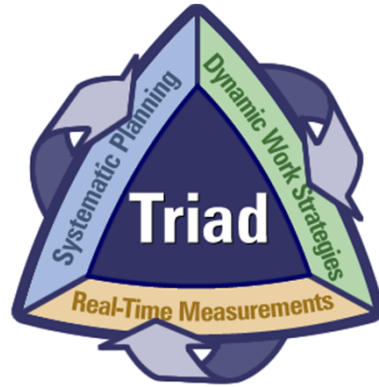


Module 1

Welcome and Introduction



Workshop Agenda

- Workshop Purpose and Goals
- Introduction to Basic Terms, Concepts, and Decision Uncertainty
- Triad Toolbox, Dynamic Work Strategies, and Case Study
- Incremental Sampling Concepts, Applications, and Case Study
- XRF Concepts, Applications, and Case Study

Instructor

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Argonne, Illinois
(630) 252-7004

20+ years of experience designing characterization programs for hazardous waste sites. Experience with DOE sites includes Argonne, Ashtabula, Brookhaven, Fernald, Hanford, Mound, Oak Ridge, Paducah, Rocky Flats, Sandia, Site A, and West Valley. Other sites include the FUSRAP program, several DoD facilities, and Superfund sites. Currently also supports the EPA's Technology Innovation Office and the International Atomic Energy Agency. Particular area of expertise is the application of real-time characterization techniques for expediting characterization and remediation efforts.

Workshop Purpose and Goal

- The Triad approach provides a means to address decision uncertainty that leverages advances in real-time data collection methods
- Purpose of this workshop is to introduce participants to the Triad approach and provide an overview of some techniques in the Triad toolbox
- Goal is to have workshop attendees become “smart consumers” of Triad approaches

Workshop Focus

- Focus is on keeping data collection programs as efficient and effective as possible
- Data collection spans a variety of media and purposes:
 - Buildings/real property
 - Waste streams
 - **Soils (*primary emphasis*)**
 - Surface Water
 - Groundwater
 - Sediments
 - Biota
 - Air monitoring

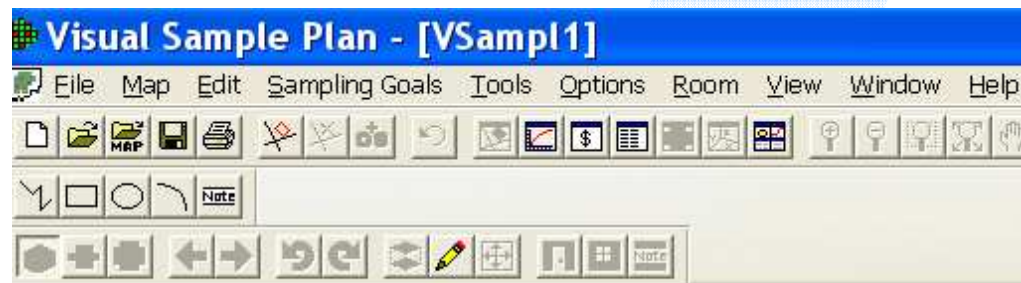
Participant Introductions and Goals



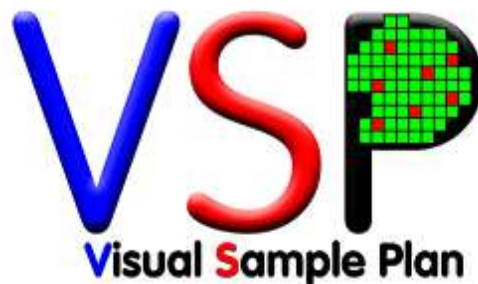
Software Resources and Disclaimer

- References to product or service providers are for information purposes only and do not constitute an endorsement
- Several software packages are referenced
- References do not constitute endorsement
- For more information:
 - Visual Sampling Plan (VSP) (<http://dgo.pnl.gov/>)
 - ProUCL (<http://www.epa.gov/esd/tsc/software.htm>)

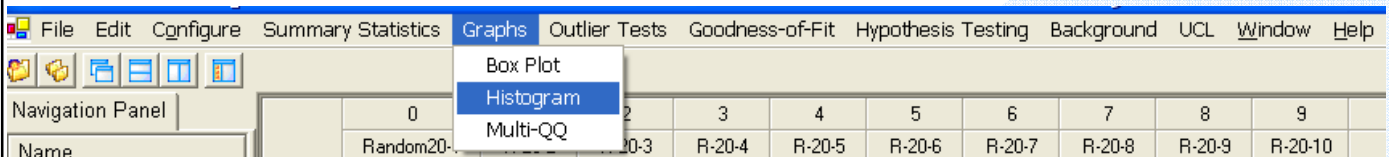
A Free (DOE Funded) Statistical Calculator & Visualization Tool to Aid Planning (EPA contributed toward its development)



Welcome to Visual Sample Plan




A Free (EPA Funded) Data Exploration & Analysis Tool



<http://www.epa.gov/esd/tsc/software.htm>

ProUCL[®]

Statistical Software to Compute Upper Limits for Full Data and Data with Non-Detects




Multiple Q-Q Plots for Mn (1), Mn (8), Mn (9)

Ordered Observations vs Theoretical Quantiles (Standard Normal)

- Mn (1): N = 15, Mean = 502.3150, Sd = 19.4226, Slope = 61.6066, Intercept = 502.3150, Correlation, R = 0.9502
- Mn (8): N = 15, Mean = 1998.1250, Sd = 838.7627, Slope = 251.1567, Intercept = 1998.1250, Correlation, R = 0.8271
- Mn (9): N = 15, Mean = 1998.1250, Sd = 508.1895

Box Plots for Mn (1), Mn (8), Mn (9)

Observed Data vs Mn (1), Mn (8), Mn (9)



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Key Take Away Points...

- The Triad approach can significantly improve (i.e., better decisions, reduced costs) site characterization and remediation activities
- A number of techniques in the Triad toolbox may be directly applicable to Portsmouth's challenges
- Implementing a Triad approach requires a paradigm change in the way data collection and field work is designed and implemented
- Triad emphasis is on addressing decision uncertainty in the field as work is underway in a technically defensible manner

Any Questions?

