

Laboratory Readiness for Large-Scale Environmental Incidents – Practice Makes Perfect

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OUTLINE



- ERLN Background
- New Capability at the Region 10 Laboratory
- Full Scale Joint Functional Exercise conducted August 2010

Homeland Security Presidential & EPA Directive 9

• HSPD 9: Defense of United States Agriculture and Food:

The Secretaries of the Interior, Agriculture, Health and Human Services, the Administrator of the Environmental Protection Agency, and the heads of other appropriate Federal departments and agencies shall build upon and expand current monitoring and surveillance programs to:

 develop nationwide laboratory networks for food, veterinary, plant health, and water quality that integrate existing Federal and State laboratory resources, are interconnected, and utilize standardized diagnostic protocols and procedures.

Integrated Consortium of Laboratory Networks







Standardized Analytical Methods for Environmental Restoration Following Homeland Security Events – SAM 2010 (Revision 6.0)



www.epa.gov/sam/

ERLN Background



- Managed by EPA Office of Emergency Management http://www.epa.gov/oemerIn1/
- Serves as national network that can be accessed during a national incident
- Intended to address chemical, biological and radiological threats in environmental matrices during nationally significant events
 - Phase 1 contained federal and state labs
 - Phase 2 broadened to include private sector labs
 - Compensation available under BOAs (Phase 2)

EPA Regional Laboratory ERLN Responsibilities During an Event

- Are responsible for the identification, organization, and coordination of overall regional capacity
- Serve as regional points of contact with EPA HQ for analytical issues
- Coordinate sample flow to ERLN member labs
- Coordinate training and terrorism-related exercises for ERLN member labs to ensure efficient sample flow to member labs as part of national training exercises
- Partner with regional emergency/disaster coordinators to strengthen relationships and establish operational roles and procedures
- Some have mobilized Chemical Agent capacity





Ultra-dilute Chemical Warfare Agent Analysis



- Agents include Sarin (GB), Soman (GD), Cyclosarin (GF), Sulfur Mustard, and VX (*O*-ethyl *S*-[2-(diisopropylamino)ethyl] methylphosphonothioate)
- A new concentration range was created for our work the ultra-dilute category
 - 1-mL ampoules contain 10 ug each
 - 15 mg required for VX LD50 (percutaneous)
- All labs did some build-out/renovation, primarily to house an All Hazards Receipt Facility for sample receipt



EPA Region 10 Laboratory





AHRF Sample Pass-thru





AHRF Sample Screening





CWA Suite – Extraction Lab





CWA Suite – Analysis Lab













Regions 9 and 10 Full-Scale Exercise (FSE)



- Exercise play between August 20-27, 2010
- Region 10 was Primary Responding Laboratory with Region 9 Lab supporting
- Region 10 Emergency Response Unit mobilized IMT and sampling support
- The scenario involved toxic industrial chemicals (xylenes), chemical warfare agent (Mustard and Lewesite) degradation products, and biological select agents (BAH)
- Exercise follow Homeland Security Exercise and Evaluation Program (HSEEP) guidelines

Goals of the Exercise



- Practice and evaluate the Water Laboratory Alliance (WLA) Response Plan (WLA-RP) and ERLN procedures
- 2. Practice coordination between two national laboratory networks (ERLN and LRN) for public health and environmental emergency response
- 3. Practice coordination between two EPA regions for a large-scale contamination incident
- 4. Identify additional systems, operations, and mechanisms to improve sample transport, data management, and analytical support for a major contamination incident

Non-Routine Practice Opportunities



- Integrate laboratory procedures with Incident Command System (ICS) structure to support emergency response
- Practice using Web-EDR (automated data quality review)
- Turn up the heat in the R1/2 exercise lab expressed they could have done things faster. 24-hour TAT requested, 48 hour required. QA validated data for GIS maps in under 3 days
- Test the procedures of CDC's LRN-C and LRN-B
- Test the use of EPA's portable ultrafiltration device for collecting large volume biological water samples

Exercise Overview – Chemical



Chemical Scenario (Environmental and Clinical)

- An aircraft sprayed an occupied sports stadium (Husky Stadium in Seattle) with CWA, then crashed into a warehouse (Seattle Yacht Club) containing TICs.
 - Environmental samples: TICs and CWA degradation products
- Clinical samples: CWA metabolites



FSE Overview - Biological





Biological Scenario

- Seattle reservoir reported to be intentionally contaminated with a bacterial select agent
- Water sample collection with the EPA portable ultrafiltration device
- Samples analyzed using the bacterial select agent screening protocol

Synopsis of the Exercise – CWA (Environmental and Clinical)



- Day 1 (Friday): CWA attack on stadium; plane crashes into industrial building
- Days 1 3: CDC Chemical Emergency Response Team collects and transfers clinical specimens to Atlanta (notional). Analyzed samples and reported data sent to state labs (notional)
- Days 4 8: Laboratory Participation
 - Notional sample collection
 - Actual shipment of samples to labs for:
 - Environmental: Water, soil, and air for TICs and water for CWA degradation products
 - Clinical: Urine samples for arsenic and CWA metabolites
 - Data reported to EPA Region 10, EPA HQ, and CDC
 - Inject tested communication, notification, information sharing, and data interpretation

