



Statistical Concepts in Nuclear Safeguards

COURSE DESCRIPTION

- This course prepares participants to understand how statistical methods are used to evaluate materials accounting data and to assess safeguards effectiveness.
- A primary focus of this course is to understand how uncertainties in the various measurement techniques (destructive assay and various nondestructive assay techniques) are determined and how those uncertainties are incorporated into the facility accountancy.
- The course is composed of lectures that describe the statistical concepts, followed by laboratory exercises on counting statistics. In addition classroom exercises will provide first-hand experience on propagation of variance and statistical methods used in material accountancy.

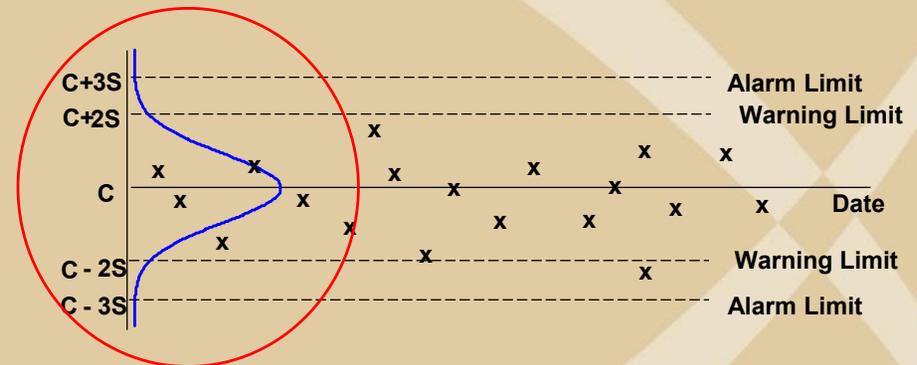
NDA Concepts Covered:

- ✓ Fundamental statistical principles
- ✓ Propagation of variance techniques
- ✓ Statistics methods applied to destructive and nondestructive measurement techniques
- ✓ Control charts and measurement control
- ✓ Statistical concepts applied to nuclear safeguards

$$\sigma_r^2 = \left(\frac{\partial f}{\partial x}\right)^2 \sigma_x^2 + \left(\frac{\partial f}{\partial y}\right)^2 \sigma_y^2 + \left(\frac{\partial f}{\partial z}\right)^2 \sigma_z^2 + \dots + 2\left(\frac{\partial f}{\partial x}\right)\left(\frac{\partial f}{\partial y}\right)Cov(x, y) + 2\left(\frac{\partial f}{\partial x}\right)\left(\frac{\partial f}{\partial z}\right)Cov(x, z) + \dots$$

Course Objective

To provide students with statistical techniques for analyzing materials accounting data, shipper-receiver differences, and for evaluating measurement methods and detecting undeclared activities.



Additional Information

Course Length: 2.5 days

Target Audience: Safeguards professionals who need to understand how statistical methods are used to assess safeguards effectiveness, and those involved in the control and accountability of nuclear materials as part of an overall safeguards program.