Rapid Deployment of On-Site Analysis and Response to Critical Chem-Bio Emergencies

Course Notes, Part 1

Lead Instructor and Contact: Martin Dudziak, PhD, TETRADYN, LLC
martinjd@tetradyn.com, martin@forteplan.com
http://tetradyn.com

Why You Are Here
You work within or are interested to learn about new tools, methods, systems, and practical techniques relating to Environmental Analysis, Homeland Defense, Laboratory-on-a-chip/Microfluidics, Laboratory Information and Management, Sample Preparation, and Sensors.

Overview
This is an introduction to the use of a fully-equipped mobile laboratory (including GC/MS, FTIR, XRF) with on-site personnel and a remote base station. Students are introduced to the use of several LIMS-related interfaces to GIS and mapping utilities for generating real-time Situation Awareness and Response reports and projections pertaining to the location, isolation, and forecasted distribution of target chemical (including radioisotope) and biopathogen compounds in the examination area of a plant, port or residential district. Particular attention is directed to issues of infrastructure integrity, redundancy, fault-tolerance, and abilities of the mobile lab equipment and staff to respond to unexpected “outlier” and anomalous events, such as may occur frequently in emergency or disaster situations.

Objectives
Training in the use and maintenance of mobile analytical and response instrumentation and also online telemonitoring and team conferencing, as well as in techniques for coordination among emergency hazmat, health, safety and security personnel in environments where critical infrastructures including particular communications and site security have been compromised by natural incidents or intentional aggression.

Outline
The “half-day” course is divided into segments, each of which will provide lecture, Q&A, team simulation exercise(s), and group discussion. The use of small break-out sessions for participants to work together and then share outcomes with the larger group is a key part of the course plan for enabling differences of method and opinion to be explored in greater depth and then shared for constructive criticism.

Scenario Introduction
- Plant and Environment
- Practices and Protocols
- Incident Model
- Simulation - “Rules of the Game”

EcOasis PodLab - A Specific Model and Case Study
- Underlying Architecture
- Analytical Instrumentation
  - GC/MS, FTIR, XRF
- Auxiliary Equipment
  - Water and Gas Generation
  - Hybrid Electric Power
- Software Resources
  - GIS
  - LARS
  - Open Net
  - Shumeru
  - Information Security
- Redundancy and Fault Tolerance
- Instrumentation Communications
- Power Supply & Control

Infrastructure Collapse and Decay Issues

Fault Tolerance and QA/QC

Situation Awareness Development and Continuity
- PANDA Model
- CASE Model
- EAGLE model
- TANGRAM model
- Nomad Eyes as a Specific Model and Case Study

Simulation Team Session(s)

Post-Facto Analysis and Feedback

Recap and Discussion

Materials

There are two sets of hand-outs provided, Part 1 (this document) and Part 2 (a slide set). In order to minimize unnecessary printing, these are comparatively small documents. Most of the course materials are being provided in electronic form and will be available online.

Organization and Presentation

This course is being conducted in segments that will have logical breaks, for accommodating both physical breaks for rest and refreshment, and simulation breaks, whereby the class, divided into teams of four or five participants, will engage in the simulation parts of the exercise. All of the material being presented will be through PowerPoint-type slides. The material in both of the hand-out documents (Parts 1 and 2) are provided for background notes and for following and referencing the course as it is conducted and as participants discuss things in their small-team break-out sessions.

Here in Part 1 are provided no slides but additional text material including papers and notes that relate to the segments of the course. Printed and bound material is in black-and-white only, while the versions used during the course will include color text and graphics.

Text Material List

