

All Hazards at Florida Department of Health

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To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Overview

- National guidelines
- State plans and protocols
- First Responder role
- BT and CT capabilities
 - Environmental samples
- Sample flow
- Florida experience

National Guidelines

 Designation: E2458 – 10

Standard Practices for Bulk Sample Collection and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents from Nonporous Surfaces¹

This standard is issued under the original designation E2458, in the case of superseding editions (1) indicates a revision.

1. Scope

1.1 These practices address collection of samples suspected of being biothreat agents from nonporous surfaces using a bulk collection method, laminated card, followed by a swab sample collection method. Bulk powder samples are collected in a manner that permits the sample to be safely transported to a reference laboratory. A sterile moistened swab is used to collect samples from nonporous surfaces for the purpose of testing.

1.2 These practices are performed in accordance with the Federal Bureau of Investigation (FBI) assessment including hazard assessment as recommended and clarified in Guide to Implement these Practices and Collect a Sample will be made by members of the response jurisdiction assuming responsibility for the sample and the receiving LRN reference laboratory.

1.3 Sample Collection Method A covers collection and packaging of suspicious visible powders suspected to be biothreat agents on nonporous surfaces. Samples are collected according to Sample Collection Method A to a LRN reference laboratory for analysis.

1.4 Sample Collection Method B covers collection of suspicious powders that are suspected to be biothreat agents.

¹ These practices are under the jurisdiction of Homeland Security Applications and are the direct responsibility of Subcommittee E2458 on CBRNE Sensors and Detectors.

Current edition approved Oct. 15, 2010. Published November 2010. Last previous edition approved 10.15.2008/0418-10.

² The CDC Laboratory Response Network is handling clinical specimens and environmental biothreat agents.

 Designation: E2770 – 10

Standard Guide for Operational Guidelines for Initial Response to a Suspected Biothreat Agent¹

This standard is issued under the original designation E2770; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last revision. A superscript letter (X) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

A biothreat is a serious matter that affects public health, public safety, the economy and the general confidence of the people. The National Strategy for Homeland Security and its National Response Framework focuses homeland security efforts on preventing and disrupting terrorist attacks, protecting the American people, our critical infrastructure and key resources, and responding to and recovering from incidents that do occur while continuing to strengthen the foundation of our nation. As laid out by the National Response Framework, a coordinated and synchronous response to suspected acts of bio-terrorism requires advance planning, including the equipping and training of emergency responders prior to an incident. The goal of this standard guide is to support national standards for responding to and collecting suspected biothreat agents with guidance centered on coordination among representatives of emergency response teams, including hazardous materials response teams, law enforcement, public health, including the Centers for Disease Control and Prevention (CDC) national Laboratory Response Network (LRN), and the Federal Bureau of Investigation (FBI). This standard guide provides uniform guidance that covers all of the following components: response planning, responder training, competency evaluation, proficiency testing, concept of operations, hazard assessment, threat evaluation, sample collection, field screening, risk communication and documentation for responding to visible powders suspected of being biothreat agents.

1. Scope

1.1 This guide provides considerations for decision makers when responding to incidents that may involve biothreats. This guide provides information and guidance for inclusion in response planning, on activities to conduct during an initial response to an incident involving suspected biothreat agents.

1.2 This guide delineates fundamental requirements for developing a biothreat sampling and screening capability within a jurisdiction, practice, or operational area to assure proper involvement, communication, and coordination of all relevant agencies.

1.3 This guide applies to emergency response agencies that have a role in the initial response to a biothreat incident. This guide is designed for emergency response services such as law enforcement, fire departments, hazardous materials, public health, and emergency management.

1.4 This guide assumes implementation begins well before the recognition of a suspected biothreat event and ends when

emergency response actions cease or the response is by federal response teams.

1.5 This guide utilizes risk-based response architecture as described in the National Response Framework and is intended to be coupled with the authorized jurisdiction's (AHS) understanding of local vulnerability capabilities when developing its plans and guidance for response to incidents involving a suspected biothreat.

1.6 This guide is compliant with the National Management System (NIMS) and uses Incident Command System (ICS) common terminology. Full compliance with NIMS is recognized as an essential part of emergency planning. In developing this standard, every effort was made to ensure that all communications between organizations during an incident are presented in plain language according to NIMS 2008. In keeping with this NIMS requirement, key definitions and terms, using plain English, are incorporated.

1.7 This guide does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

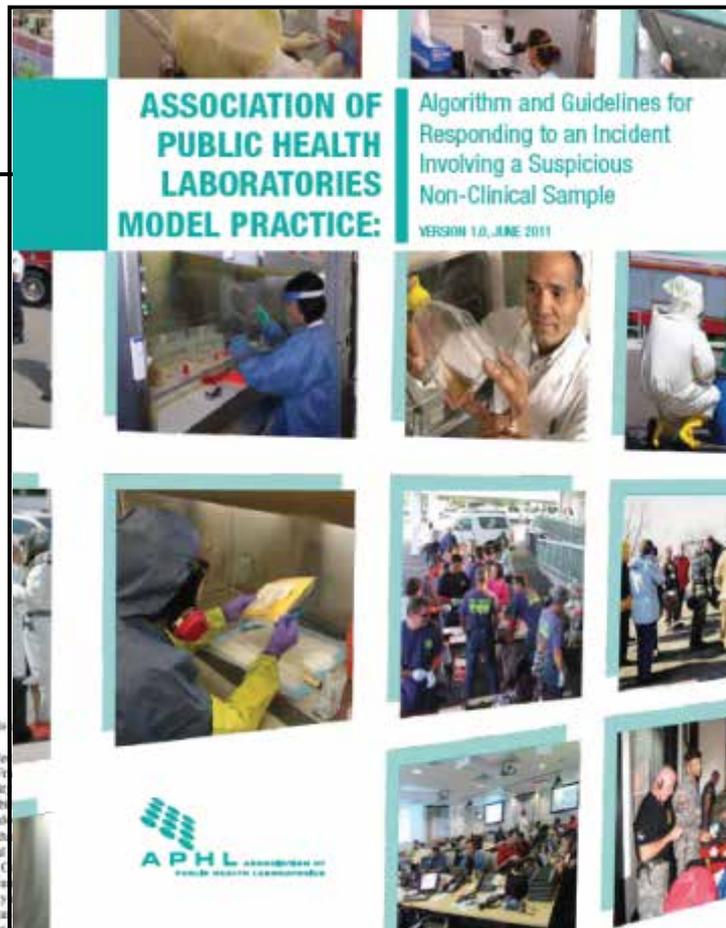
¹ This practice is under the jurisdiction of ASTM Committee E24 on Homeland Security Applications and is the direct responsibility of Subcommittee E2458 on CBRNE Sensors and Detectors.

