Advanced Design Application & Data Analysis for Field-Portable XRF

A Series of Web-based Seminars Sponsored by Superfund's Technology Innovation & Field Services Division

Contact: Stephen Dyment, OSRTI/TIFSD, dyment.stephen@epa.gov

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How To . . .

- Ask questions
  - » "?" button on CLU-IN page
- Control slides as presentation proceeds
  - » manually advance slides
- Review archived sessions
  - » http://www.clu-in.org/live/archive.cfm
- Contact instructors

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Notes

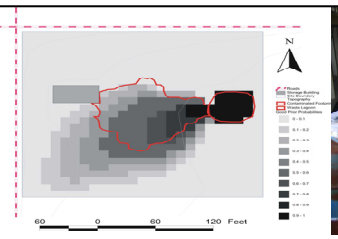
- When you registered, you were directed to this seminar's specific URL, which is the front page of today's seminar. The Front Page of the Web cast contains a short abstract of today's session. We have also included pictures and short biosketches of the presenters. Please note the presenters' email addresses are hotlinked on that page in case you have any questions for one of them after today's presentation.

- For those of you joining us via the phone lines, we request that you put your phone on mute for the seminar. We will have Q&A sessions at which point you are welcome to take your phone off mute and ask the question. If you do not have a mute button on your phone, we ask that you take a moment RIGHT NOW to hit *6 to place your phone on MUTE. When we get to the question and answer periods you can hit #6 to unmute the phone. This will greatly reduce the background noises that can disrupt the quality of the audio transmission.

- Also, please do not put us on HOLD. Many organizations have hold music or advertisements that can be very disruptive to the call. Again, keep us on MUTE. DO NOT put us on HOLD.

- Also, if you experience technical difficulties with the audio stream, you may use the ? icon to alert us to the technical difficulties you are encountering. Please include a telephone number where you can be reached and we will try to help you troubleshoot your problem.

- Instructor contact information is provided in this module.



Module 1:

Introduction

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Your Instructors.....

- Deana Crumbling - USEPA/OSRTI
  - » Technology Innovation Field Services Division
    - — crumbling.deana@epa.gov
- Robert Johnson, PhD - Argonne National Lab
  - » Environmental Assessment Division
    - — rlj@anl.gov
- Stephen Dyment - USEPA/OSRTI
  - » Technology Innovation Field Services Division
    - — dyment.stephen@epa.gov

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Notes

- **Deana Crumbling**, U.S. EPA Office of Solid Waste and Emergency Response; Office of Superfund Remediation and Technology Innovation

  Deana Crumbling is a chemist with over 25 years experience, 12 of which have been in the waste cleanup industry. She worked for a state Superfund program and a consulting firm before joining EPA's Technology Innovation Program in 1997. Ms. Crumbling specializes in issues related to field analytical methods, sampling issues, statistics, and the Triad approach.

  Phone: (703) 603-0643
  Fax: (703) 603-9135
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- **Robert Johnson**, PhD, Argonne National Laboratory, Environmental Assessment Division

  Dr. Johnson has worked at Argonne National Laboratory since 1991 as an environmental engineer, statistician, software developer, and project manager. He serves as principal investigator and technical lead for Argonne's adaptive sampling and analysis program (ASAP), and provides expert technical support to EPA on a number of Triad-related training courses and projects. Bob has significant experience in statistical sampling design as well as data analysis/interpretation using XRF through his DOE, EPA, DoD, and other technical support functions.

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- **Stephen Dyment**, U.S. EPA Office of Solid Waste and Emergency Response; Office of Superfund Remediation and Technology Innovation

  Stephen Dyment is a chemist with more than 15 years experience including 4 years in a commercial analytical laboratory and 8 years in environmental consulting. He joined EPA in 2005 with a focus towards enhancing acceptance and use of emerging analytical technologies and sampling strategies. His perspective draws upon years of practical laboratory and field experience to apply EPA's Triad approach at sites in Superfund, Brownfields, RCRA, UST and State programs. Mr. Dyment's efforts have resulted in the development of numerous EPA case studies, profiles, and training courses that outline successful strategies for the use and understanding of collaborative data sets, adaptive QC programs, and real time analytics. He holds a B.S. in Environmental Science/Toxicology from the University of Massachusetts at Amherst.

