Biological
Crime Scene Examination

Learning Objectives

- Recognise the stages of crime scene response
- Demonstrate the collection of biological samples using the methods described
- Identify where law enforcement and public health may need to interact
- Identify challenges associated with processing a contaminated crime scene

CBR Crime Scene Investigation Outline

- Site Safety and Planning
  - Management
  - PPE
- Equipment unique to CBR investigations
- Evidence collection
  - Types of evidence
- Transport of evidence
- Documentation

Overt vs. Covert Attack Considerations

Overt Attack

- ✓ Discovered by first responder or public
- ✓ Immediately initiates a police investigation
- ✓ Requires Public Health notification through pre-established contacts
- ✓ Requires response by CBRN trained personnel
- ✓ Police investigation initiates Crisis Management

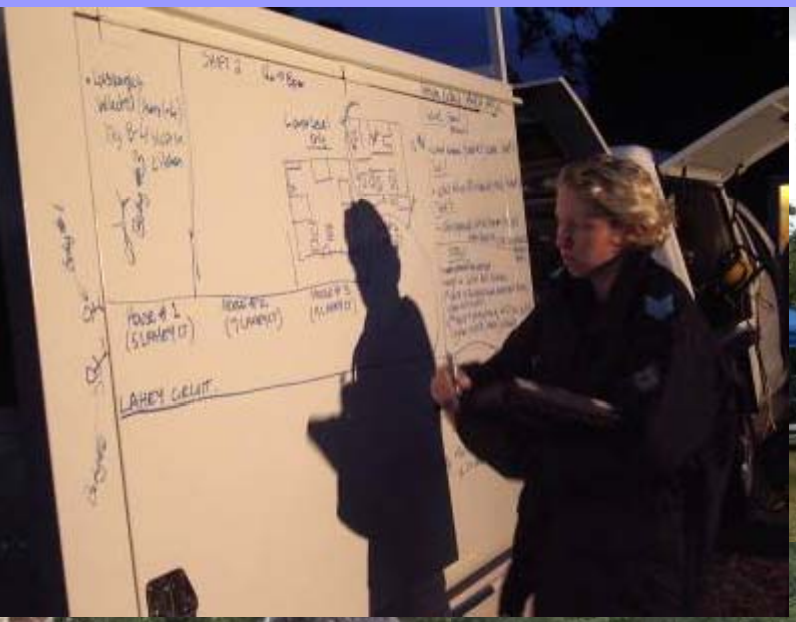
Covert Attack

- ✓ Unannounced threat
- ✓ Identified through Public Health Network via victims
- ✓ Public Health notification initiates police investigation
- ✓ Public Health initiates Consequence Management
- ✓ Requires response by CBRN trained personnel
- ✓ Police investigation has epidemiological focus

Initial Procedures for responding to the crime scene

- Seek specialist assessment and advice
- Establish cordon at safe distance from incident site
- Secure the area prevent entry of unauthorised and unprotected people
- Establish the Hot, Warm and Cold zones
- Shut off the Air-conditioning systems- internal release
- Shut windows and doors
- Isolate all potentially exposed individuals to an area outside
- Decontaminate individuals using soap and water
- Record details of individuals exposed or present at time of incident

Establish your site



Personal Protective Equipment

Level C

Level B

Three Most Important Aspects of Evidence Collection

- Personal and public safety
- Sample integrity and preservation
- Accurate documentation and chain of custody

Types of Evidence

- Direct Evidence
  - Documents, records, physical evidence, notes, computer data, videotapes, or other types of information that directly relate to the case.
- Trace Evidence
  - Minute particles of matter that can be examined microscopically, physically and/or chemically

CBRN Crime Scene Processing (Evidence Collection Team)

- Four persons Evidence Collection Team Model
  - Sampler (Forensic Specialist)
  - Assistant (Forensic Specialist/ Public Health specialist)
  - Notetaker / Camera Operator (Forensic Specialist)
  - Safety Officer
- Evidence Collection Teams must contain a minimum of 2 persons. (Sampler and Assistant)

