Radioanalytical Response – A State Perspective

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Why Enhance Capacity?

- At a senate hearing on Nov 15, 2007 entitled "Not a Matter of 'If', but of 'When': The Status of U.S. Response Following an RDD Attack", Senator Coleman said "It can happen, and we must be prepared to deal with it'

Why Enhance Capacity?

- National Planning Scenario #11
  - "Dirty Bomb" in major urban area
  - Three simultaneous explosions
  - 100,000 – 300,000 people exposed
    - 20,000 – 60,000 people with detectable contamination
  - 360,000 – 1,000,000 environmental samples in the first year

Current Capacity Estimates

- For 100,000 clinical samples it is estimated that the analysis would take *4 years* to complete
- For 350,000 environmental samples (depending on the radioisotope) the analysis would take *4 to 6 years* to complete

Some Isotopes of Concern

- Am-241- Measurement instruments
- Cs-137 – Medical imaging and food irradiation
- Pu-238 – Medical devices and measurement devices
- Sr-90 – Heat source for thermal electric generators
- Po-210 – Static eliminators
- Co-60 – Food irradiation and radiography
- Ir-192 – Gamma source for radiography (fixed and mobile)
- Pu-239 – Alpha or neutron source for research
- Cm-224 or Cf-252 – Neutron source for research and measuring

Radiological Capacity Enhancement Grant

- In October of 2007, Connecticut applied for funding under the EPA Radiological Capacity Enhancement Grant
  - The grant will fund a demonstration project
- Connecticut, Washington and Texas were selected as recipients of the grant

Connecticut's Experience

- Connecticut has a mature radioanalytical program
  - Safe Drinking Water Act Primacy Laboratory for Connecticut and Massachusetts
  - Ingestion Pathway Response Laboratory
  - Routine Nuclear Power Plant Monitoring
  - RADNET

Rad Grant Project Approach

- Incorporate design lessons learned into criteria that can be shared with other laboratories
- Develop enhanced health and safety protocols
- Collaborate with EPA on both of the above

Rad Grant Project Approach

- Identify and address bottlenecks that limit ability to respond rapidly
  - Two major bottlenecks identified
    - Time consuming sample preparation
    - Lack of analytical instrumentation
- Expand Analytical Capabilities
  - Add alpha spec to analytical scheme

Rad Grant Project Approach

- Expand Analytical Capacity
  - EPA would more than double our existing instrumentation by providing:
    - 2 – High Purity Germanium Detector Systems
    - 2 – Gas Flow Proportional Counter Systems
    - 1 – Liquid Scintillation Counter
    - 1 – Alpha Spectrometry Counting System
      - 16 individual alpha spectrometry detectors

Rad Grant Project Approach

- Expand Analytical Capacity (ctd.)
  - Hire one new chemist
  - On-site training of staff in alpha spec
  - Provide training to staff from other states
  - Provide training to partners within Connecticut
    - CST
    - Connecticut Agricultural Experiment Station

Rad Grant Approach

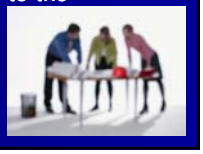
- Integrate the enhanced radiological response capability into Connecticut's comprehensive All Hazards Response partnerships
- Develop educational materials to inform the public
- Share lessons learned with other States

Connecticut's Future

- The Connecticut Department of Public Health Laboratory (CT DPHL) has received State funding to construct a new, state-of-the-art Public Health Laboratory
  - Scheduled to open in 2011
- One of the key drivers in the design process is the incorporation of the all hazards concept
  - Radioanalytical response is an integral part of this concept.

Radioanalytical Response

- Radiological response enhancement was actually easier to plan for than chemical response enhancement
  - Ingestion pathway plan is tested in an evaluated drill every 6 years
  - Plan is modified in response to the exercise
  - Exercise provides staff an opportunity to practice



New Lab Design Drivers

- Ability to accept "hotter" samples safely
  - How hot is hot??
- Able to "dilute" hotter samples so that they could be brought into counting room used for routine samples
  - Have to have ability to screen samples
- Decided that a simple All Hazards Lab was the way to go

New Lab Design Drivers

- Contamination control
  - To prevent samplers from contaminating the lab, sample receipt area was set up outside in a "porch"
    - Heated semi-enclosed area (like a bus shelter)
    - Stainless steel tables for DOT type screening
  - After screening, samplers would pass cooler into the lab through a "window"

New Lab Design Drivers

- Contamination control, ctd.
  - Cooler would be opened inside a hood, and screened for alpha and beta
    - Worker safety primary reason
- Other issues
  - What about soils and other types of solids?
  - Can we minimize transport distances from All Hazards Lab to Routine Analytical Lab?
  - If we get a large number of samples, how do we store them safely?

Early Lessons Learned

- When adding a lot of weight to a building, consult a structural engineer
- Talk to instrument manufacturers to make them aware of any facility limitations
  - Elevators, stairwells, etc.
- Initiate discussions with the NRC (or your state agency) early in the licensure process
  - They may be able to guide you to less costly licensing options

Early Lessons Learned

- Build bridges to the Radiation Control Program in your state
  - Especially if it is in a different agency from your laboratory
- Bring Law Enforcement into the process early
  - Even though there may be good relationships for other types of threats, rad may raise some additional concerns
- Chemists with formal training in radiochemistry are scarce

Plan Ahead

- The time to prepare is before samples "hit the door"
- Think about:
  - Need for a NRC License
  - Enhanced Rad Safety Plan
  - Enhanced radioanalytical contamination control
  - Enhanced contamination monitoring

EPA Guidance Documents

- Already Published
  - Radiological Laboratory Sample Analysis Guide for Incidents of National Significance – Radionuclides in Water
    - Available at the NAREL website – search for EPA 402-R-07-007
    - Also available at www.aphl.org (search for "rad water")
- In Preparation
  - Sample Screening Guide
  - Air Analysis Guide
  - Soil Analysis Guide
  - Method Validation Guide
  - Contamination and Exposure Control Guide
  - QA/QC Guide
  - Core Operations Guide

Future Activities

- Coordination between labs
  - A mechanism needs to be developed to ensure that this will happen.
    - Build on lessons learned from the grant awarded state labs
    - Develop a "semi-regional" approach?
      - Some capabilities in all states
      - Advanced and surge capabilities in a few states

Leverage Assets

- Co-ordinate "existing" resources?
  - EPA, FERN, LRN-R, however.....
    - Clarification of CLIA requirements for bioassay
    - Which samples get analyzed first?

Improved Coordination

- Pre determined Data Quality Objectives
  - Recommended response detection limits
  - Reasonable Count times
  - Isotopes of interest list
  - Common short reporting libraries

Improved Coordination

- Common unit usage
  - Same expression of units for interoperability
- Common sample acceptance criteria
  - Currently rad lab criteria ranging from 2x background to 100mCi and 10mR/hr
- Training on proper packaging and shipping of radiological samples to other laboratories

Enhanced Communication

- Communication pathways developed
  - Regular teleconferences
  - MOU's
  - Regional meetings

- Common data transfer standards
  - A theme common to all aspects of emergency response

Expanded Networking

- Integration of rad response capabilities into ICS
- Exercise involvement

Quality Control

- Monetary assistance to states to help purchase expensive standards.
- Development of a funded performance evaluation program
  - Low cost or free
  - Cover matrices and isotopes needed for terrorism response

Questions??

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