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  Thanks to Jeff Catanzarita EPA ERT and Dennis J. Kalnicky, PhD, Lockheed Martin Information Systems & Global Services, Response Engineering and Analytical Contract (REAC)

  Dr. Kalnicky is a Senior Chemist/Environmental Engineer with the Lockheed Martin Response Engineering and Analytical Contract (REAC) at the U.S. EPA Environmental Response Team facility in Edison, NJ. He has over 30 years experience in the development and application of laboratory, process, field, and environmental analysis instrumentation and methodology. Dr. Kalnicky specializes in the evaluation, development, and application of real-time and laboratory methods for analyzing metal contaminants in hazardous wastes.

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Who Will Benefit from this Course?

- Regulatory project managers and quality assurance reviewers who use XRF data
- Consultants and regulatory staff responsible for
  - » Designing and approving work plans that use XRF
  - » Interpreting XRF data

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Notes

- **Regulatory project managers and quality assurance reviewers who use XRF data:** This course will benefit project managers from Federal, State, and local regulatory programs and the quality assurance staff that review data collection plans and XRF data. The course will give project managers and QA staff a better understanding of how XRF data should be collected and how it can be used to reduce site characterization uncertainty.

- **Consultants and regulatory staff responsible for:** Consultants and regulatory staff who are responsible for designing and approving work plans that use XRF and who interpret XRF data will also benefit from this course. After taking this course, the participants should be able to design and implement XRF sampling strategies that provide more reliable and robust data sets. Participants will also be able to better interpret the XRF data generated from the improved sampling strategies.

Take Away Points…

- Spatial heterogeneity is a primary source of data uncertainty
- Traditional data strategies often not cost-effective for addressing this data uncertainty
- More effective, efficient data designs involve
  - » dynamic/adaptive field decision-making
  - » real-time data generation and management tools
- XRF is one of these tools
- Use of appropriate sampling designs, QA/QC, and collaborative data allow higher certainty and defensible decisions with XRF

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Notes

- **Spatial heterogeneity is a primary source of data uncertainty:** Spatial heterogeneity, or the random distribution of contaminants in environmental media, is the primary contributor to data uncertainty. Data uncertainty associated with spatial heterogeneity is far greater than uncertainty associated with analytical errors. Reducing spatial heterogeneity is the way to significantly reduce data uncertainty.

- **Traditional data strategies not cost-effective for addressing this data uncertainty:** Traditional data strategies involve the collection of discrete samples that are analyzed in a fixed laboratory. Traditional strategies can only address this uncertainty by collecting a very large number of samples for laboratory analysis, which in most cases is cost prohibitive.

- **More effective, efficient data designs involve:** Data designs that are dynamic and can be adapted in the field combined with real-time data generation and management tools can overcome spatial heterogeneity effectively and efficiently.

- **XRF is one of these tools:** For many sites, the XRF can be used in a dynamic sampling strategy to generate real-time data and to more fully characterize contaminant levels and locations.

Web-Seminar Sessions and Schedule

- Session 1
  - » Module 1 - Introduction and Module 2 - XRF Basics
  - » Monday, August 4, 2008. 1PM-3PM EST.
  - » Stephen Dyment, Robert Johnson
- Session 2
  - » Module 3.1 - Representativeness Part 1
  - » Thursday, August 7, 2008. 1PM-3PM EST.
  - » Deana Crumbling
- Session 3
  - » Module 3.2 - Representativeness Part 2
  - » Monday, August 11, 2008. 1PM-3PM EST.
  - » Deana Crumbling

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Notes

- **XRF Web seminar sessions and schedule:** The XRF Web seminar is a series of eight sessions to be held each Monday and Thursday from 1:00 p.m. to 3:00 p.m. Eastern time during the month of August 2008, beginning on Monday, August 4 and ending on Thursday, August 28. The first three sessions are structured as follows:

  - » Session 1 is comprised of Module 1 – Introduction and Module 2 – Basic XRF Concepts.
  - » Session 2 is comprised of Module 3.1 – Representativeness Part 1.
  - » Session 3 is comprised of Module 3.2 – Representativeness Part 2.