The same format can be used for crime scenes involving chemical and radiological contamination

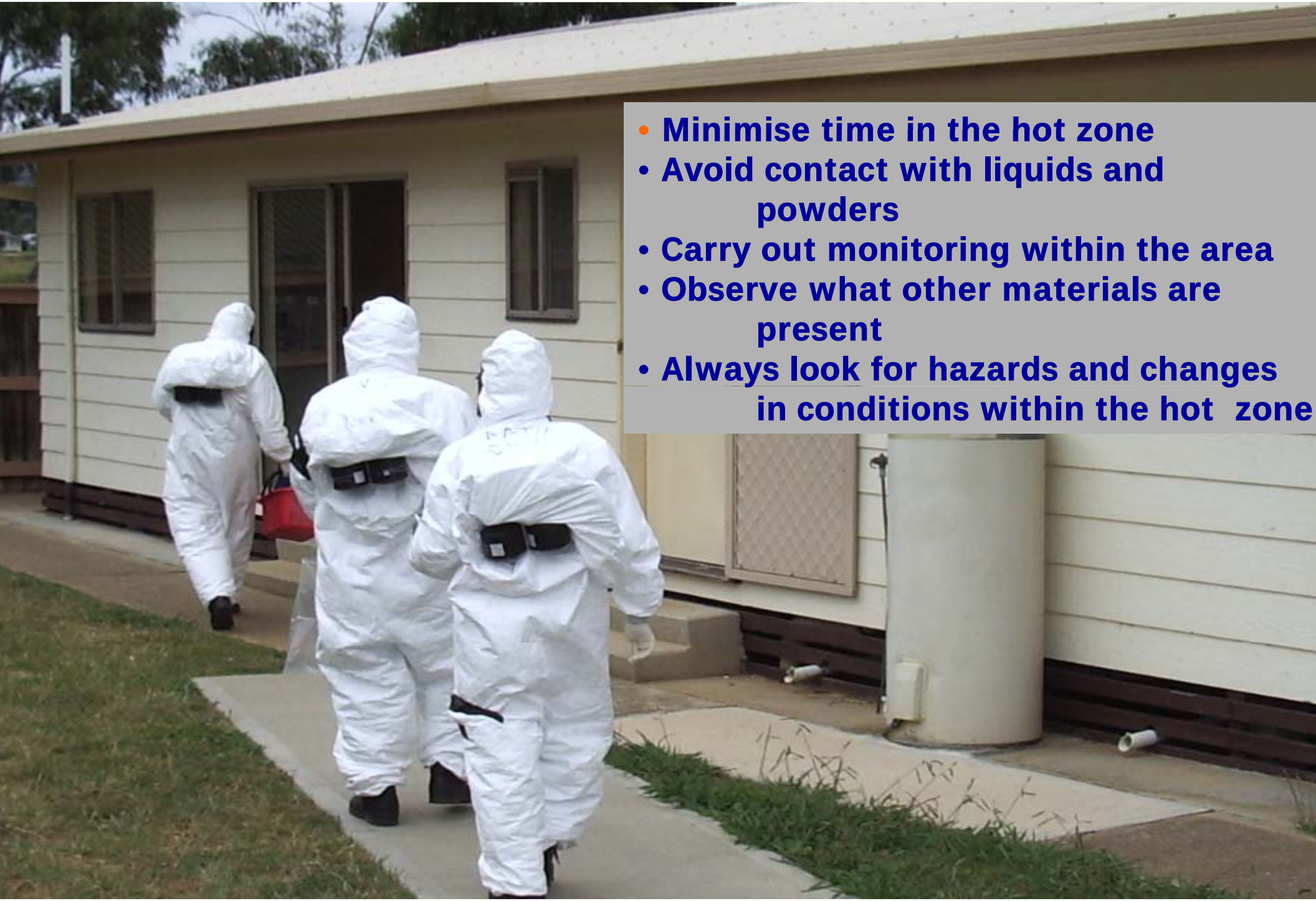
Sample Collection

Scribe

- Photograph item in situ mark location
- Item registered on document

Sampler and assistant

- Collect first item of priority
- Over pack
- Placed into clean bucket
- Next sample collected



