Best Practices for Sample Control During Nuclear Incident Response

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Outline

• Introductions

• Elements of an effective sample control process

• Issues that arise from an ineffective sample control processes

• Conclusion

• Integrated Consortium of Laboratory Networks: Working with Limited Laboratory Resources during an incident
Panel Members

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- Sonoya Shanks - Sandia National Laboratories
- Lynn Jaussi - Nevada National Security Site
- Phil Torretto - Lawrence Livermore National Laboratories

YOU!

Please ask questions and raise issues with us, our goal is to start a conversation and learn from each other!
Elements of an effective sample control process: Pre-planning

- Defined Data Quality Objectives (DQOs)
- Field sample plan coordinated between stakeholders
- Clear and concise analysis plan with direct ties to the DQOs and question being asked
- Integration with Incident Command
- Pre-built database for sample control and results
Elements of an effective sample control process: Hotline and sample storage

**Hotline Setup**
- Organization of space
- Efficiency in process
- Data entry system

**Hotline Operations**
- Pre Job Brief
- Contamination Control
- Buddy System

**Sample Storage**
- Plan for expansion
- Practice ALARA
Elements of a rock-solid sample control process: Interactions with the laboratory

- Understand capabilities
- Clearly Define requirements
- Work toward automation
- Double-check analysis instructions documents
- Allow for iteration on data packages with new labs
- Frequent status updates

Communication
All elements work in concert and lead to a smooth, efficient response

- Pre Planning
  - Integration with incident Command
  - Pre-Built database for sample control and results
  - Clearly planned sample plan backed by statistics

- Sample Control Hotline
  - Hotline Setup
    - Organization of Space
    - Efficiency in Process
    - Data entry system
  - Hotline Operations
    - Pre Job Brief
    - Contamination Control
    - Buddy System
  - Sample Storage
    - Plan for expansion
    - Practice ALARA

- Laboratory Interactions
  - Work toward automation
  - Understand capabilities
  - Clearly define requirements
  - Communication
  - Double-check analysis instructions documents
  - Frequent status updates
  - Allow for iteration on data packages with new labs
  - Practice ALARA

Carefully Planned Data Quality Objectives (DQOs)
Issues that can arise when critical sample control elements are missing

Unclear/Confusing/Inconsistent/ Non-existent Chain of Command

• Difficult for sample control/labs to effectively coordinate efforts with stakeholders and decision-makers

• Difficult for sample control to understand what priorities are, what requirements are, and what assets are needed

• Ineffective lab support without stakeholder communication to define sample data quality objectives

• May result in wasted time arguing about who is in control

• Results in elevated confusion level for all Responders slowing the entire process
Issues that can arise when critical sample control elements are missing

No standardized sample control processes

- Chain-of-Custody could become inconsistent, inappropriate sample packaging may occur, samples could become damaged and unusable without standardized collection and delivery process

- Effort to collect and analyze samples could be wasted due to inadequate sample control methods

- Resolving issues takes considerable time and consumes a considerable amount of personnel resources

- It results in haphazard, inefficient, ineffective, inconsistent operations, samples and results dropped through the cracks, difficulty in tracking samples and results, difficulty in prioritizing sample analysis, etc.
Issues that can arise when critical sample control elements are missing

No structured process or tools for tracking sample status and lab results

- May be difficult to tie sample analysis results to sample collection locations and times
- May be difficult to verify if sample results meet their intended purpose (i.e. original question being asked)
- Without a structured format (adequately constructed database, specific data and result formats), it is difficult to share results in a readily usable form with Assessment personnel and Decision Makers
- Data quality review becomes difficult
- Difficulties may be encountered with data storage and retrievability
- Results will not get to the data Assessors, or the Decision Makers fast enough.
- Inefficiencies will abound

Laboratory Interactions

- Understand capabilities
- Clearly Define requirements
- Double-check analysis instructions documents
- Work toward automation
- Allow for iteration on data packages with new labs
- Frequent status updates
- Communication
What happens when all the elements (Best Practices) are in place?