Synopsis of the Exercise (Bio)



Days 1 - 3: Students from Roosevelt High School fell ill; FBI received tip about possible drinking water contamination

Days 4 - 8: Biological Laboratory Participation

- Water sample collection of field samples using the EPA portable ultrafiltration device at the Roosevelt reservoir
- LRN-B laboratories analyzed water samples using ultrafiltration and BT agent screening protocol
- Data reported to EPA Region 10 IMT, EPA HQ, and CDC
- Injects tested communication, notification, information sharing, and data interpretation

25 Participating Labs (41 roles)

tal Protection

17 Environmental Labs

- 12 Clinical Labs
- 4 Biological Labs
- 4 Private Sector (ERLN Tier II) Labs
- 10 Public Health labs
- 4 Public Utilities

66 Exercise Participants

- 28 Players
- 28 Lab Evaluators
- 6 IMT Evaluators
- 4 Controllers





Laboratory Data Flow





Labs Participating



Chemical Environmental Laboratories

Regional Laboratories

- EPA Region 10 laboratory
- EPA Region 9 Laboratory

State and County Laboratories

- Nevada State Laboratory
- Washington Dept. of Ecology
- Idaho Bureau of Laboratories
- Arizona Public Health Laboratory
- Oregon Department of Env. Quality
- Hawaii Department of Health Laboratory
- Pima County Compliance Laboratory
- Washington State Public Health Laboratory



Labs Participating, cont.



Chemical Environmental Laboratories, cont. <u>Commercial Laboratories</u>

- CH2MHill, Inc., Applied Sciences Laboratory
- Test America Laboratories, Inc. (Phoenix, AZ)
- Test America Laboratories, Inc. (Sacramento, CA)
- Test America Laboratories, Inc. (Irvine, CA)

Drinking Water Utility Laboratories

- Metropolitan Water District of Southern California
- City of Phoenix Water Services Laboratory
- City of Scottsdale Water Quality Laboratory

Labs Participating, cont.



Clinical Laboratories

- Idaho Bureau of Laboratories
- Nevada State Health Laboratory
- Arizona Public Health Laboratory
- California LRN-C Level 1 Laboratory
- Alaska State Public Health Laboratory
- Oregon State Public Health Laboratory
- Washington State Public Health Laboratories
- Los Angeles County Public Health Laboratory
- Hawaii Department of Health State Laboratory
- Commonwealth of Virginia, Division of Consolidated Laboratory Services



Labs Participating, cont.

Biological Laboratories

- Sacramento County Public Health Laboratory
- Michigan Department of Community Health ATDC
- Wisconsin State Laboratory Hygiene
- Idaho Bureau of Laboratories LRN-B

Other Participants

- Kaiser Oakland Medical Center- Clinical
- Kaiser Richmond Medical Center- Clinical
- Seattle Public Utilities collecting samples for biological scenario



ronmental Protection

Aaencv

Laboratory Coordination



CWA Environmental Scenario

- IMT staged at Region 10 Laboratory
- Primary Responding Laboratory (PRL) Region 10 Laboratory
- Assisting Primary Responding Laboratory Region 9 Laboratory

<u>CWA Clinical Scenario</u>

PRL was Washington State Public Health Laboratory

<u>Biological Scenario</u>

- IMT staged at the Region 10 Laboratory
- PRL was Idaho Bureau of Laboratories







Acceptable Detection Limits

Highest (Presence/Absence)	Lower	Lowest (Below Removal Action Levels)
Acceptable Turn Arou	nd Times	
Fastest (<24 hours)	Slower	Slowest
Data Deliverable Nee	ds	
Preliminary	Basic QA/QC	Full QA/QC Validation

EDD Comparison



	JFE ERLN Type 1t	SEDD 2b
Number of elements	19 required	50 required
Surrogate and Target Results	Yes	Yes
Blanks, duplicates, matrix spikes, lab control standards	Yes	Yes
Initial cal, continuing calibration checks, tune data, extraction and analysis batch	No	Yes



High soils (xylene)	12,000 ug/kg
Low soils (xylene)	1,500 ug/kg
High waters (xylene)	1,500 ug/IL
Low waters (xylene)	200 ug/L
High waters (arsenic)	15 ug/L
Low water (arsenic)	3 ug/L
Air samples	71.5 ppbv
Blanks	

- Percent Recoveries for all waters ranged from 82 112%
- Percent Relative STD for all waters ranged from 9 23%





Benefits of Exercise Participation



Benefits to ERLN Labs:

- First opportunity for laboratories and regional IMT to practice interacting
 - Every lab contacted volunteered without hesitation, including the 4 private labs
 - Labs that couldn't play because they were not ERLN members, later applied for membership
- Improved relationships between regional labs and state health labs

Benefits of Exercise Participation



Benefits to ERU and QA Office:

- Strengthened Region 10 relationships between (ERU, QA, OW and Laboratory
- Found a new tool to speed up data review (WebEDR)
 - GIS maps with validated data in 2.5 days (after sample receipt) is a significant accomplishment

Join Our Team



ERLN Membership open through January 30, 2012

http://www.epa.gov/erln/join.html