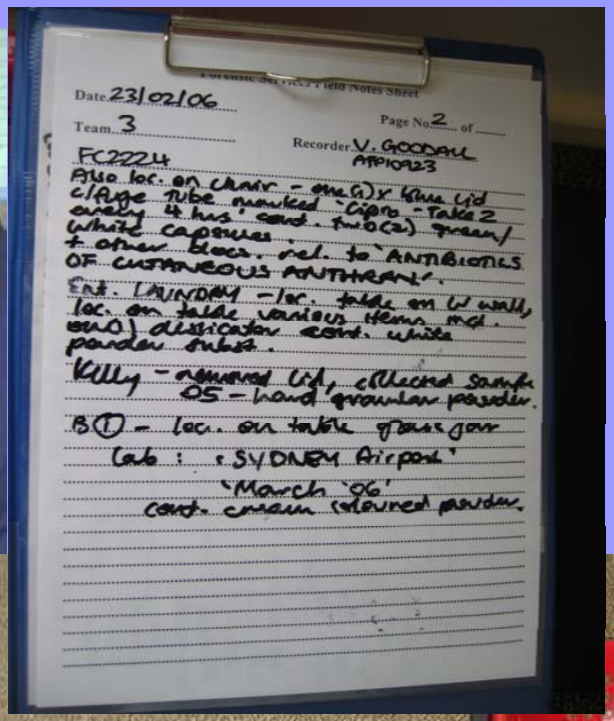
- Minimise time in the hot zone
- Avoid contact with liquids and powders
- Carry out monitoring within the area
- Observe what other materials are present
- Always look for hazards and changes in conditions within the hot zone

Sampling Plan

- Gather information from the Recon Team
- Obtain specialists advice where needed
- Assign sampling team tasks
- Identify location for each sample on site map
- Select and identify method of collection
- Document process
- Time / outline elements of the entry plan
- Prepare control samples

