

AGENDA Day 2

Managing Uncertainty with Systematic Planning: (Developing Defensible Sample Designs for Environmental Decision-Making)

8:00 AM to 5:00 PM

8:00 AM – 8:15 AM **Module 6: Introduction & Agenda and Objectives**

Presenter: Sebastian Tindall

This module briefly discusses the DOE and EPA missions to institutionalize a Systematic Planning Process throughout the DOE complex and EPA Regions and provides an overview and presents the day's agenda, the objectives of each of today's 5 modules and 4 exercises.

8:15 AM – 9:00 AM **Module 7: Multi-Increment Sampling**

Presenter: Sebastian Tindall

Multi-Increment Sampling is presented in this module in more detail, with examples.

9:00 AM – 9:30 AM **Exercise 0 – Introduction to Statistical Concepts: Demonstrations**

Presenter: Sebastian Tindall

Fundamental concepts necessary for the understanding of managing uncertainty and development of statistical sampling designs are presented to the students in the form of "hands-on" demonstrations, slides, and computer simulations.

9:30 AM – 9:45 AM **Morning Break**

9:45 AM – 10:45 AM **Module 8: The Systematic Planning Process (Step 1 – State the Problem)**

Presenter: Sebastian Tindall

This module presents the Planning Process in detail, with both general and specific examples. Each step is discussed in terms of the information that is needed to begin the step, the actions that need to be performed, and the information that is needed to conclude a given step and begin the next step. Step 1 is covered in this Module.

10:45 AM – 11:15 AM **Exercise 1 – Populations, Histograms, Range, & Simulations**

Presenter: Sebastian Tindall

This exercise introduces a bag of 450 colored beads to represent a target contaminant population. Students will take a sample of five beads and construct a histogram and find the sample range. Data will also be combined to observe what happens when the sample is 50 beads. Computer simulations provide the results of repeated sampling.

11:15 AM – 11:45 AM **Module 9: The Systematic Planning Process (Step 2 – Identify the Decisions)**

Presenter: Sebastian Tindall

This module presents the Planning Process in detail. Step 2 is covered in this Module.

11:45 AM – 12:15 PM Exercise 2 – Hypothesis Testing for Alpha Error Using X-Bar

Presenter: Sebastian Tindall

Students conduct hypothesis tests on samples of beads using the sample average as the test statistic. Students will gain understanding of alpha error rate. This exercise provides a hands-on example of a typical alpha error rate. Computer simulations will illustrate this exercise.

12:15 PM – 1:15 PM Lunch Break

1:15 PM – 2:00 PM Module 10: The Systematic Planning Process (Step 3 – Identify Inputs)

Presenter: Sebastian Tindall

This module presents the Planning Process in detail. Step 3 is covered in this Module

2:00 PM – 2:30 PM Exercise 3 – Hypothesis Testing for Alpha Error Using the 95% UCL

Presenter: Sebastian Tindall

Students conduct hypothesis tests on samples of beads using the 95% UCL as the test statistic. Computer simulations illustrate this exercise.

2:30 PM – 2:45 PM 1st Afternoon Break

2:45 PM – 3:45 PM Module 11: The Systematic Planning Process (Step 4)

Presenter: Sebastian Tindall

This module presents the Planning Process in detail. Step 4 is covered in this Module.

3:45 PM – 4:00 PM 2nd Afternoon Break

4:00 PM – 4:15 PM Exercise 4 – Hypothesis Testing: Beta Error

Presenter: Sebastian Tindall

Students conduct hypothesis tests on samples of beads using the 95% UCL as the test statistic. Here the true mean of the population equals the Lower Bound of the Gray Region and thus this exercise provides a hands-on example of a beta error rate. Computer simulations illustrate this exercise.

4:15 PM – 4:30 PM Exercise 5 – Hypothesis Testing for Clean & Dirty Sites

Presenter: Sebastian Tindall

Students conduct hypothesis test on samples of beads using the 95% UCL as the test statistic. Here populations from a clean and a dirty site will be tested. Computer simulations illustrate this exercise.

4:30 PM – 5:00 PM Module 12: The Systematic Planning Process (Step 5)

Presenter: Sebastian Tindall

This module presents the Planning Process in detail. Step 5 is covered in this Module.