Current edition approved Oct. 15, 2010. Published November 2010. DOI: 10.1520/E2770-10.

ASSOCIATION OF PUBLIC HEALTH LABORATORIES MODEL PRACTICE:

Algorithm and Guidelines for Responding to an Incident Involving a Suspicious Non-Clinical Sample

VERSION 1.0, JUNE 2011



 **APHL** ASSOCIATION OF PUBLIC HEALTH LABORATORIES





**Standard Guide for
Operational Guidelines for Initial Response to a Suspected
Biothreat Agent¹**

- Provides guidance for planning and response to an incident involving suspected biothreat agents
- Designed for law enforcement, fire departments, hazardous materials, public health, and emergency management
- Requirements for developing a biothreat sampling and screening capability
- Uses risk-based response architecture described in the National Response Framework
- Compliant with National Incident Management System (NIMS) and uses Incident Command System (ICS)

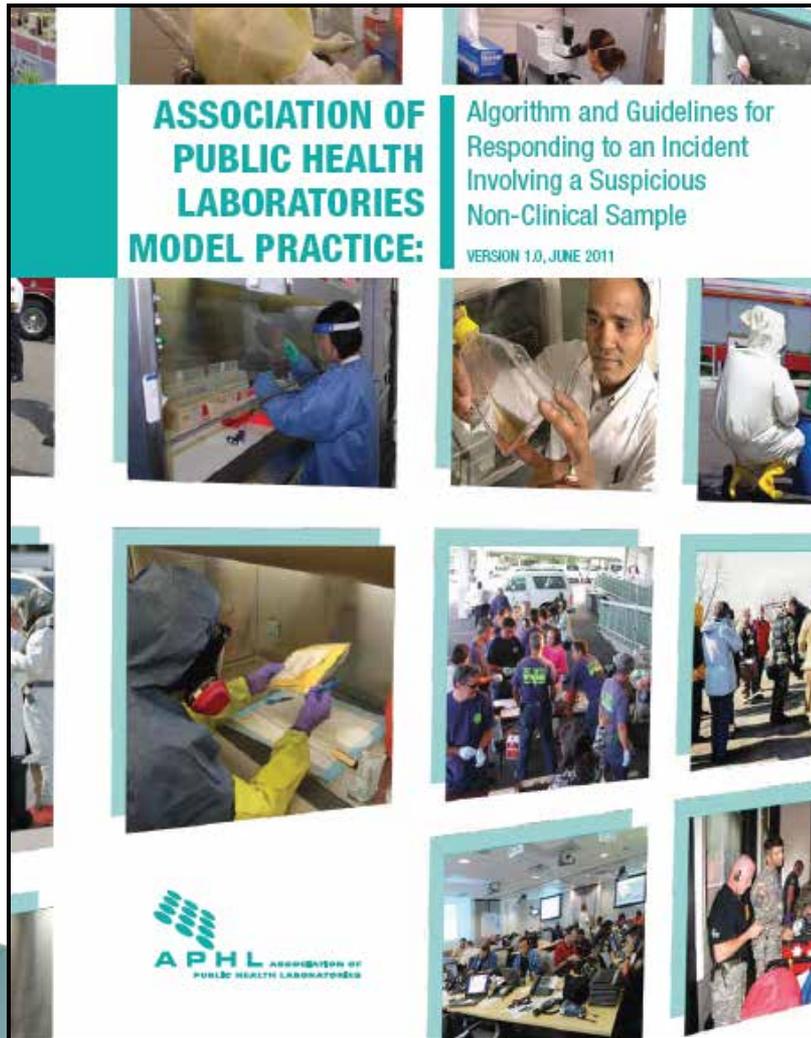




**Standard Practices for
Bulk Sample Collection and Swab Sample Collection of
Visible Powders Suspected of Being Biothreat Agents from
Nonporous Surfaces¹**

- Addresses collection of visible powders for suspected biothreat agents
 - Solid, nonporous surfaces
 - Method A – Dry sample for LRN
 - Method B – Optional, on-site biological assessments
- Coordination with the FBI and the receiving LRN reference laboratory
- Federal regulations compliance for packaging and transport
 - Biosafety and biosecurity

APHL Algorithm



- Standardization of response among network laboratories
- Assist LRN-C labs in testing for chemical agents in non-clinical samples
 - No definitive chemical identification possible for unknown environmental samples
- Basic general compound classification can be very valuable

State Plans & Protocols



State of Florida
Comprehensive Laboratory Response Plan
for
Chemical, Biological and Radiological Incidents

Version 11.0
October 14, 2013

Comprehensive Laboratory Response Plan For Chemical, Biological and Radiological Incidents

– Describes the roles, capacities and coordination of combined laboratory resources available in Florida

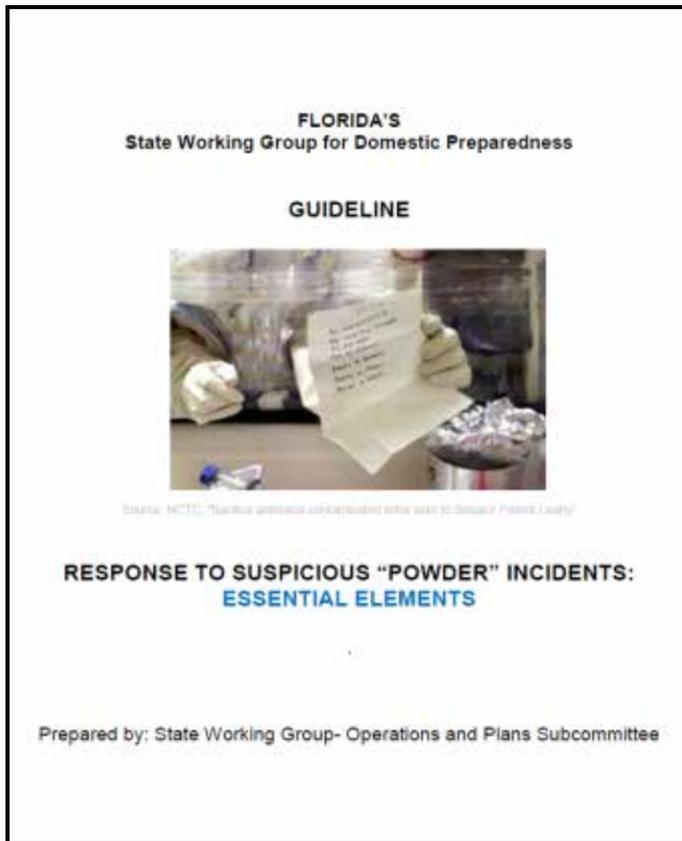
- Government and non-government
- Health, food, veterinary, environment, forensic, academic