Clandestine Lab with items of interest

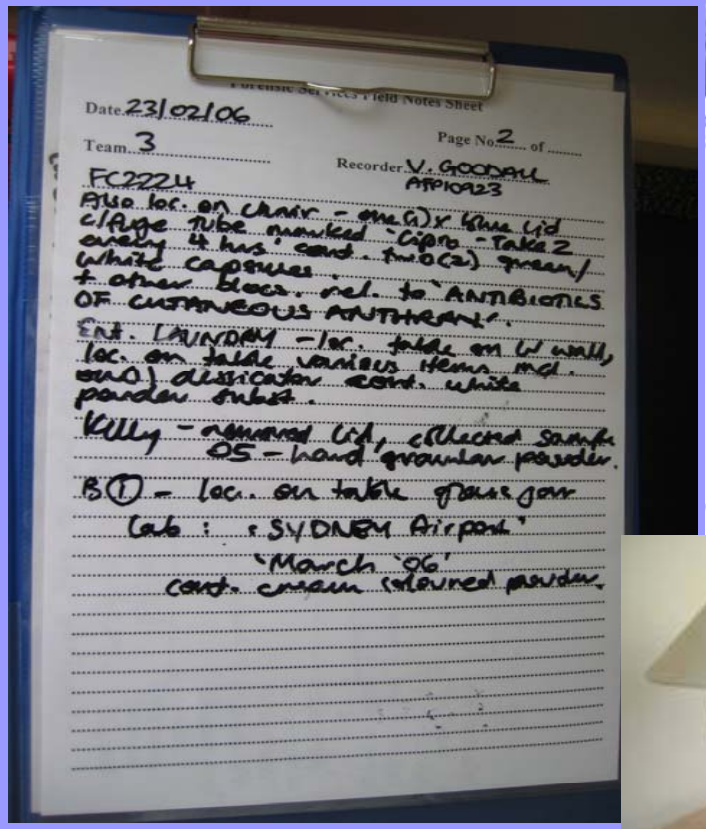
Pre-entry preparation & Equipment



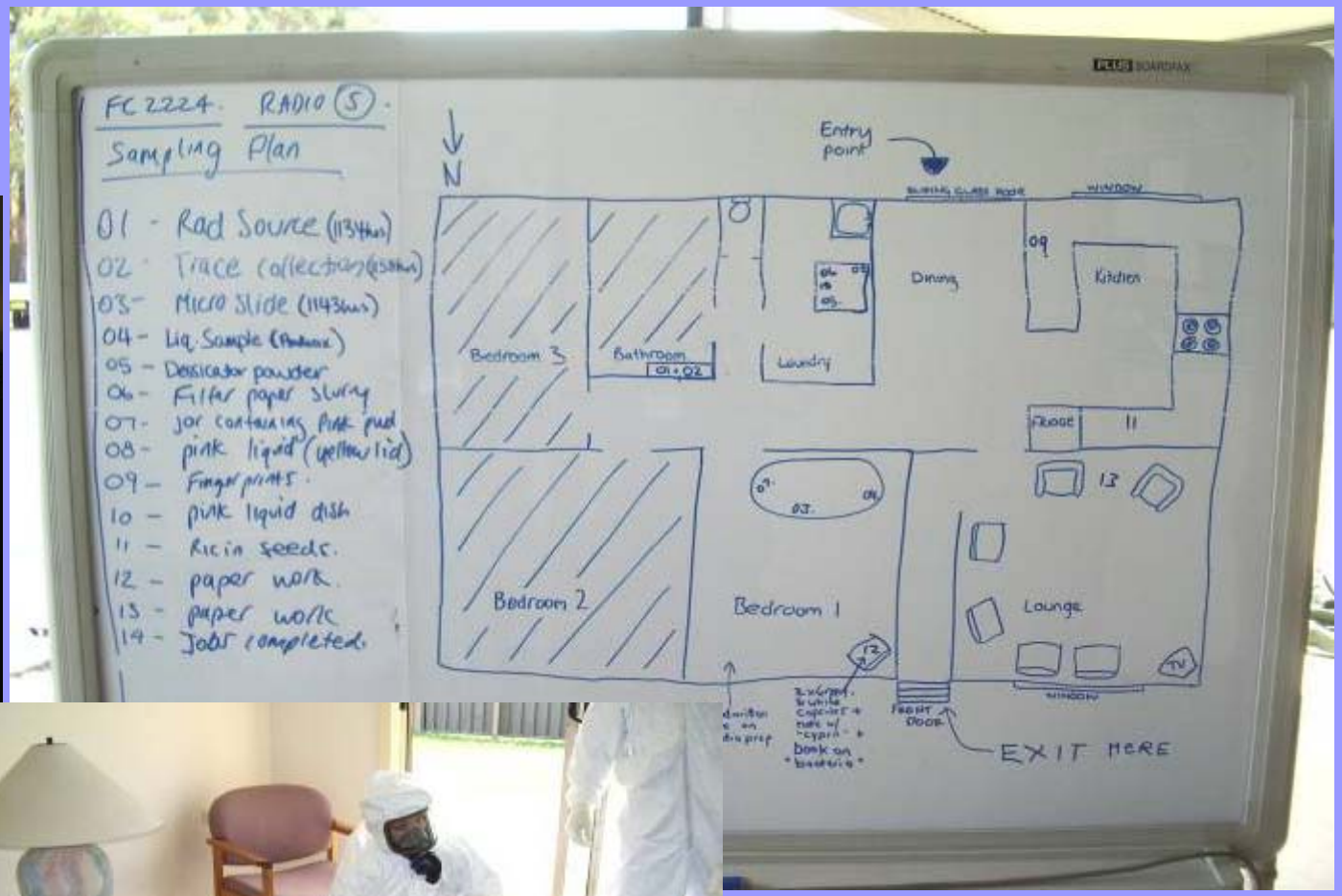
Laminated note sheets

Water proof camera

Carry basket



Refer to your Sampling Plan

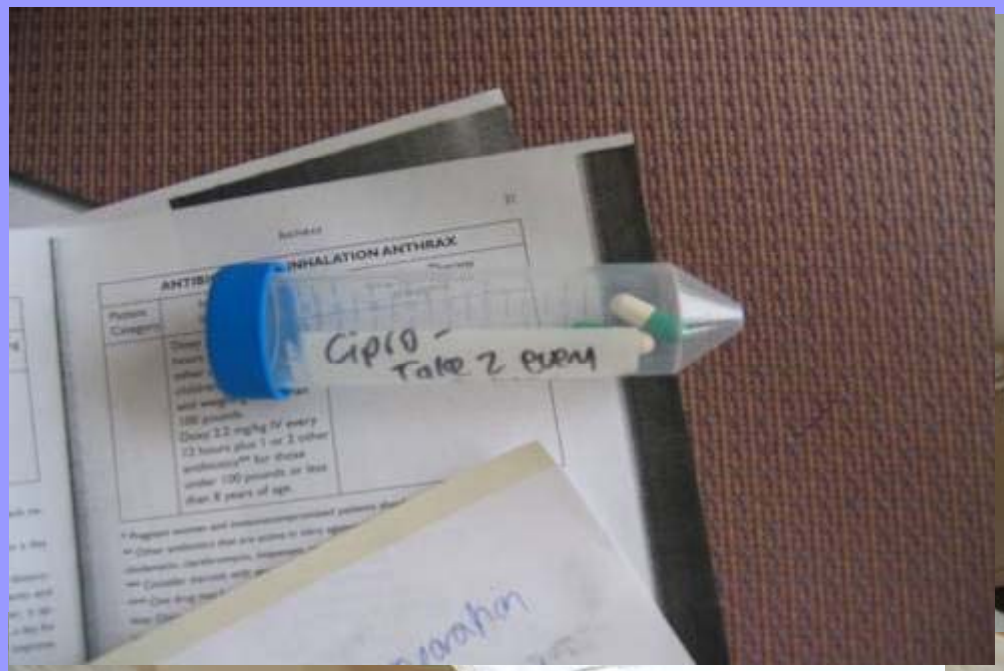


Incident management / visualisation

Establish clean area in the scene

