



WASTE DISPOSAL WORKSHOPS: ANTHRAX CONTAMINATED WASTE

January 2010



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Waste Disposal Workshops: Anthrax-Contaminated Waste

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January 2010

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Pacific Northwest National Laboratory
Richland, Washington 99352

Summary

In 2006, the Defense Threat Reduction Agency (DTRA) within the U.S. Department of Defense (DoD) launched a collaborative program with the U.S. Department of Homeland Security (DHS) titled the Interagency Biological Restoration Demonstration (IBRD). The goal of the IBRD program is to help develop policies, methods, plans, and applied technologies to restore large urban areas, DoD installations, and critical infrastructure following the release of a biological agent such as *Bacillus anthracis* (anthrax).

Disasters often create large amounts of waste that must be managed as part of both immediate recovery and long-term recovery processes. While many federal, state and local agencies have debris management plans, they often do not address chemical, biological, and radiological contamination resulting from a terrorist action. In the case of wide-area anthrax contamination, it is anticipated that a wide range of material will require decontamination and disposal. This may include furniture, carpeting, sludge, building material, common garbage, and animal carcasses. Part of the IBRD program is to assist in the planning and development of debris management plans that can address contaminated waste through the entire life cycle of the waste.

Through a series of interviews and workshops with local, state, and federal representatives, three issue areas were identified as being the primary areas of focus:

- Planning
- Research Questions
- Regulatory Issues

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Acronyms and Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
CDC	Centers for Disease Control
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DHHS	U.S. Department of Health and Human Services
DHS	U.S. Department of Homeland Security
DoD	U.S. Department of Defense
DOT	Department of Transportation
DTRA	Defense Threat Reduction Agency
EMD	Emergency Management Division
ESF	Emergency Support Function
EPA	U.S. Environmental Protection Agency
FBI	Federal Bureau of Investigation
IBRD	Interagency Biological Restoration Demonstration
LLNL	Lawrence Livermore National Laboratory
MSW	Municipal Solid Waste
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
POTW	Publicly Owned Treatment Works
RCRA	Resource Conservation and Recovery Act
SNL	Sandia National Laboratories
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
WWT	Waste Water Treatment
WUTC	Washington Utilities and Transportation Commission

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1.0 Background

In 2006, the Defense Threat Reduction Agency (DTRA) within the U.S. Department of Defense (DoD) launched a collaborative program with the U.S. Department of Homeland Security (DHS) titled the Interagency Biological Restoration Demonstration (IBRD). The goal of the IBRD program is to help develop policies, methods, plans, and applied technologies to restore large urban areas, DoD installations, and critical infrastructure following the release of a biological agent such as *Bacillus anthracis* (anthrax). The Seattle urban area is a key partner for this project and was selected as the demonstration region for the IBRD program. The IBRD program is designed to take a collaborative approach among regional stakeholders in the Seattle urban area including local, state, federal and private sector partners to develop and deliver solutions that are tailored to the needs of the Pacific Northwest Region, yet applicable to other regions. Members of the public and private sector in the Seattle urban area have been key partners in the implementation of IBRD.

Disasters often create large amounts of waste that must be managed as part of both immediate recovery and long-term recovery processes. While many federal, state and local agencies have debris management plans, they often do not address chemical, biological, and radiological contamination resulting from a terrorist action. In the case of wide-area anthrax contamination, it is anticipated that a wide range of material will require decontamination and disposal. This may include furniture, carpeting, sludge, building material, common garbage, and animal carcasses.

In October 2009, a series of workshops was coordinated by the Pacific Northwest National Laboratory, with support from the U.S. Environmental Protection Agency (EPA), to understand: the current state of preparedness for disposal of anthrax-contaminated materials; capabilities, requirements, and limitations to respond to and recover from an anthrax incident; the issues of and barriers to disposal of biological agent-contaminated waste; and to develop a prioritized list of issues to be addressed. Three separate facilitated workshops were held in Seattle with 1) waste facility owners, haulers and associations, 2) state and local participants, and 3) federal participants. This report is a summary of those workshops, which EPA will use to enhance the ability to recover and restore operations after such a disaster.

2.0 Project Objectives

The primary objectives of this project are to:

- Understand the current state of preparedness of disposal of anthrax-contaminated materials
- Understand the capabilities, requirements, and limitations in responding to and recovering from an anthrax incident
- Understand the issues of and barriers to disposal of biological waste (specifically, anthrax-contaminated waste)
- Develop a prioritized list of issues to be addressed.

3.0 Approach

Tasks associated with this project are described below.

Stakeholder Selection – Key waste facility owners, haulers, waste associations, and service providers were identified to participate in the workshops along with relevant officials at the local, state, and federal levels. The participants represented the waste-disposal ecosystem that included transportation, disposal, treatment, and regulatory components. An effort was made to include representatives from all relevant organizations, companies, and agencies involved with the handling and disposal of all forms of waste in order to provide a comprehensive picture of waste management from the initial response phases through the recovery phase.

Baseline Assessment Interviews – Telephone interviews were conducted with stakeholders in preparation for the workshops to review workshop objectives and understand each organization's current level of preparedness as well as to flag relevant concerns to be addressed in the context of the workshops and the final report. A complete list of interviewees is provided in Appendix A.