– All hazard reporting



State Plans & Protocols



Response To Suspicious “Powder” Incidents

- Establish a procedural framework for coordinated responses to suspicious substances, letters, or packages in which Biological Agent involvement is an initial concern
- Describes a HazMat, law enforcement, and public health coordinated response

First Responder Role

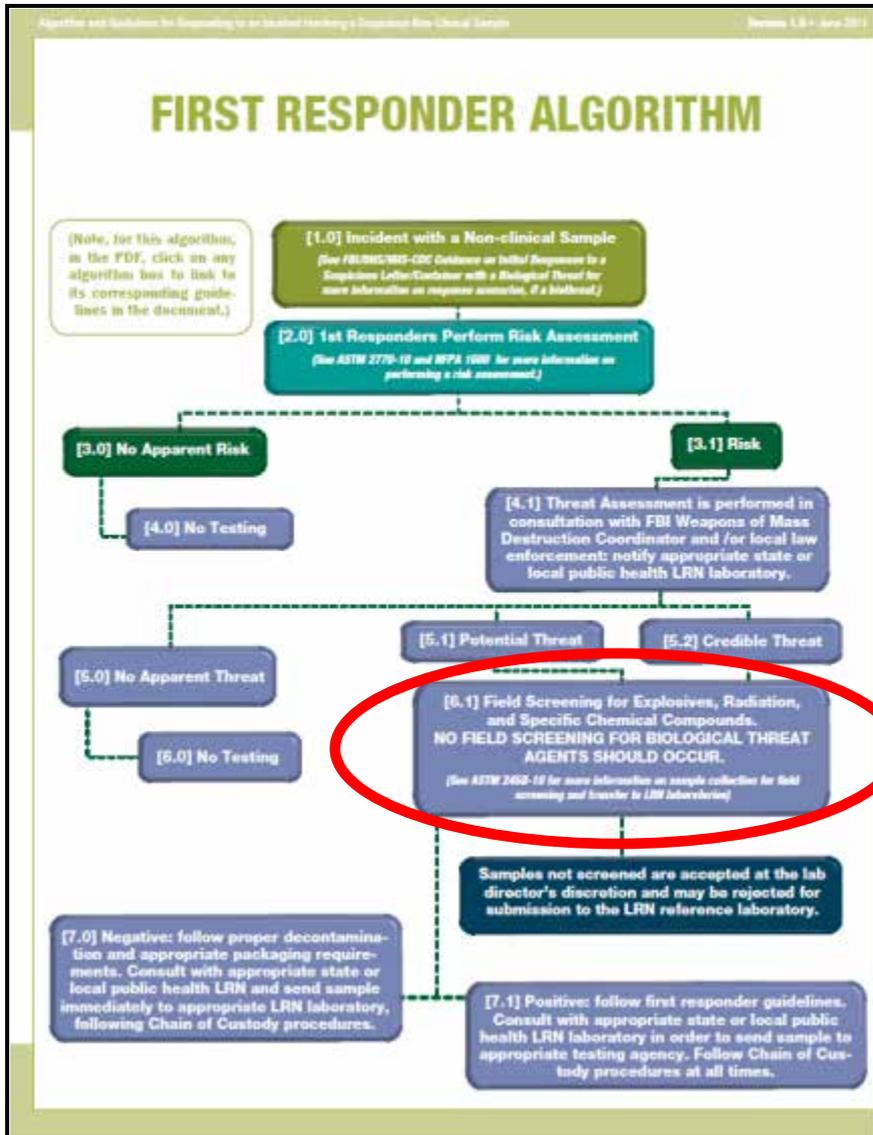
Field screening

- Trained HazMat and Bomb Squad

- Rule out explosives, VOC, radiological substances

Sample collection

- ASTM E2458-10



First Responder Role

Mission:
To protect, promote & improve the health of all people in Florida through integrated state, county & community efforts.



John

Vision: To be the Healthiest State in the Nation

FLORIDA BUREAU OF PUBLIC HEALTH LABORATORIES CHAIN OF CUSTODY

For Laboratory Use Only
Case# _____ Laboratory Sample ID # _____

Quantity of Items	Type/Description of Item(s)	Barcode Tracking #
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Delivered to the Laboratory By:
Printed Name _____ Title _____ Agency _____
Signature _____ Date & Time _____

Received in Laboratory By:
Printed Name _____ Title _____
Signature _____ Date & Time _____

Additional Processing:
1. Printed Reason: _____
2. Printed Reason: _____

Relinquish:
Printed Name _____

Recipient:
Printed Name _____

NOTE: SA agents, SA

Evidence Discarded By: _____ Date & Time _____

Rick Scott

Mission:
To protect, promote & improve the health of all people in Florida through integrated state, county & community efforts.



Rick Scott
Governor

John N. Armstrong, MD, FACS
State Surgeon General & Secretary

Vision: To be the Healthiest State in the Nation

DOMESTIC SECURITY ENVIRONMENTAL SAMPLE SUBMISSION FORM – BIOLOGICAL

Sample Information:
Case/Alarm Number: _____
County: _____
Collection Date/Time: _____
Incident address: _____
Targeted individual's name (if any): _____
Sample description: Bulk powder Letter/envelope Swab Other: _____
Letter/package opened (if applicable) no yes n/a
POC for agency collecting sample: _____ (name) _____ (phone)
POC for agency transporting sample: _____ (name) _____ (phone)

For Laboratory Use Only
Lab Sample ID Number: _____
DASH Number: _____
Other ID Number: _____

ALL SAMPLES MUST BE SCREENED BEFORE SUBMISSION TO THE LABORATORY

Field Hazard Screens performed by: _____

*Explosives/Energetics negative Test(s) used: _____
*Chemical Hazard negative Test(s) used: _____
*Radiological Hazard negative Test(s) used: _____
*Laboratory will only accept samples screened negative for the above hazards.

Credible Threat Assessment Criteria: _____

NOTIFICATION OF RESULTS:
In order to ensure timely notification, please provide contact information for someone with 24/7 availability, who will be responsible for disseminating results to other local agencies.