Sampling may include;

Collection of powders, liquids or trace



Or the collection of physical evidence and intelligence

Collecting a Sample

Where do I sample?

-Obvious liquids, powders, trace evidence

-Air conditioning vents, filters, stains

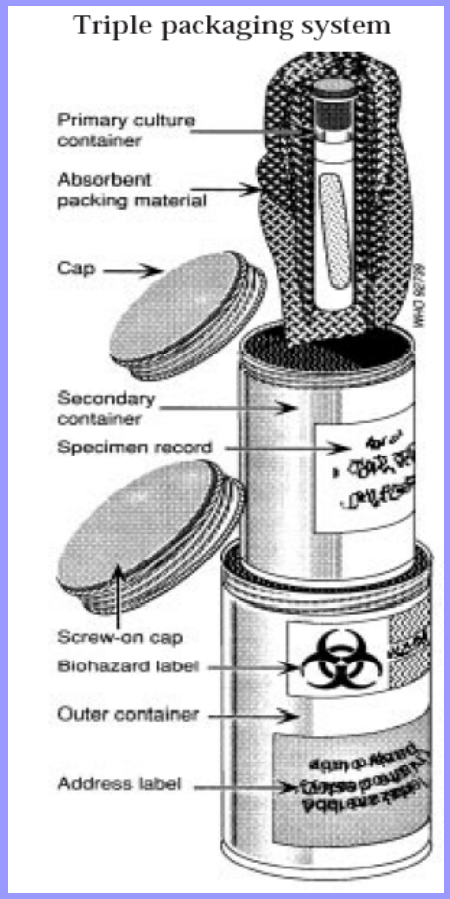
-Horizontal surfaces where particles can settle

