other common examples

Correct words?

- **MC&A Delayed but soon enough detection**
    - **Identifies the anomaly**
    - **Identifies it before it becomes significant**
    - **Enables corrective actions to be implemented.**

Statistics used in Safeguards

- **Sampling and inspection plans**
  - **Attributes or acceptance sampling plans where the population, *N,* is unacceptable, if one or more defects is found in a sample of size *n***

- **Process Control**
  - **Measurements or Measurement control**
  - **Standards and Traceability**
  - **Quantifying the error of measurement**
  - **Effect of measurement error on Safeguards decisions (e.g., Material balance or inventory difference evaluation)**
  - **Controlling and reducing the error of measurement**