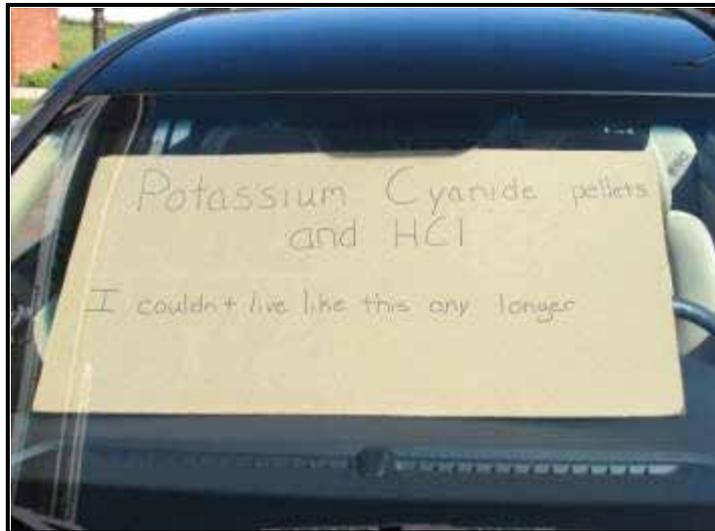
NAME: _____ WORK NUMBER: _____
24/7 TELEPHONE NUMBER: _____ FAX NUMBER: _____
AGENCY: _____
AGENCY ADDRESS: _____

Signature: _____ Date: _____ Time: _____ AM PM

NOTE: SAMPLE WILL BE DISCARDED 30 DAYS AFTER TESTING UNLESS OTHERWISE INSTRUCTED
Responder Incident Report attached: no yes

HazMat Personnel Training





Biological Agent Field Screening

- Only with field assays that have been validated by the appropriate federal agencies
- The use of non-validated field testing can generate inaccurate data, including false positive or negative results

**FIELD DEVICE USE BY FIRST RESPONDERS:
ISSUES AND SOLUTIONS**

During an emergency, first responders must make rapid decisions to protect their community's safety as well as their own. Should they evacuate the area? How many blocks should they evacuate? Should they don protective equipment? The answers to these questions can make the difference between health and permanent disability, or even death.

The Department of Homeland Security provides funding to first responders for purchase of biological and chemical detection kits and devices to provide fast, accurate identification of the agent. Unfortunately, many of the devices are untrustworthy—and often, the results are neither accurate nor valid. Even more troubling, first responders are typically unaware that the kits and devices have limitations. This misperception further endangers those public servants as well as the public they strive to protect.

FALSE HOPE?

In 2008, several businesses, including Chase Bank and The New York Times, received threatening letters containing a white powder. First responders used a popular field device, which indicated that the powder was a highly toxic chemical. Although follow-up tests at the FBI laboratory confirmed the powder was a common, non-toxic substance, the initial identification of the powder as a toxic chemical that could cause illness if inhaled or ingested.

UNNECESSARY PANIC?

During a similar incident in Florida, reported to 911 at 7am, first responders got a positive result for anthrax using a field device. To double-check the initial result, responders repeated the field assay but this time, the result was negative. Due to these conflicting results, the first responders performed the assay a third time, which resulted in a second positive. Panic ensued, at both the state and federal level, and medical intervention was provided for individuals exposed at the scene. At least one individual went to the hospital for blood work and spore inhalation. Luckily, some of the original sample remained, and it was delivered to the Laboratory Response Network (LRN) reference laboratory at 6pm—more than 11 hours after the incident was reported. A little over two hours later, the Jacksonville LRN reported that the sample did not contain anthrax.

APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES
NOVEMBER 2012

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National Guard Bureau

- Weapons of Mass Destruction Civil Support Team
- Certified HazMat training and FBI evidence collection protocols
 - Analytical Laboratory System (ALS)
 - Field screen samples for safe transport to LRN Reference laboratory



The Role of Civil Support Teams
in Support of the Laboratory
Response Network

A white rectangular box containing a teal header with the text "The Role of Civil Support Teams in Support of the Laboratory Response Network". Below the header are three logos: the LRN logo, the FBI seal, and the APHL logo.



USAMRIID

U.S. Army Medical Research
Institute of Infectious Diseases

FIBWA

**Field Identification
of Biological
Warfare Agents**

CST WMD Training



LRN-B REFERENCE AND LRN-C LABORATORY TESTING ALGORITHM

[8.0] Non-clinical Sample arrives at the state or local public health LRN laboratory

[9.0] Perform recommended preliminary screening and Split Sample for Bio, Chem or other testing

[10.0] Test for Biological Threat Agents

Follow the LRN-B Reference Level Protocol for Processing an Unknown Non-Clinical Sample for Bioterrorism Agents

[11.0] Positive: Report preliminary results using LRN Notification and Data Messaging Policies.

[11.1] Negative: Report preliminary results using LRN Notification and Data Messaging Policies and consult with the LRN-C laboratory to determine capability for Chemical Threat Agent Analysis.

[12.0] Perform agent specific confirmatory testing using LRN Reference Level Protocols.

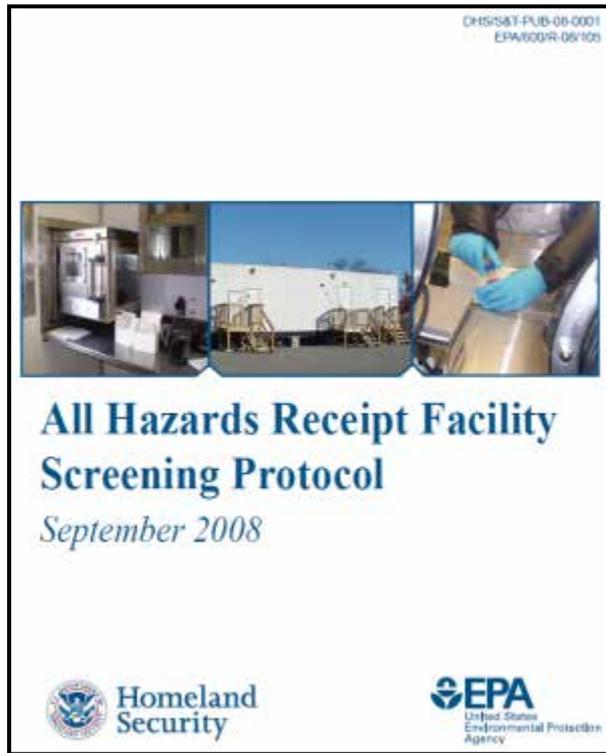
[13.0] Report confirmatory testing results using LRN Notification and Data Messaging Policies.

[14.0] Sample sent for Analysis for Chemical Threat Agents

(Note, for this algorithm, in the PDF, click on any algorithm box to link to its corresponding guidelines in the document.)

- LRN-B Reference Laboratory Testing Algorithm
- LRN-C guidance for environmental sample testing

Preliminary Laboratory Screening



- Highly recommended if sufficient sample available
- Safety of laboratorians
- Confirm field tests prior to further manipulation.
- Two trained scientists
 - Biologist and chemist if LRN-B and LRN-C co-located
- Biosafety Level 3 (BSL-3) Class II BSC or a BSL-2 with Class III BSC
- AHRF Screening Protocol

Preliminary Screening

Minimal recommended testing if instrumentation and supplies are available.