Workshops – A series of three workshops was conducted October 13 – 14, 2009 at Pacific Northwest National Laboratory's offices in Seattle, Washington. Each workshop focused on a specific stakeholder group: 1) waste facility owners, haulers, associations; 2) state and local agencies; 3) federal agencies. The workshops were designed to identify and prioritize major concerns of each group regarding the management of waste during and after a biological disaster including the decontamination and restoration of property during the recovery phase while also maintaining current levels of service. At the outset of each workshop, the wide-area anthrax contamination scenario was described and participants were asked to describe their major concerns and needs to support recovery and restoration efforts. A complete list of participants is provided in Appendix D.

4.0 Summary of Findings from Pre-Workshop Interviews

4.1 Background/Approach

Informational interviews were conducted in June and July of 2009 focusing on the topic of anthrax-contaminated waste disposal. The EPA provided an initial list of interview contacts encompassing both the private and public sector. The list included representatives from local, state, and federal government agencies as well as waste facility owners, haulers, waste associations, and service providers. At the end of the process, 53 individuals were interviewed, the interview protocol is provided in Appendix B. A complete list of interviewees can be found in Appendix A.

Three primary issues were repeated by all three groups during the interview process. These mirror the priority issues that came out of the workshops (see next section) and are detailed below.

Roles and Responsibilities – There were questions as to what role would be played by each level of government. Many comments were related to which agencies would be involved and in what capacity. The specific delegation of responsibility and the chains of command within and throughout the decision-making process were not clear to the interviewees.

Waste Characterization – As would be expressed in the workshops, the classification of anthrax-contaminated waste was unclear. Beyond the basic regulatory framework concerns, there were ancillary questions regarding how the waste, once categorized, would be handled in the context of the cleanup. There were questions about determining how “clean is clean.” There were also concerns about whether the waste could go to Subtitle C or D facilities, and irrespective of the final disposal site, what type of long-term monitoring would be required.

Planning –There were questions about the planning and execution process:

- Current plans do not include anthrax as a possibility and focus on response rather than recovery.
- There is a need to understand current capacity to handle waste and capability to generate an estimate of the volume of waste from an anthrax attack.
- There can be no valid plan without first establishing a risk baseline.¹
- Current federal, state, and local agencies have not communicated their roles and responsibilities that are specific to anthrax and therefore can neither determine the level of risk nor identify gaps in the response.
- Communication of risk between agencies and the general public has not been appropriate for an anthrax incident. To be effective it would require further education.

A more comprehensive summary of the interviews, categorized by interview group, can be found in Appendix C.

5.0 Summary of Findings from Workshops

5.1 Workshop with Waste Facility Owners, Haulers, Associations, and Service Providers on October 13, 2009

This section presents the findings from the workshop conducted with waste management organization and association representatives from the Washington Refuse and Recycling Association, Waste Management, Republic Services, Allied Waste – Roosevelt Regional Landfill, Stericycle, Cleanscapes, the Washington Association of Sewer and Water Districts, King County Department of Natural Resources, and King County Solid Waste. The individuals invited to the workshop represent the private sector and a small cross section of local public sector waste management and regulatory authorities in the Seattle urban area. A list of attendees and the agencies they represented are provided in Appendix D.

During the workshop, participants were asked to share their major concerns regarding the collection, disposal, and management of anthrax-contaminated waste. These concerns were recorded and prioritized by attendees at the end of the session through a voting process. Each attendee was given red and green markers with which to vote. The red marker indicated the top priority for the individual. Issues were marked, and the “priority issues” (listed below) were tabulated by counting both the number of total votes

¹ In the context, Risk Baseline refers to the standard level of risk to workers, equipment, and facilities if the attack was to happen under current conditions.

and the number of red votes received. All other issues receiving votes are listed at the end of the section, and a complete list of issues collected is provided in Appendix E.

5.1.1 Priority Issues

Planning – The consensus priority was the creation of a pre-written plan that could be implemented if an attack occurred. Within the plan was the need for extensive research on the survivability and viability of anthrax through the waste disposal process. Of specific concern was how anthrax behaves in both natural and landfill environments and how this can impact the destruction of the spores. Attendees agreed that a pre-established waste disposal pathway would significantly improve responses to an attack. Also to be contained in the plan are pre-determined methodologies for cleanup at varying levels of “clean,” provision and monitoring of prophylaxis and personal protective equipment (PPE), and identification of disposal capacity and site-specific treatment of contaminated waste. It was agreed that with a well-researched plan in place, the private sector would be able to move quickly to support cleanup.

Regulatory Status of Waste – A significant component of the plan would be the regulatory classification of the waste and how it would be transported. Attendees recommended the use of proclamations to clarify the regulatory status of the waste and to address who can and would be handling it through the disposal process while also providing the leverage to bring historically hesitant participants, such as railroads, to the table. The regulatory status at the time of the workshop was unclear. Attendees could not determine how the waste would be classified, which inhibits the risk assessment and planning process.