Over-packed centrifuge tube

Scoops for powders

swabs

Packaging and Transport



- **All packages treated as “Dangerous Goods”**
- **Primary and secondary packaging must be leak proof**
- **Place over-packed items in a 5 L drum recommended**
- **Label with appropriate signage**
- **IATA- Air transport**
- **Road-Dangerous Goods Code**
- **Special requirements for Chem Warfare Agents**

Over pack should be no bigger than 10L drum

Sample Decontamination

- All collected items that exit a crime scene contaminated with a CBR agent require DECONTAMINATION.
- The decontamination process requires personnel wearing the appropriate level of PPE
- Wash the exterior of the packaging (e.g. plastic drum containing sample) with soap and water and place into a clean dry container for transport

Chain of Custody

- The documentation that tracks the movement and location of evidence from the time it is obtained to the time it is presented in court.
- Any unrecorded break in the chain of custody may cause the admission of the evidence to be denied or challenged.

Example Chain of Custody Form

Signatures required

CHAIN OF CUSTODY FORM

Sheet ___ of ___

Investigator *(name, address, ph & fax nos.)* Contact person:					**Sample matrix**						**Sample preservation**					**Analysis**							
Site																						
Laboratory *(name, address, ph & fax nos.)* Contact person:																						
Courier *(name, address, ph & fax nos.)* Contact person:																						
Sample ID	**Laboratory ID**	**Container**	**Sampling**		WATER	SOIL	SLUDGE	OTHER (SPECIFY)	COMPOSITE		ICE	HNO_3/HCl	UNPRESERVED	OTHER (SPECIFY)								
			Date	Time																		
Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.									**Sampler name:** *(print & signature)*													
Relinquished by: *(print & signature)*			Date	Time					Received by: *(print & signature)*						Date	Time						
Relinquished by: *(print & signature)*			Date	Time					Received by: *(print & signature)*						Date	Time						
Relinquished by: *(print & signature)*			Date	Time					Received by: *(print & signature)*						Date	Time						

Confirmatory Testing

- A sample has been collected where does it go?
  - Establish what testing you require
  - Identify which laboratory can receive and process this type of sample?
    - Some labs can only do basic testing while others can conduct a full identification within a Class III Biological Safety Laboratory (BSLIII).
  - Contact the laboratory prior to transport.
  - What are their requirements?
  - Has it been screened for Toxic Chemicals and RAD?