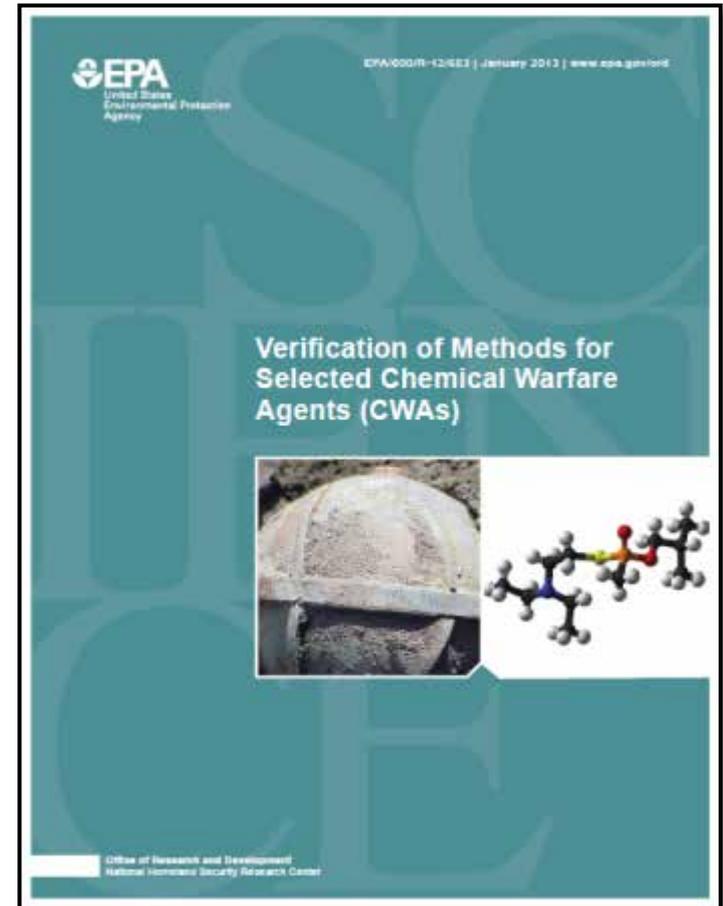
EQUIPMENT/TEST	HAZARD CLASS/COMPOUNDS
Geiger Counter with a Geiger Mueller Probe (β/γ) and Pancake Probe (α)	Radiation
Explosives Kit	Explosives and Oxidizers
<i>E.L.I.T.E Tickets</i>	Explosives
<i>DropEx Plus Explosive Detection System</i>	Explosives
M8, M9 Paper	Chemical Warfare Agents
Gas Meter	Volatile Organic Compounds/ Lower Explosive Limit
Oxidizer Test Kit/Strip	Oxidizers
Litmus Paper	pH, Corrosives, Water Reactivity
FTIR/Raman	Additional Chemical Classifications via Spectroscopy
Water Reactivity Test	Water reactive chemicals

Chemical Analysis

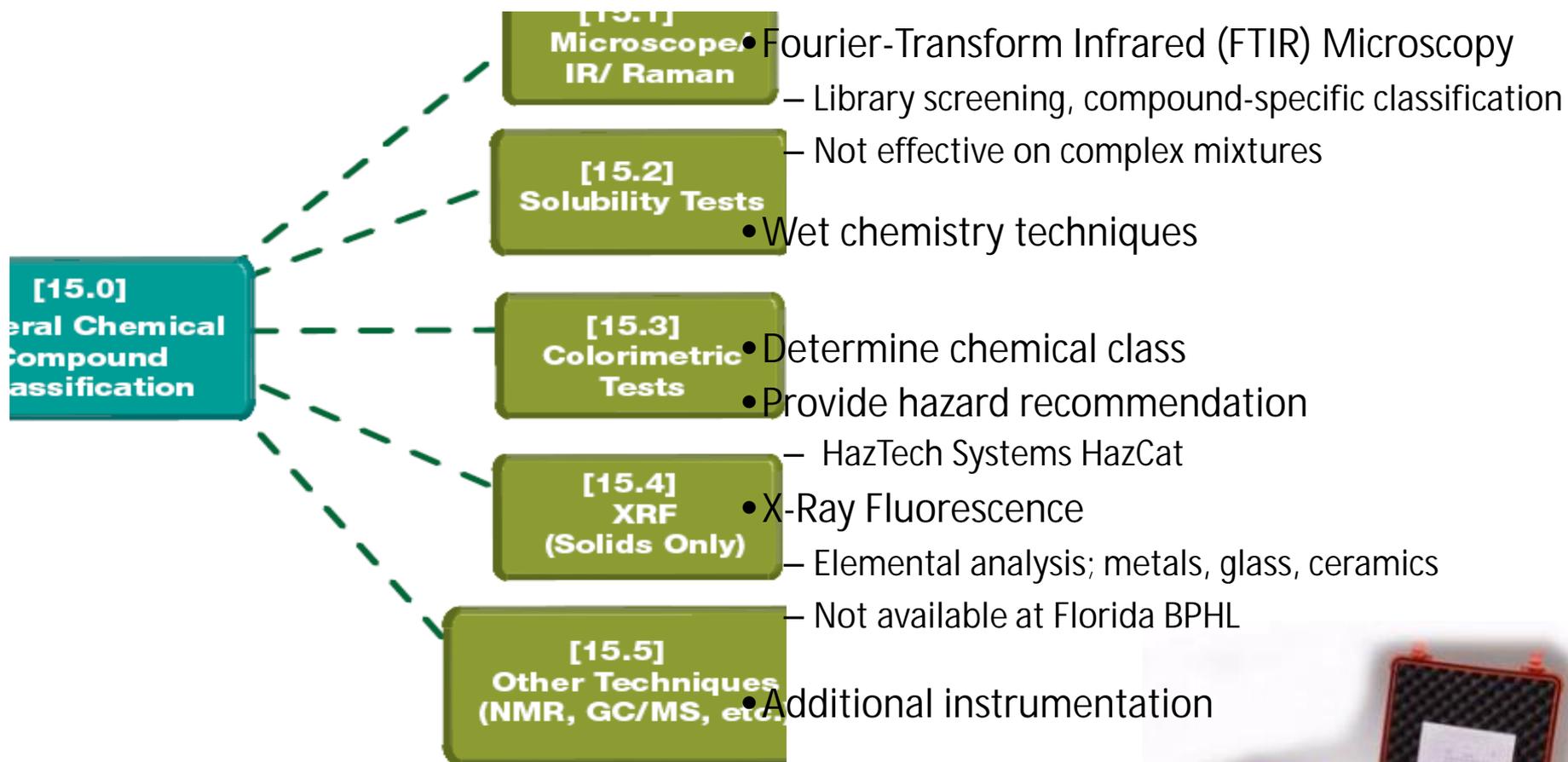
- Florida Bureau of Public Health Laboratories, Jacksonville
 - One of 10 Level 1 LRN-C laboratories
 - Level 3 LRN-C laboratories in Miami, Tampa & Pensacola
- Funded for human clinical specimens only
 - Will respond to unknown environmental samples when needed
- CT testing after BT analyses are negative
 - Limited simultaneous testing capabilities
- Can provide confirmation for field screening
- Can provide valuable information to assist with response to an incident

Chemical Analysis

- No LRN-C methods specifically for environmental samples
- Adapt LRN-C clinical methodology
- Validated non-LRN-C methods
 - EPA's National Homeland Security Research Center
 - Standardized Analytical Methods for Environmental Restoration Following Homeland Security Events.