How is “clean” verified? – There was a significant concern about the verification of “clean” following the decontamination process. Through the discussion, it was clear to the attendees that the more material that can be decontaminated in place, the easier it will be to manage the waste. Of all the research questions discussed in the plan, the issue of verifying what constitutes “clean” with different types of material and in different environments was the priority issue to be researched. Without being able to answer this question, there is no feasible way to plan or conduct a risk assessment to begin an anthrax waste management planning process.

Education/Training – Attendees were very concerned that there was insufficient information about the behavior and effectiveness of treatment against anthrax in the public sphere. This was of particular importance in retaining workers or convincing workers to return to assist in the cleanup process. The worker education process would need to include specific provisions for timeframe and material so they could begin work. The other educational issue related to the communities where the waste would be transported and ultimately housed through the waste disposal pathway. The communities in question would need to be educated and informed in order to streamline the disposal process.

Corollary to education would be worker training to handle, collect, and dispose of the waste. Training would be done as needed/on demand, but the attendees stressed the importance of having a training program in place and ready for deployment. There was an expressed concern about the content of training because workers would only want to know their roles without getting bogged down in scientific details.

5.1.2 Other Issues

The following are the remaining issues that received votes from attendees.

- Planning
 - What is the process for disposal?
 - What is the threshold for transition from emergency response to recovery?
 - What is the process for waste handling and collection?
 - What is the waste consolidation strategy?
- Research Questions
 - Can contaminated waste be combined with other waste?
 - What is the survivability/viability of anthrax spores?
 - What happens to anthrax in publicly owned treatment works (POTW)?
- Education
 - Risk Communication
- Economics
 - Cleanup issues regarding current tariff structures and pre-existing contracts
 - Indemnification

5.2 Workshop with State and Local Participants on October 14, 2009

This section presents the findings from the workshop conducted with six state and local agencies. The individuals invited to the workshop represented the City of Seattle, King County, Snohomish County, and the State of Washington. A list of attendees and the agencies they represented are provided in Appendix D.

The same methodology for identifying and prioritizing issues was used in this workshop as in the previous workshop.

All other issues receiving votes are listed at the end of the section, and a complete list of issues collected is provided in Appendix E.

5.2.1 Priority Issues

Regulatory Ownership – Attendees were unable to reach consensus on how to classify the contaminated waste. There also was concern about how to classify (if at all) waste that had been decontaminated that needed disposal. The group reached consensus that this should be studied rigorously because of the implications for command and control as well as the impacts classification has on how the waste is handled, transported, and disposed.

Behavior of Anthrax in Landfill Environment – Attendees voiced a concern that decontaminated waste might still contain spores, owing to differentials in decontamination; and that while mostly effective, incineration-based municipal solid waste (MSW) is still dependent on verification and the ash might still contain some trace amount of spores. Therefore, there was an expressed need to understand how spores behave under standard landfill conditions: issues of temperature /pressure, leachate treatment,

effects of gas flaring, and cross-waste contamination all were brought up, especially regarding the planning process. It was unclear at the time whether anthrax-contaminated or decontaminated waste could be stored with other types of waste (hazardous and/or non-hazardous) not contaminated by anthrax. The group identified this as a research priority in developing proper waste disposal pathways.

Lessons Learned – There have been multiple incidents involving cleanup after large-scale disasters and several incidents involving anthrax that attendees thought had many valuable lessons that could be learned for IBRD planning purposes. Of primary interest was identifying where those efforts met bottlenecks, areas for process improvement, and any other positive or negative similarities in the cleanup execution that could be avoided. In moving forward, the group agreed that studying the cleanup issues from September 11 and Hurricane Katrina; the anthrax letters found at the AMI building in Florida, the Hart Senate Office Building, the New Jersey Post Office, and the ABC/NBC/CBS/New York Post Offices in New York City; and Idaho’s bird-flu cases could provide some valuable lessons in devising a plan for waste management following the IBRD scenario and should be a primary focus.

Treatment in Place – The final consensus priority was that as much material as possible should be decontaminated in place to minimize the amount of waste produced. This required research into decontamination protocols, the availability of technology and its effectiveness, sampling and clearance methodologies, and estimated timeframes for completion based on “acceptable” levels of “clean.” Attendees also brought up the possibility of encapsulating the spores as a method of minimizing the amount of waste produced. Related to the ability to re-use decontaminated materials was a discussion on physically reducing the size of waste before disposal through methods such as incineration.

5.2.2 Other Issues

The following are the remaining issues that received votes from attendees.

- Transportation
 - Packaging/encapsulation of materials for transport
 - Monitoring en route
 - Mitigation en route
- Education
 - Anthrax 101
 - Health and safety communication
- Roles
 - Who is in charge?
- Disposal
 - Continuous monitoring at disposal site
 - Long-term liability of disposed waste
- Regulations
 - Coordination among counties under common regulatory authority
- Research Questions
 - What packaging is acceptable to prevent leakage?

5.3 Workshop with Federal Participants on October 14, 2009

This section presents the findings from the workshop conducted with Fort Lewis, representatives from EPA Headquarters and the Regional Office, and the U.S. Department of Agriculture (USDA). Attendees represented a cross section of the EPA's responsibility in the event of an anthrax attack and represented the waste management scenario from the perspective of the U.S. military. Together, the group was a small cross section of the federal assistance that would be expected in the event of an anthrax attack. A list of attendees and the agencies they represented are provided in Appendix D.

