Guidelines for Collecting Qualitative Environmental Samples of Anthrax

Adapted from Centers for Disease Control "Procedures for Collecting Environmental Samples of Anthrax" (October 23, 2001 draft)

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PREFACE

These guidelines are intended for the use of state and local personnel in Maryland who are called upon to collect environmental samples to be analyzed for the presence of anthrax. The methods described in this document are for the collection of qualitative samples; i.e. samples which will be used only to determine the presence or absence of anthrax and not to quantify the amount of anthrax present at a particular location. If a test indicates the presence of anthrax at a particular location, additional detailed sampling must be conducted to quantify the amount and extent of anthrax contamination.

The decision to sample for *Bacillus anthracis* should be made by medical, environmental or industrial hygiene professionals familiar with the organism and environmental sampling methodologies described herein. Representatives from local, state and federal authorities should be consulted during the decision making process.

The decision to conduct environmental sampling should be based on the nature and location of the suspected contamination, medical diagnoses and impressions, potential contaminate migration, the activity for which the facility is used and the reliability and uncertainty associated with the data to be generated. Environmental sampling may be done to help determine the extent and degree of contamination, support decisions on when cleanup is needed and provided guidance on when cleanup is adequate for re-entry into an area.

Environmental exposure standards for *Bacillus anthracis* spores do not exist. Investigators who review and interpret the results of environmental sampling for *Bacillus anthracis* spores must consider these uncertainties and use professional judgement in interpreting any positive or negative findings.

Before sampling, consult the building's engineer to determine airflow patterns and the design of the heating, ventilation and air conditioning system. Since most building ventilation systems recirculate air to other locations in the building, the ventilation system serving the contaminated area should be shut off to prevent further airborne spread of anthrax spores. Depending on the size of the area involved, the types of surfaces potentially contaminated and the extent of contamination, it may be necessary to seal the contaminated area to prevent the spread of contamination through the movement of people or equipment.

- If the contaminated area is small, discrete and only lightly contaminated, it may suffice to cordon off the area
- If the contaminated area is large, seal off the affected area using polypropylene sheeting and tape in the same way areas are sealed off for asbestos abatement. Air vents in the area should also be sealed with polypropylene sheeting and tape.

Environmental sampling by experienced investigators will provide the best probability of locating and identifying *Bacillus anthracis* spores if they are present. The sampling method and number of samples collected will be influenced by the nature, circumstances and setting of the potential contamination. A sufficient number of samples must be taken to increase the probability that the sampling is representative. Additional sampling locations may provide more specific information on the source of the contamination. The methods used may involve bulk, surface or air sampling strategies. In this document, only qualitative surface samples will be discussed.

The first priority should be to collect samples in locations that are near suspected release sources. Later samples should be collected by moving outward in concentric circles to follow the path by which spores would disperse outside of the immediate zone of release. Note that if the aerosol containing the *Bacillus anthracis* has an aerodynamic size of less than 10 microns, the particles may remain suspended in the air for extended periods of time. In such cases, the spores can quickly spread throughout an air space and into adjacent areas served by the same ventilation system. Spores can be carried further if they attach to clothing, shoes or other objects—so more distant sampling may be needed. Personnel who enter the contaminated area must wear appropriate personal protective equipment (see Attachment 1) and follow a safety plan developed for a particular site.

Collecting Qualitative Surface Wipe Samples

For use on large, non-porous surfaces such as table tops, counters, desks, file cabinets and non-carpeted floors.

1. Don sterile, non powdered examination gloves over gloves worn as part of standard personal protective equipment.

2. Remove a sterile 2" X 2" or 4" X 4" gauze pad from package.

3. Moisten the gauze with sterile water or sterile saline solution (non-buffered).

4. Wipe the surface. Recommended wipe area is approximately 1 square foot. Avoid letting the gauze pad dry completely. Suggested sampling technique: Make 3 to 4 vertical S-strokes; fold the exposed side of the pad; make 3 to 4 horizontal S-strokes over same area.

5. Place the sampled gauze into a self-sealing bag (Ziploc® bag, Whirlpack® or similar).*****

6. Label the bag with the exact location, time and date of sample and place it into a second self-sealing bag.

7. Clean the outside of the second sealed bag with alcohol wipes or a .5% bleach solution just prior to leaving the contaminated area.

8. Place the cleaned, sealed bags in another unused self-sealing bag or 5-gallon bucket with lid.

9. Submit the samples to the DHMH laboratory for analysis.

To collect another sample, repeat steps 1-8. Change gloves between samples.

*****_The use of trade names is for identification and information only and does not constitute an endorsement by the Maryland Department of the Environment._

Note: This procedure differs from CDC draft guidance in two respects. First, CDC suggests the use of a non-cotton 3" X 3" sterile pad. The DHMH laboratory has approved the use of cotton gauze pads as detailed above. Second, CDC suggests placing the swipes into a conical vial. The DHMH laboratory has approved the use of the "double bag" technique as described above.