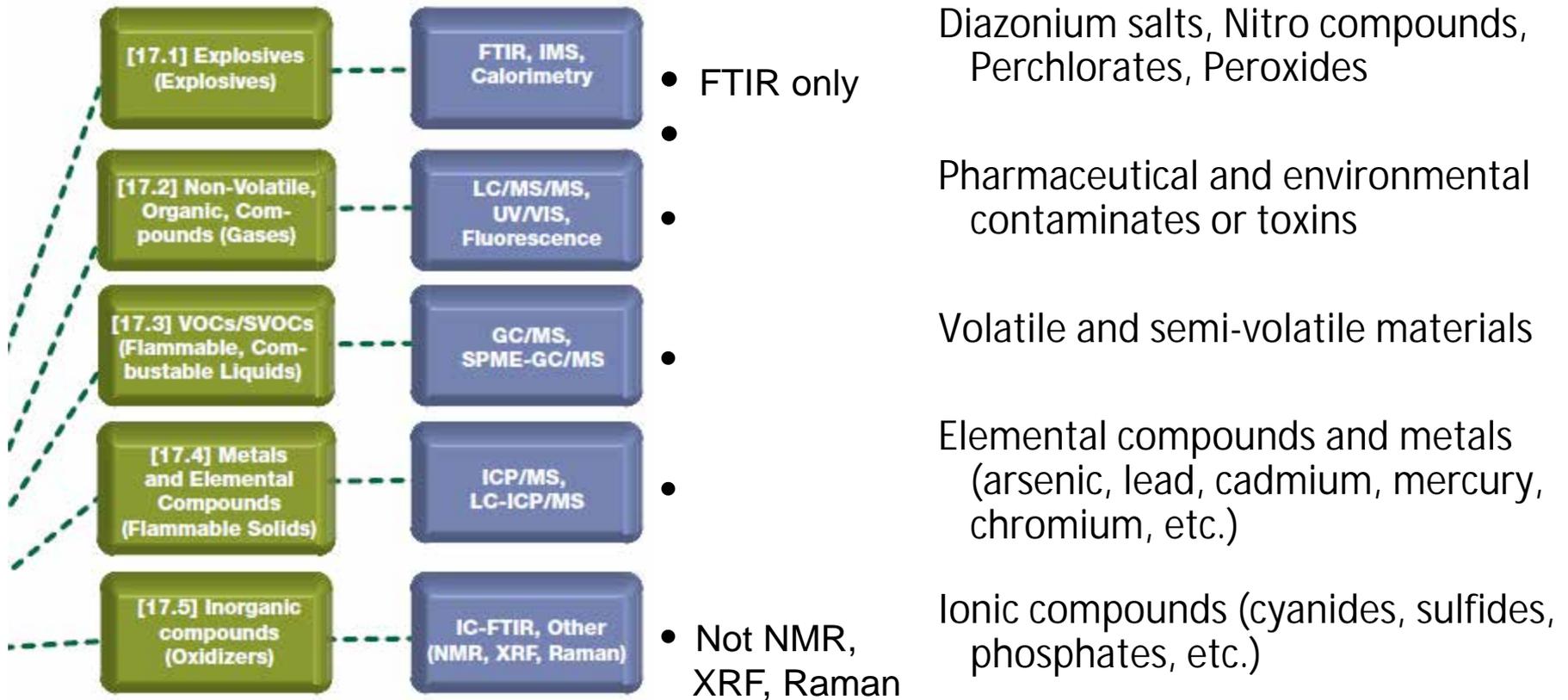


General Chemical Classification



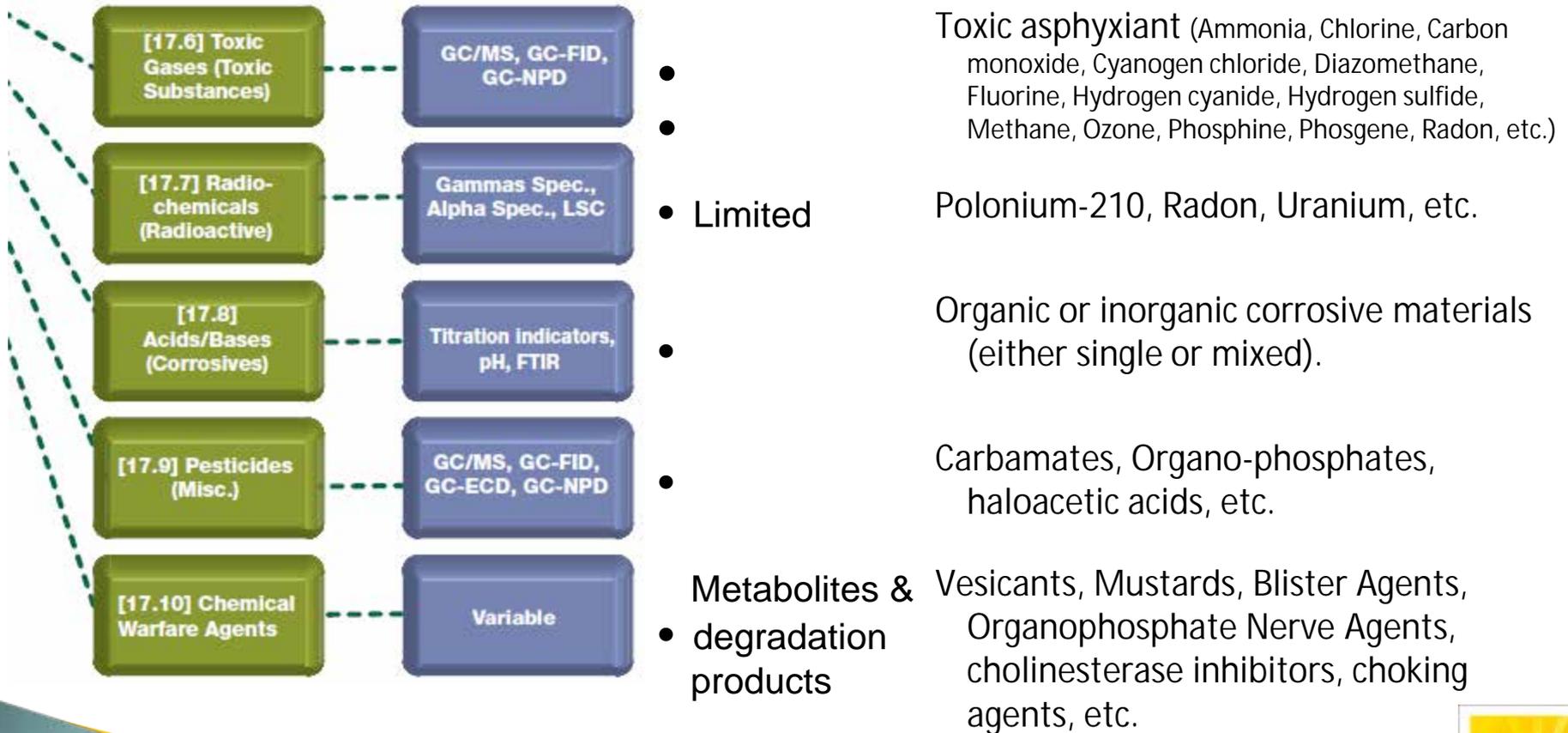
Additional Chemical Analysis

Florida
BPHL-Jax



Additional Chemical Analysis

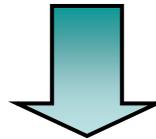
Florida
BPHL-Jax



Florida LRN



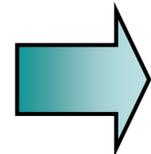
Sample



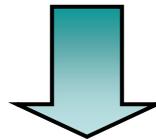
Radiation check: Pre- and Post-unpackaging



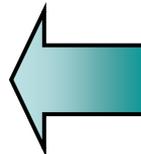
Forensic documentation: Photography



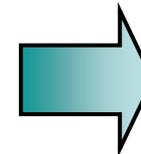
FBI
FDLE
USPIS



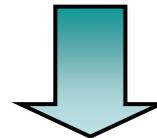
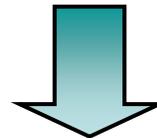
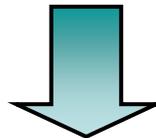
Archive



Split sample



LRN-C



LRN-B:

PCR

TRF

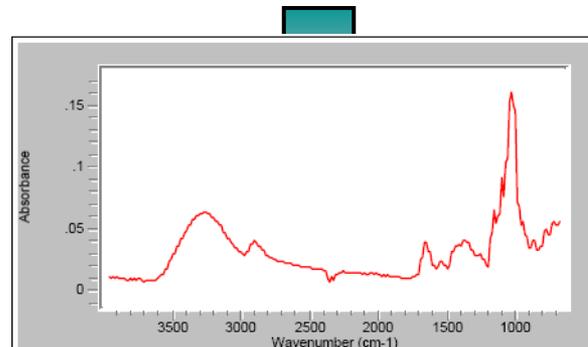