The same methodology for identifying and prioritizing issues was used in this workshop as in the previous workshops.

All other issues receiving votes are listed at the end of the section, and a complete list of issues collected is provided in Appendix E.

5.3.1 Priority Issues

Template/Decision Framework – The overall consensus priority was to create a “loose” template or decision framework that shows who the key players are, who sits at the table, who makes decisions and how, and what questions need to be asked and when. There was consensus that the inevitable fear and stigma of anything related to the “event” could be combated effectively with clearly defined procedures and decision-making frameworks. Another related issue that needed to be addressed was cross-state outreach. Lessons learned from September 11 were that significant efforts will be required to facilitate waste disposal in addition to identifying the disposal locations and necessary points of contact in advance. Attendees agreed unanimously that if a template exists to tell them who has jurisdiction, who makes the decisions, and who to bring to the table and when, the overall response and recovery process will be more effective.

Research – Under the auspices of decision framework, there was consensus on the need for more research, primarily on the performance of a risk assessment. There is a need to know, from a waste management standpoint, how clean is clean enough for different treatment and disposal pathways, and if there are flexible tolerances for levels of clean, and where they exist. Without assessing risk, the planning process cannot triage the waste, estimate tonnage of different classes of waste, or know how much and what type of material will be needed to manage it. Other primary research needs included the types of technology available, their effectiveness, and what can be developed and pushed out to first responders and cleanup crews in order to speed up the decontamination process. Parallel to this focus is the need for more efficient sampling and clearance analysis regarding the waste itself. Attendees compared the goal to asbestos sampling, where samplers have a high confidence that there has been a total extraction.

Waste Treatment and Disposal Pathway/Regulations on Decontamination Agents – The final consensus priority was a waste treatment and disposal pathway that was triggered with the classification of the waste. The need for legal counsel to weigh in was suggested because of the disagreement as to how the waste would be characterized. Once the classification decision is reached, the owners, haulers, and operators all expressed that if their employees are given the proper training, personal protective equipment (PPE), and the standard operating procedures, they will be able to move the waste down the disposal pathway without any additional need for additional information. There was agreement about a need to study how to characterize the waste so that “The Plan” can include a risk assessment and clear

steps for treatment and final disposal of the waste. Identifying the capacity of onsite treatment is necessary to allow the EPA On-Scene Coordinator to define the site boundaries for staging and treatment before material becomes waste and is subject to regulatory timelines and tracking requirements.

5.3.2 Other Issues

The following are the remaining issues that received votes from attendees.

- Waste Disposal
 - Who decides final disposal site location?
 - Who works politics/negotiations?
- Education/Training
 - Provide operational info to POTW
 - Worker safety
 - Perception/stigma issues
- Federal guidance on POTW issues/policy on wastewater treatment

6.0 Conclusions

From both the workshops and interviews, three major issues were determined to be the highest priorities for future work.

6.1 Planning

Developing the decision processes and chains of command that will be employed following a biological attack were the primary concern of both the interview groups and the workshop attendees. A major component of this process is contingent on research, particularly with regards to disposal techniques and the waste disposal pathway. Beyond the research, there is a need to begin work on following aspects:

1. A risk assessment² that is periodically updated as research and guidance changes.
2. A template or decision framework so that if an attack occurs all stakeholders know their roles and overall position in the response and recovery process but are not boxed in to specific tasks that may not be relevant.
3. The final component relates to how the response and recovery effort's message will be created and communicated to the relevant stakeholder groups.
 - a. Part of this process will require educating the participants as well as the public as to the dangers of anthrax,

² Risk Assessment is used in this context as an evaluation as the level of risk faced by those participating in the response and recovery processes, under a defined set of conditions with a specified level of resources. The risk assessment referred to here is an evolving document that quantifies the level of risk at any given time, and changes as additional resources are identified or put into the pipeline and as research reveals more about effectiveness of decontamination and clearance processes.

- b. How prophylaxis works and its effectiveness,
- c. What steps can be and are being taken,
- d. The roles that each stakeholder has to play in the overall effort.

6.2 Research Questions

There are multiple key research questions that need to be addressed to support waste management planning:

- 1. How clean is clean?
- 2. How do you verify clean?
- 3. How does anthrax behave in a landfill environment?
- 4. What are the lessons learned from previous experiences with anthrax?
- 5. What is the best available way to treat contaminated material in place, and what types of technologies are being investigated to make that process more efficient and effective?

6.3 Regulatory Issues

There is a critical need to clarify the regulatory status of contaminated waste and the materials used in the decontamination process in order to establish a clear waste treatment and disposal pathway.

Currently, there is no protocol for biologically contaminated waste, and arbitrarily placing anthrax into a preset category has significant legal and planning implications that need to be understood. It must be determined what new or modified regulatory spaces need to be created in order to house this type of waste.