**Pre-Planning**

Clear data quality objectives, negotiated with stakeholders, leads to robust and easy to follow sampling plans

- Field teams able to telemeter situational awareness to analysts generating sampling plans remotely
- Clear tie between sample plan location and sample identification allows for easier data product generation

**Hotline Setup and Sample Control**

Sample control in the field with sample collectors allows for effective and efficient sample flow through the process. Regular briefings keep personnel informed and up to date

- Responders will be less stressed, less confused, happier, more efficient, more productive
What happens when all the elements (Best Practices) are in place?

Interactions with the Laboratory

Clear instructions ensures data results will be delivered in a timely manner, easily transferred to event database/data entry system

• Establish detection limits
• Agreed upon result data reporting requirements and standardized format

When all elements are in place

• Samples collected will have a purpose. Fewer results generated that service no purpose.
• Maps, Models and other data products will be updated faster with more accurate data. This allows data Assessors to provide data sooner to the Decisions Makers.
• Data flow will be faster, more efficient and more accurate.
Importance of Drills and Exercises

- Helps train personnel and condition them to react in a specified, directed, organized, consistent and efficient manner.

- Familiarizes and prepares Responders with probable and potential real world events.
Bottom Line

• If Sample Control has a well established process that is effective, then the Data Assessors can be effective.

• If Sample Control is not effective, then the Data Assessors cannot be effective.

• If the Data Assessors are not effective, then the Decision Makers cannot be effective.

• If the Decision Makers cannot be effective, then we all suffer.
Integrated Consortium of Laboratory Networks (ICLN)
ICLN Organizational Structure

THE INTEGRATED CONSORTIUM OF LABORATORY NETWORKS

The Integrated Consortium of Laboratory Networks is sponsored by the Department of Homeland Security

Joint Leadership Council
DHS ICLN JLC Chair

Networking Coordinating Group
DHS ICLN NCG Chair
Technical Project Management Team
DHS CWMD

Subgroups/Workgroups
- Scenario/Threat Prioritization
- Methods/Detection Technology
- Interlaboratory Comparability/QA Subgroup (IC/QA) Training
- Radiological Laboratory Response
- COVID-19 Lessons-Learned
- Sample Prioritization
- Laboratory Logistics

Stakeholder Members
DOJ/FBI
DOE
DOS
DOI

DLN
DoD Laboratory Network
DoD

LRN
Laboratory Response Network
CDC

NAHLN
National Animal Health Laboratory Network
USDA

NPDN
National Plant Diagnostic Network
USDA

FERN
Food Emergency Response Network
USDA/FDA

ERLN
Environmental Response Laboratory Network
EPA

Vet-LRBN
Veterinary Laboratory Investigation & Response Network
FDA
Addressing the Unique Resources of Radiological Laboratories for Emergency Response

Why is this important?
This allows for more strategic preplanning for laboratories to identify and address potential shortages.

• Limited availability;
• Available only from a single or limited number of vendors; and
• Long lead times for acquisition.

Technology
• Instrumentation (purchase/repurpose)

Supplies
• Standards
• Resins
• Reagents

General Preparation
- Permits, licensing
- Advanced protocols with overnight carriers
- 24/7 operations - Staffing plan and WPC documents
- Cross-training of staff
- Infrastructure (IT, facility...)
- Establish accelerated procurement processes
- Acquisition of temporary secure storage space
- Instrumentation automation and data-processing
- Adopt rapid methods
- Have a plan and EXERCISE for long-term operations

This document was developed by the Radiological Laboratory Subgroup (RLS) which is part of the ICLN Program.
For Information on other ICLN Documents you can visit

https://www.icln.org/subgroups.cfm#radiological-laboratory-response

“Radiological Laboratory Response - Limiting Issues”
(May 2009)

“The Tenuous Future of Radiological Laboratories”
(Oct 2018)

“Radiological Laboratories - Executive Summary for Senior Executives/Administrators”
(Sept 2020)
Questions?