Culture



LRN-C

FTIR: BSL-3 TravellIR sealed cell

Organics Detected



Organic solvent extraction:
(Semi-)Volatiles

Aqueous solvent extraction:
Non-volatiles

Aqueous solvent
Nebulization

GC-MS or
GC-MS/MS

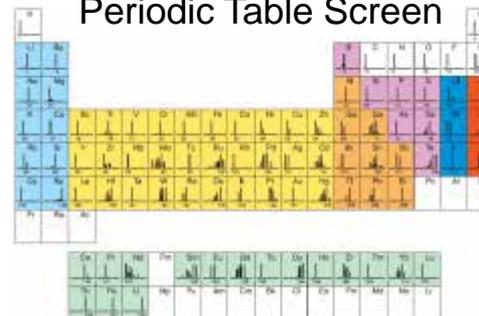
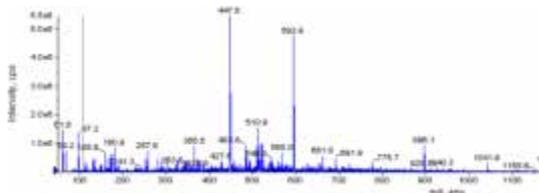
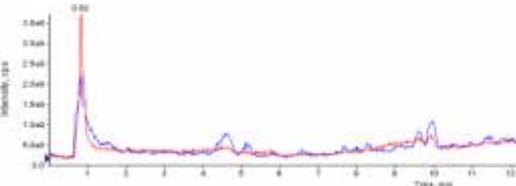
LC-MS or
LC-MS/MS

ICP-MS

Identification of compounds:
Molecule fragmentation
fingerprint

Molecule protonation:
Retention time matching
with a standard.

Metal speciation
Periodic Table Screen



Florida Experience

October 1, 2009

- Body found in car under bridge in Jacksonville, FL
- Sign posted on windshield
 - Warned first responders of cyanide
- Third and successful suicide attempt
- Sample delivered to BPHL-Jacksonville