Appendix A

List of Interviewees

Appendix A

List of Interviewees

A.1 Federal

Mark Williamson, DOD – Fort Lewis
 Jim Sheline, DOD – Fort Lewis
 Ken Smith, DOD – Fort Lewis
 Kyle Greer, DOD – Fort Lewis
 Richard Singler, DOD – Fort Lewis
 Paul Kudarauskas, EPA – National Decontamination Team
 Erica Canzler, EPA – OEM
 Jim Michael, EPA – ORCR
 Marissa Lynch, EPA – OW
 David Rees, EPA – Region 10
 Dave Bartus, EPA – Region 10
 Lori Miller, FDA/USDA
 Marianne B. Feback, USDA, APHIS
 LeeAnne Jackson, FDA/USDA – Region 10
 Jonathan Anderson, FEMA – HQ
 Patrick Massey, FEMA – Region 10
 Bill Gadberry, FEMA – Region 10
 CAPT David Kerschner, HHS/CDC – Region 10
 CAPT Sven Rodenbeck, ATSDR
 CAPT Peter Kowalski, ATSDR
 Mamie Brouwer, USACE
 Tim Gouger, USACE – HQ
 Scott Deitchman, HHS – CDC HQ

A.2 State and Local

Kathryn Howard, King County Emergency Management
 Jim Henriksen, Seattle/King County Public Health
 Jeff Neuner, Seattle Public Utilities
 Deanna Carveth, Snohomish County Solid Waste
 David Hodgeboom, Washington State Department of Agriculture
 Peter Christiansen, Washington State Department of Ecology
 Chuck Hagerjelm, Washington State Department of Emergency Management
 John Erickson, Washington State Department of Health
 Wayne Turnberg, Washington State Department of Health
 John Himmel, Washington State Department of Transportation
 Peggy Ingram, Washington Utilities & Transportation Commission, Regulatory Services Division
 Grant Tietje, Seattle Emergency Management

A.3 Haulers

Mike Long, King County Solid Waste
Pam Badger, King County Solid Waste
Terri Barker, King County Solid Waste
Allen Alston, King County Department of Natural Resources
Phil Scott, CleanScapes
Chris Stromerson, Stericycle Inc.
Ross Wilson, Stericycle Inc.
Dr. Ben Hoffman, Waste Management, Inc.
Bruce Jernigan, Waste Management, Inc.
Brian Bowen, Waste Management, Inc.

A.4 Landfills/Treatment Facilities

Allen Alstan, King County Publicly Owned Treatment Works Treatment Plant
Art Mains, Roosevelt Regional Landfill/Regional Disposal Company
Rich Thompson, Republic Services
Grant Hill, Recomp WTE/Transfer Station
Paul Dawkins, City of Tacoma Landfill

A.5 Associations

Kevin Morley, American Water Works Association
Walter Bailey, DC Water and Sewer Authority
Hal Schloemann, Washington Association of Sewer and Water Districts
Brad Lovaas, Washington Refuse and Recycling Association
Alice Jacobsohn, National Solid Waste Management Association

Appendix B

Pre-workshop Interview Protocol

Appendix B

Pre-workshop Interview Protocol

B.1 Questions for Federal State and Local Participants

1. What are the roles/responsibilities of your organization in coordinating the disposal of anthrax derived wastes? Who are the key players in your organization with these responsibilities? Please explain.
2. Has your organization completed existing plans or conducted exercises describing how roles/responsibilities will be implemented when dealing with special waste? Biohazardous waste? Medical waste? Anthrax-derived wastes? Please explain.
3. Have you engaged in discussions with other federal, state, and local departments/agencies to understand their roles/responsibilities in managing the disposal of anthrax derived wastes? Please explain.
4. Does your organization have a risk communication strategy (e.g., how science, technology and/or policy issues would be communicated to the public) to implement during an anthrax incident?
5. What do you see as the major impediments (if any) for the disposal of anthrax-derived wastes in your region?
 - At the federal level;
 - the state and local level;
 - the facility owner/operator level; and/or
 - the public
6. Do you believe there is sufficient disposal capacity to properly dispose of anthrax-derived wastes in the event of an incident? Why or why not? Please explain with specific numbers if possible.
7. How would you gauge the willingness of facilities to accept anthrax-derived wastes in the event of an incident? Do you anticipate that willingness to change depending on whether waste is verified treated, unverified treated, or untreated?
8. Do you perceive issues with the overall ability, including capacity and willingness to accept, to dispose of anthrax-derived waste?
 - a. If yes, what do you believe would be the most important action(s) to undertake to increase the number and capacity of facilities willing to accept biological threat agent derived wastes in your region?
 - At the federal level;
 - the state and local level;
 - the facility owner/operator level; and/or
 - the public
9. What outcomes would you most like to see from this workshop?

B.2 Questions for Waste Facility Owners, Owners, Associations

1. What are the roles/types of services of your company/organization in the transportation/disposal of anthrax-derived wastes?
2. Have you engaged in discussions with other federal, state, and local departments/agencies to understand what they are planning with respect to the transportation/disposal of anthrax-derived wastes?
3. Do you know the regulatory status of anthrax-derived wastes transportation and disposal in your state? Do you believe that such waste is currently allowed to be transported and disposed according to state and local regulations?
4. If anthrax-derived wastes are allowed to be transported and disposed according to state and local regulations, would your company/organization be willing to transportdispose of such wastes in facilities that you own or operate?
 - a. If yes, would it make a difference in your decision if the waste is verified treated, unverified treated, or untreated?
5. If your company/organization is willing to transport/dispose of such wastes in facilities that you own or operate:
 - How much capacity would you be willing to provide in such an event?
 - Do you currently have contracts with someone for this type of service?
 - Has there been some type of training or special requirements of your staff for handling this type of waste?
6. If your company/organization is not willing to transport/dispose of such wastes in facilities that you own or operate, what do you see as the major impediments?
7. What do you believe would be the most important action(s) to undertake to eliminate, or reduce the impediments to disposal?
 - At the federal level;
 - the state and local level;
 - the facility owner/operator level; and/or
 - the public
8. What impediments would need to be eliminated or removed in order for you to be willing to transport/dispose of such wastes in facilities that you own or operate?
9. What outcomes would you most like to see from this workshop?