Types of Laboratory Testing

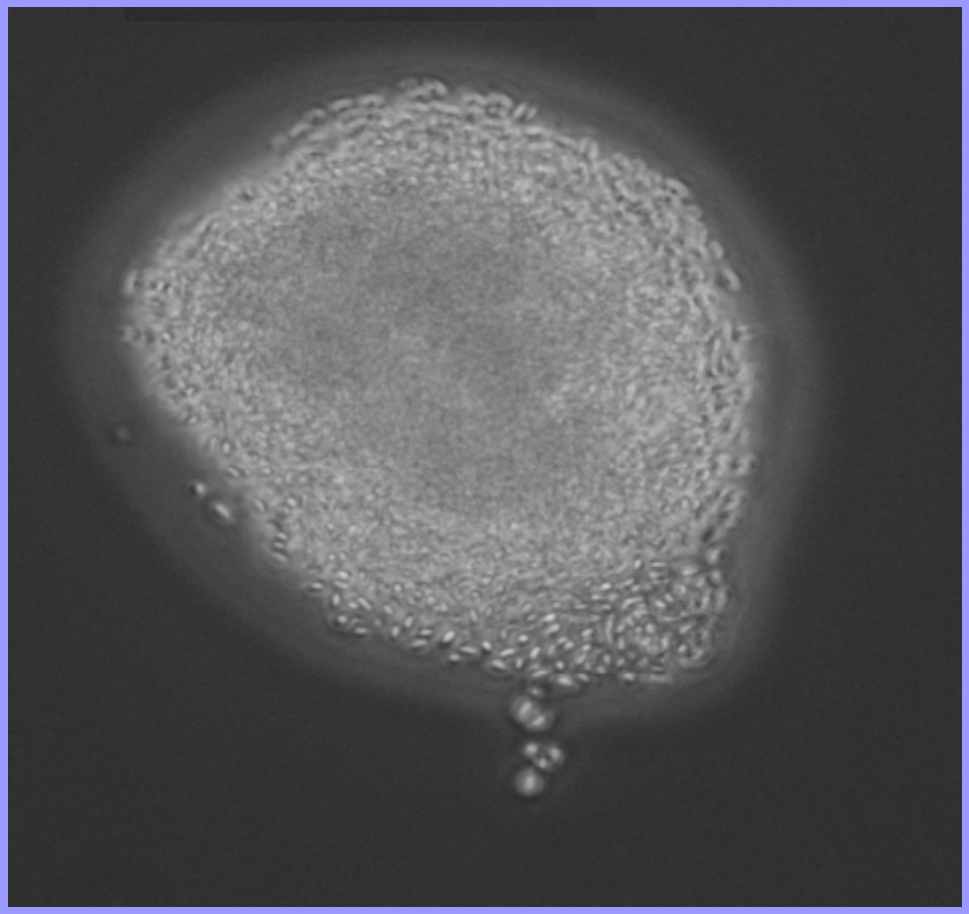
- Microscopy
  - Identify spores, bacterial staining
- PCR testing for specific organisms
- Culture for confirmatory identification
- Genetic Typing and sub typing for species identification

Confirmatory testing by Culture is the International 'Gold Standard' for microbial identification

Implications to the receiving Laboratory

- Safety- working in appropriate level facilities (BSLIII)
- Sample receipt and packaging
- Chain of custody
- Processing of environmental samples
  - Identify which lab can handle these samples
- Reporting
  - Presumptive vs. confirmatory
- Lines of communication

Microbial intelligence



Anthrax spore clump

- What bacteria is it?
  - Who would have access?
- How was is made?
  - Level of expertise?
- What additives are within it?

Example:

  - Type of media
  - Flow agents
  - Dyes
- Where would these be purchased?

Who are the players?

In your jurisdiction……

- Who can provide advise on biological agents?
  - Public Health, Military specialists, scientific?
- Who provides environmental CBR screening?
  - Fire Brigade, forensics, scientific staff , other?
- Who collects the samples for testing?
  - Forensics, scientific staff, Fire Brigade?
  - Are they trained to collect forensic samples?
- Who provides safe packaging & decontamination of sample?

Reasons to work together…

Define the event

- Conduct initial risk assessment
  - Symptoms (overt), signs, environmental monitoring
- Does a threat indicate a biological event?
- Is there a risk to health?
- Has the agent been identified?
  - Agent characteristics
- Area of contamination/ spread?

Reasons to work together…

Analyse event through joint investigations

- Continue assessing the information gathered
- Information sharing may help establish if;
  - The event is naturally occurring? *(outbreak)*
  - Criminal? *(deliberate act- isolated incident)*
  - Negligent? *(food poisoning)*
  - Or an act of Bioterrorism?

This will determine the level of expertise and resources required to respond.

Begin practical sampling demonstration