Sample Analysis

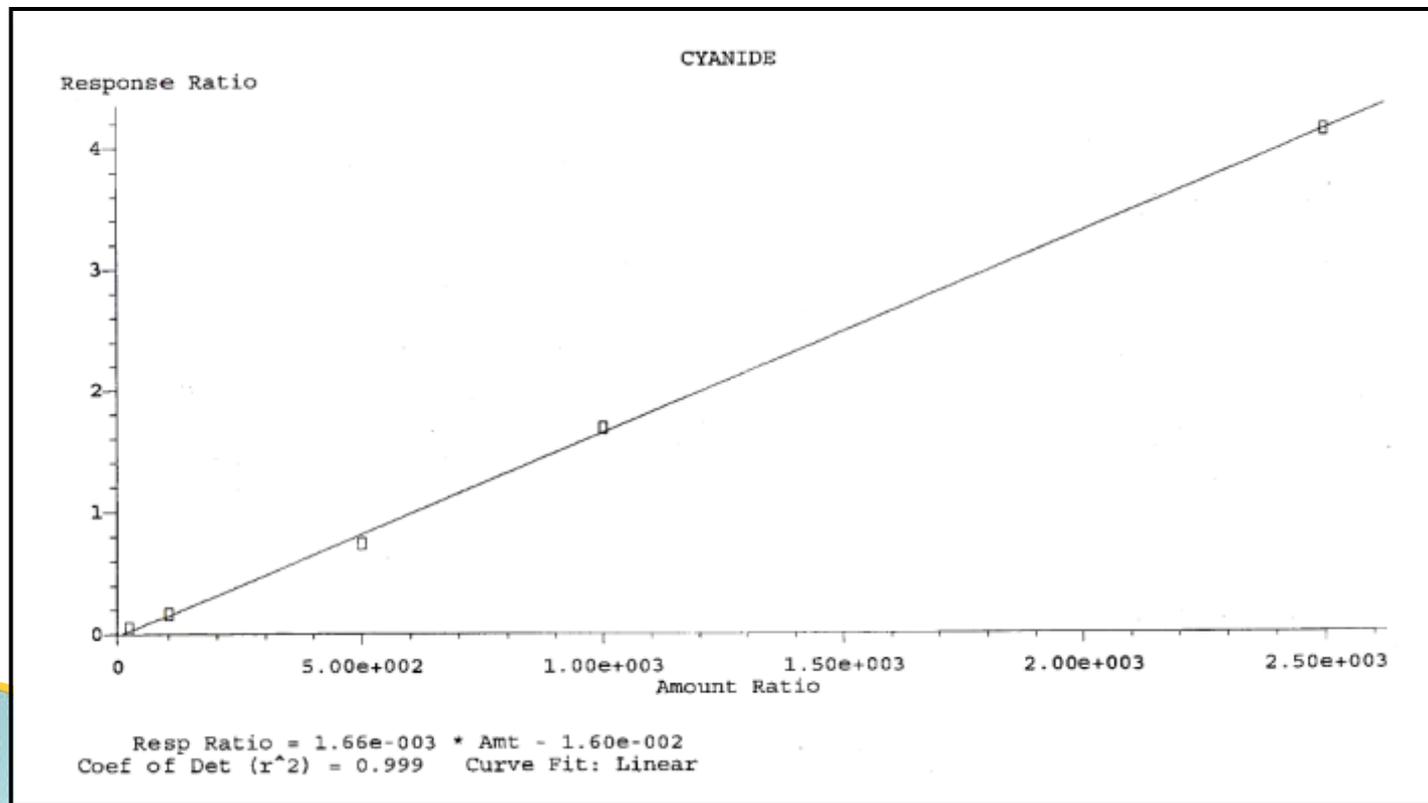
- LRN-B ruled-out BT agents
 - Known previous suicide attempts
 - Field screening

- LRN-C
 - Sample manipulated in BSL-3 laboratory
 - Class II Type B2 BSC

LRN-C Whole Blood Headspace GC-MS

Calibration curve

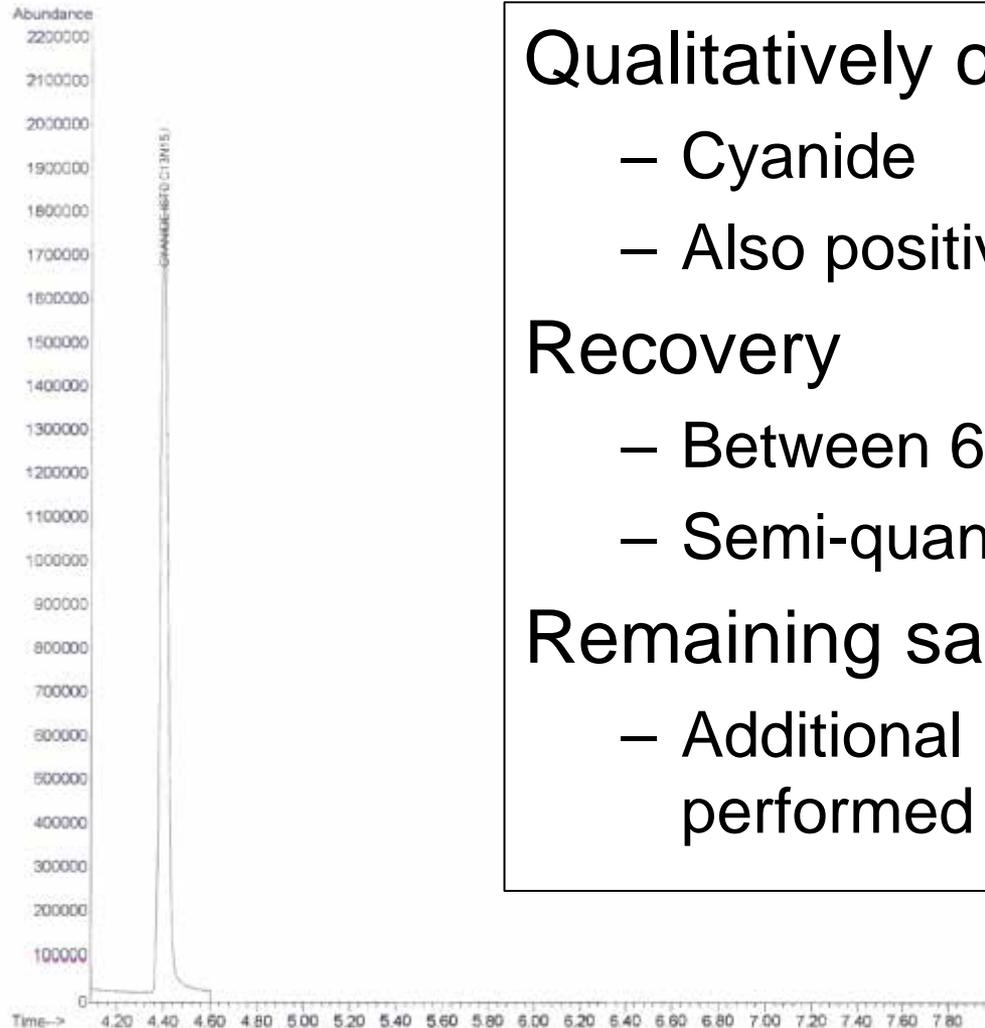
- Aqueous cyanide standards
- $^{13}\text{C}^{15}\text{N}$ isotopically labeled internal standard



LRN-C Whole Blood Headspace GC-MS

- 30.3 mg dissolved in water
- Four 1:21 serial dilutions performed
- Internal standard and phosphoric acid added to sample
 - Liberate gaseous HCN
- Headspace GC-MS
 - Column retention time: 4.4 minutes
 - Mass-to-charge ratios (m/z): 27 and 29
 - Sample and internal standard

GC-MS Conclusions



Qualitatively confirmed

- Cyanide
- Also positive cyanide test strip

Recovery

- Between 65% and 89%
- Semi-quantitative

Remaining sample preserved

- Additional purity testing not performed

Last Words

- Vast majority of suspicious substances submitted to LRN-B are chemical in nature
- Federal funding restrictions for LRN-C
- BT/CT and external partnerships invaluable
- Provide valuable information to first responders and FBI

Acknowledgments

Jason Palcic, Ph.D.

Chemical Threat Coordinator

Florida Department of Health

Division of Emergency Preparedness and Community Support

Bureau of Public Health Laboratories

Jacksonville, FL



Questions?