Web-Seminar Sessions and Schedule

- Session 4
  - » Module 4, Demonstration of Method Applicability and QC
  - » Thursday, August 14, 2008. 1PM-3PM EST.
  - » Stephen Dyment
- Session 5
  - » Module 5, XRF and Appropriate Quality Control Strategies
  - » Monday, August 18, 2008. 1PM-3PM EST.
  - » Stephen Dyment
- Session 6
  - » Module 6.1 - Dynamic Work Strategies Part 1
  - » Thursday, August 21, 2008. 1PM-3PM EST.
  - » Robert Johnson

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Notes

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  - » Session 4 is comprised of Module 4 – DMA and Demo.
  - » Session 5 is comprised of Module 5 – XRF and Appropriate Quality Control.
  - » Session 6 is comprised of Module 6.1 – Dynamic Work Strategies Part 1.

Web-Seminar Sessions and Schedule

- Session 7
  - » Module 6.2 - Dynamic Work Strategies Part 2
  - » Monday, August 25, 2008. 1PM-3PM EST.
  - » Robert Johnson
- Session 8
  - » Q&A for Session 7, In Depth Q&A Review for All Seminars, and Resources
  - » Thursday, August 28, 2008. 1PM-3PM EST.
  - » Deana Crumbling, Robert Johnson, Stephen Dyment

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Notes

- **XRF Web seminar sessions and schedule:** The XRF Web seminar is a series of eight sessions to be held each Monday and Thursday from 1:00 p.m. to 3:00 p.m. Eastern time during the month of August 2008, beginning on Monday, August 4 and ending on Thursday, August 28. The sessions 7 and 8 are structured as follows:
  - » Session 7 is comprised of Module 6.2 – Dynamic Work Strategies Part 2.
  - » Session 8 is a Q&A review and discussion of resources.

Session Logistics

- Each session will be 2 hours long
- Questions should be submitted by email or chat
- Some questions may be answered at the end of the current session
- Most questions will be answered during the first 30 minutes of the subsequent session

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Notes

- **Session logistics:** Each session is 2 hours long and will consist of presentations and a question and answer period. Questions should be submitted by email or chat. Some question may be answered at the end of the current session. However, most questions will be answered during the first 30 minutes of the following session.

Session Breakouts

- Session 1
  - » Presentation
  - » Answers to some questions
- Session 2 through 7
  - » 30 minutes answering questions submitted for previous session
  - » 1 hour and 30 minute presentation for current session
  - » Answers to some questions for current session
- Session 8
  - » 30 minutes answering questions submitted for Session 7
  - » Q&A review for Sessions 1 - 7
  - » Review of resources

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Notes

- **Session breakouts:** Each session will be conducted as discussed below:
  - » Session 1 consists of the presentation of Modules 1 and 2 and answers to some questions at the end of the presentation.
  - » Sessions 2 through 7 consist of 30 minutes for answering questions submitted for the previous session at the beginning and 1 hour and 30 minutes for presentation of the scheduled modules. Some questions may be answered at the end of each session if time allows.
  - » Session 8 consists of 30 minutes for questions and answers from Session 7, a question and answer review for all sessions, and a review of XRF resources.

Instrument and Software Disclaimer

Referring to specific XRF instruments or software packages is for information purposes only and does constitute endorsement.

- Manufacturers Niton and Innov-X
- Excel (Microsoft Office)
- Visual Sampling Plan (Pacific Northwest Lab: http://dqo.pnl.gov/)
- BAASS (Argonne National Lab: http://www.ead.anl.gov/project/dsp_topicdetail.cfm?topicid=23)
- Surfer/Grapher (Golden Software: www.goldensoftware.com)
- ArcView 3.x or 9.x (ESRI: www.esri.com)
- Freeware can be found at http://www.frtr.gov/decisionsupport/

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