Attachment 1: Personal Protective Equipment

Personal protective equipment should only be worn by properly trained, fitted and qualifed personnel.

LEVEL C

Note: Level C protection is recommended for facility assessments unless other conditions (noted under Level B and Level A) are present.

Responders may use a full facepiece respirator with a P100 filter or powered air-purifying respirator (PAPR) with high efficiency particulate air (HEPA) filters when it can be determined that:

- An aerosol-generating device was not used to create high airborne concentration

- Dissemination was by a letter or package that can be easily bagged.

These type of respirators reduce the user's exposure by a factor of 50 if the user has been properly fit tested. In these circumstances, standard Tyvek® suits with hoods; latex gloves and shoe covers will provide sufficient protection.

LEVEL B

Responders may use a Level B protective suit with an exposed or enclosed NIOSH- approved pressure-demand SCBA if the situation can be defined in which:

- The suspected biological aerosol is no longer being generated

- Other conditions may present a splash hazard.

LEVEL A

Responders should use a NIOSH-approved, pressure-demand SCBA in conjunction with a Level A protective suit in responding to a suspected biological incident where any of the following information is unknown or the event is uncontrolled:

- The type(s) of airborne agent(s)

- The dissemination method

- Dissemination via an aerosol-generating device is still occurring or it has stopped but there is no information on the duration of dissemination, or what the exposure concentration might be

Attachment 2: Operational Concept for Facility Assessment

PHASE 1: Dispatch and Arrival

- Sites to be tested will be identified and assessment team dispatched
- Scene will be secured to the maximum extent possible by local law enforcement, facility security staff or State Police.
- Upon arrival, an in-briefing will be conducted with the facility point of contact. Information to be discussed will include:

    a. Diagrams of facility and mailroom
    b. Discussion of flow of mail through facility
    c. Airflow patterns in the facility
    d. Identification of potential numbers of affected staff
    e. Briefing by assessment team on procedures to be followed during the assessment
    f. Procedures for referral of media inquiries

- Assessment team will set up decon stations and don appropriate personal protective equipment.
- If staff members are present, they should be removed from the area to be assessed for the duration of sampling activity. This is to allow the assessment team maximum freedom of movement and to prevent needlessly alarming staff members.

PHASE 2: Facility Assessment

- Assessment team will enter the facility and take swipe samples along the probable path of mail through the mailroom as well as other suspected sources of contamination.
- Qualitative swipe samples will be taken in accordance with guidelines found in this document. Individual swipes should be taken at the beginning and end or mail sorting equipment flow paths; composite swipes will be taken along the rest of the flow path.
- Other swipes will be taken by the assessment team as determined during Phase 1. Specific swipe locations are unique to each facility.

- If present, National Guard Civil Support Team personnel will conduct two hand-held biological assays with verification assays (for a total of four assays per facility). These assays will consist of composite samples from probable entry and exit paths or mail flow or other locations of suspected contamination. ***(Note: hand-held assays are field tests only and do not conclusively determine the presence or absence of anthrax spores. They are not a substitute for laboratory analysis).***

- All swipe samples will be bagged and labeled in accordance with DHMH laboratory procedures. A log will be kept detailing the exact number and location of samples within each facility.

- In the event of a positive result from a hand-held assay, a third assay and verification (from a separate lot) will be conducted. In the event this assay also tests positive, the team will immediately contact the local health officer and State Emergency Operations Center for further instructions.

PHASE 3: Demobilization and Reporting

- Upon conclusion of facility assessment, the team will exit the facility and begin personal decontamination.

- Personal decontamination will consist of dry decontamination (removal of protective clothing) to the maximum extent possible. In the event items of protective clothing such as protective boots need decontamination, a solution of .5% household bleach (10 parts water to 1 part household bleach) will be applied. Decon solution may be disposed of in a sanitary sewer or other sanitary drain. All assessment personnel will wash their hands with soap and water as part of the decontamination process.

- An out-briefing will be conducted with the facility point of contact. This out-briefing will include:

    a. Discussion of swipes taken and other procedures
    b. Point of contact information for follow-up questions from the facility
    c. Clear discussion that laboratory analysis will provide the determination of the presence/absence of anthrax. Share information regarding the anticipated availability of lab results (normally 3-5 days).
    d. Lab results will be provided by DHMH to the local health department for communication to the facility.

- Preliminary results of the out-briefing and assessment (if conducted by a State team) will be communicated back to DHMH and MDE.

- A log will be maintained of all samples collected at an individual facility. Expended hand-held assays will be maintained by the MDE Emergency Response Division pending the results of laboratory analysis.