Appendix C

Pre-Workshop Interview Summary

Appendix C

Pre-Workshop Interview Summary

C.1 Federal-specific Responses:

- **Roles and responsibilities are not clearly defined**

- Who is in charge at the federal level?
 - EPA designated as lead agency under ESF-10
 - Would provide technical guidance and oversight of state authorities
 - May subcontract to USACE
 - USDA would provide support regarding methods of disposal
 - ATSDR would provide health consultation support, help determine re-occupancy
 - FEMA can provide grant funding in a federally declared disaster
 - Unclear how they would be involved with anthrax because EPA would be lead agency.
- Who issues PPE and ensures operators are wearing it?
 - DHHS and CDC would look at safety issues such as PPE
- FBI involvement
 - Would terrorist attack trigger FBI as lead?
- How far will authorities go with anthrax under CERCLA?

- **Waste Characterization**

- EPA says anthrax is not regulated as hazardous waste; the state will be the decision maker
- What is the appropriate sampling methodology?
- Current treatment technologies are limited

- **Transportation and Disposal**

- Need to gauge the willingness of facilities and haulers to handle this waste
- Facilities will encounter materials they have never encountered before
 - Workers will need to be pre-trained to deal with this waste
- What is the fate of waste water disposal?
 - EPA Office of Water is working on water decontamination guidelines for the utilities to use
 - Will some of this end up at WWTPs, and are they prepared to treat it?
- Security during transport and at final resting place

- **Risk Communication**

- Need to have plans in place
 - CDC Office of Terrorism and Emergency Response has a strategy in place
 - State of New York has a bio-waste plan in place due to past incidents of naturally occurring anthrax
- EPA would be more involved in research side than communication side
- Private sector needs to be involved in these conversations
 - Effects on commerce

- **Desired Workshop Outcomes**

- Understand capacities, roles, and responsibilities and limitations at all levels
 - What do the haulers, facilities, and associations need from the federal government for them to be open to accepting the waste?
- Streamline communications between agencies
- Risk communication
 - Which areas should have a plan in place?
 - What is the likelihood of an event?
 - Where should we focus our resources?
- Decision tree to help locals approach recovery issues
- Call list for locals—who to contact for what information

C.2 State/Local Participants:

- **Roles and responsibilities are not clearly defined**

- Who is in charge at the state and local level?
 - Department of Health
 - State Emergency Management Division (EMD) operates in support of lead
 - Department of Ecology
 - State EMD operate in support of lead
 - Local Public Health Department would enforce standards in their jurisdiction, provide guidance on pre-treatment and disposal protocol
 - Local OEM would provide support to local Public Health Department
- Who is responsible for establishing technologies and standards?
 - EPA
- Declaration of federal disaster vs. declared emergency – does this affect who responds?

- Who owns the waste?

- **Waste Characterization**

- Need more clarification on classifications and regulations
 - Is anthrax characterized as hazardous? RCRA?
- What is the appropriate decontamination method?
 - Is it appropriate for widespread contamination?
- What types of materials will need to be disposed of?
 - Large furniture
 - Miscellaneous small soft materials
 - Grocery stores – food waste
 - Water runoff
- What is the PPE policy for handling this waste?
- Can any of this waste be recycled?

- **Transportation and Disposal**

- Who can legally handle, transport, and accept anthrax-derived waste?
 - Washington Utilities and Transportation Commission (WUTC) regulates county contracts with haulers
 - Haulers have exclusive privileges
 - Haulers have the right to refuse to haul special waste
 - WUTC is not responsible for hazardous or RCRA waste
 - This would be Department of Ecology
- Who will package the waste prior to hauling?
- Is transportation by rail car acceptable?
- Is transportation by truck acceptable?
 - Currently the U.S. Department of Transportation (DOT) has no plan developed for this type of event
- Will facilities have indemnification?
- What is the appropriate disposal method?
 - Short- and long-term
- Capacity of haulers and facilities depends on what mode of disposal is recommended
 - Incineration – may have enough capacity if portable incinerators are OK, but most incinerators are not designed for high output
 - Landfill – Roosevelt Regional landfill has most capacity in the region

- Autoclave – two at Morton, Washington facilities, also not designed for high output
- Microwave – some medical waste facilities use this, would it work?

- **Risk Communication**

- State EMD would follow lead agency's communication strategy
- Local public health would rely heavily on CDC information to relay to the public

- **Desired Workshop Outcomes**

- What is the current regulatory framework under EPA, CDC, and DHS for appropriate handling of this material?
- Clearly defined requirements for handling, disposing of waste
 - Definitive answers on decontamination technologies
- Fix issues with the UCC

C.3 Facility Owners, Haulers, and Associations:

- **Need regulatory guidance**

- Treatment standards
- Sampling, analytic procedures
- Long-term monitoring and detection equipment
- Haulers: Transportation regulations—DOT?
- Facilities: How the waste is characterized will determine which regulations to follow
- Do state regulations apply to waste that is generated by terrorist/criminal activities?

- **Need clearly defined roles and responsibilities**

- Who is in charge?
 - Department of Ecology or Department of Health?
- Would federal agencies supply drugs to workers, or would facility be responsible?

- **Liability associated with accepting anthrax-derived waste**

- Worker safety
- Training would be needed
- Who owns the waste?
- Will the federal government take on any liability or provide indemnification?
 - Less of a concern with landfills; liability lies with owner/originator of the waste
- Many facilities use subcontractors, will they deal with anthrax-derived waste?

- **Need public education, communication strategy**
 - “Not in my backyard” attitude can be avoided with proper outreach
- **How clean is clean?**
 - How many spores does it take to infect a person?
 - How long does it remain inactive?
 - What are the best methods for medical treatment?
 - What are the long-term effects?
- **What are acceptable disposal and decontamination techniques?**
 - Any research to back these up?
 - Need treatment standards for solids, liquids, gases, semi-solids (sludge)
 - Are specialized roll-off containers required for hauling?
- **Capacity to accept or haul the waste**
 - Depends on the nature of the waste (size, properties)
 - Large sofas will not fit into an autoclave or incinerator
 - Only one autoclave in the area and few medical incinerators
- **Hauling permitting issues**
 - What is acceptable method for transporting this material?
 - Rail cars widely used to transport to landfills
 - Truck with specialized roll-off containers
 - Washington State does not have primary authority. UTC decides who collects what and where it goes.
 - Haulers have exclusive privileges
 - Few landfills in Seattle region
 - Waste must be transported to remote locations.
- **Landfill permitting issues**
 - **Subtitle C** (from EPA website)
 - Under the RCRA hazardous waste regulations, Subtitle C, EPA has primary responsibility for the permitting of hazardous waste treatment, storage, and disposal facilities. This is until EPA authorizes a state to operate portions or all of the hazardous waste program in lieu of EPA operating the program. In contrast, Congress intended, via RCRA Subtitle D, that permitting and monitoring of municipal and non-hazardous waste landfills shall be a state responsibility. RCRA does not authorize EPA to issue federal permits for disposal of Subtitle D wastes. Information on the permitting process and on individual landfills must be obtained

by contacting the state agencies (and in some states the local health departments) and the local municipality in Alaska, Idaho, Oregon, or Washington.

- **Subtitle D** (from EPA website)
 - Subtitle D of RCRA addresses non-hazardous solid wastes, including certain hazardous wastes that are exempted from the Subtitle C regulations such as: hazardous wastes from households and from conditionally exempt small-quantity generators. Subtitle D also includes garbage (e.g., milk containers, coffee grounds), non-recycled household appliances, the residue from incinerated automobile tires, refuse such as metal scrap, wall board and empty containers, and sludge from industrial and municipal wastewater and water treatment plants and from pollution control facilities.

- **Willingness to accept the waste varies**

- Must be able to ensure worker safety
- Accepting large volumes of waste shortens the life of landfills
- What happens to all other waste that landfills are accepting daily? If they are responding to an incident, somebody else has to take their usual load.

- **Wastewater treatment**

- Federal WWTP regulations prohibit facilities from accepting decontamination water, even if it is pre-treated
- What happens to the decontaminated water that runs down the storm drains?
- What do we do with the decontaminated water that we capture?

- **Funding is a big issue**

- Nobody wants to front the money to be prepared ahead of time

- **Desired workshop outcomes**

- Networking and coordination pre-event
- Clearly defined requirements for handling, disposing of waste
- Better understanding of hazards of anthrax
- Understand capacities, roles and responsibilities, and limitations at all levels
- Bridge credibility gaps, provide solid background research on:
 - How is anthrax neutralized?
 - How do we prove the waste is clean?
 - What is safe to leave behind?
 - What are the appropriate handling methods?
 - What are the sampling technologies?
 - How do we treat it?

- Is incineration effective?
- How do we treat gases from the waste?

- Local capacities

- Waste Management: largest commercial waste company in the United States
 - Hauler in Seattle
 - 280 landfills nationwide (including Subtitle C&D, hazardous waste landfills)
 - 16 incinerators nationwide
 - 1 autoclave nationwide
 - Would likely subcontract anthrax waste handling, they do not haul hazardous waste
 - Involved with anthrax planning at corporate level several years ago
 - Has tried to engage EPA in the past with little response
- Cleanscapes
 - Additional hauler in Seattle
- Stericycle
 - Hazardous and medical waste facilities
 - 2 autoclaves at their facility in Morton, Washington
 - Have 16-18 28-ft trailers that come to the facility each day
 - Containers have a 48-gal maximum (cannot fit large furniture)
 - Process is largely manual labor
 - Not permitted to haul anthrax
 - Roosevelt Regional Landfill (operated by Republic Services)
 - Currently accepts waste from Snohomish County, but little from King or Pierce counties
 - Very large capacity – permitted to accept 5 million tons a year
 - Robust special waste department
 - Dealt with mad cow, asbestos
 - Refer to National Emission Standards for Hazardous Air Pollutants 40CFR 63.1955 when dealing with asbestos
 - Would look to Department of Ecology and/or Department of Health for guidance

C.4 Past Experience with Anthrax

- Federal experience

- Tim Gouger, USACE – involved in cleanup and disposal of waste associated with USPS. Facility cleanup process as follows:

- Hydrogen peroxide used to fumigate buildings to kill all viable agents
 - Spore strips (para formaldehyde) were used to determine if building was clean
 - DOS ordered buildings to be entirely gutted, so everything was removed, sterilized, transported to a sterilization facility. At that point, the sterilization company owned the waste
 - Sterilization facility cleaned the waste
 - Once it was rendered treated and certified by the facility, it was disposed of in a regular MSW landfill
 - Wastewater became an issue. All water was collected in tanks, treated, and sampled to confirm decontamination, but the public WWTP would not take it. It was eventually trucked to Fort Dietrich.
- Peter Kowalski, ATSDR – served on interdisciplinary team that was involved in determining when it was safe to go back into the Hart building
 - Sven Rodenbeck, ATSDR – involved in training and sampling at the Daschle office and the incident in Florida. ATSDR intimately involved with EPA on reviewing sampling plans and results.

- **State/local experience**

- n/a

- **Facilities, haulers experience**

- Walt Bailey, DC Water & Sewer Authority: Involved in discussions with the EPA regarding the decontamination water. Even though the water had been disinfected, management ultimately said the facility would not accept it. However, they agreed to take it if something like this happened again.
 - Dr. Ben Hoffman, Waste Management (WM), Inc.: WM involved in the disposal of materials from NBC Headquarters incident in 2001.
 - Material was decontaminated before WM accepted it
 - Material were placed in specialized roll-off containers fitted with special boxes that were sealed and shipped to Model City, New York and buried in a special cell with GPS units attached to the containers.

Appendix D

List of Attendees

Appendix D

List of Attendees

D.1 October 13th – Waste Facility Owners, Haulers, Associations

Brad Lovaas – Executive Director, Washington Refuse and Recycling Association; Lacey, WA
 Brian Bowen – E.P. Director, Waste Management; Sacramento, CA
 Rich Thompson – Director of Compliance, Republic Services; Phoenix, AZ
 Art Mains – Environment Manager, Allied Waste – Roosevelt Regional Landfill; Roosevelt, WA
 Bruce Jernigan – Senior Environmental Director, Waste Management; Houston, TX
 Chris Stromerson – Director of Safety, Stericycle; Snohomish, WA
 Ross Wilson – Safety Manager, Stericycle; Kent, WA
 Allen Alston – King County Department of Natural Resources; Seattle, WA
 Pam Badger – King County Solid Waste Department; Seattle, WA
 Terri Barker – King County Solid Waste Department; Seattle, WA
 Phil Scott – Senior Vice President, Cleanscapes; Seattle, WA
 Hal Schlamann – Executive Director, Washington Association of Sewer and Water Districts; SeaTac, WA

D.2 October 14th AM Session – State and Local Participants

David Hodgeboom – HLS Coordinator, Washington State Dept of Agriculture; Olympia, WA
 Peter Christiansen – Washington State Dept of Ecology; Bellevue, WA
 Jim Henriksen – Seattle King County Public Health; Seattle, WA
 Jeff Neuner – Seattle Public Utilities; Seattle, WA
 Wayne Turnberg – Washington State Dept of Health; Tumwater, WA
 Deanna Carveth – Snohomish County Solid Waste; Snohomish, WA

D.3 October 14th PM Session – Federal Participants

Mark Williamson – Emergency Manager, Fort Lewis; Olympia, WA
 Jim Sheline – CBRNE Specialist, Fort Lewis; Fort Lewis, WA
 Kyle Greer – Environment Services, Fort Lewis; Fort Lewis, WA
 Richard Singler – Environment Services, Fort Lewis; Fort Lewis, WA
 Ken Smith – Environment Services, Fort Lewis; Fort Lewis, WA
 Marianne Febach – USDA; Olympia, WA
 David Rees – EPA – Region 10; Seattle, WA
 Dave Bartus – EPA – Region 10; Seattle, WA
 Paul Kudarauskas – Deconologist, EPA; Washington, DC
 James Michael – Chief, WCB, MRWMD, ONCR, EPA; Washington, DC
 Marissa Lynch – Environmental Engineer, EPA; Washington, DC
 Lindsay Guzzo – EPA
 Paul Lemieux – Chemical Engineer, EPA; RTP, NC

D.4 Observers

Juan Reyes – EPA; Washington, DC
Cayce Parrish – EPA; Washington, DC
Paul Kudarauskas – Deconologist, EPA; Washington, DC
James Michael – Chief, WCB, MRWMD, ONCR, EPA; Washington, DC
Marissa Lynch – Environmental Engineer, EPA; Washington, DC
Paul Lemieux – Chemical Engineer, EPA; RTP, NC
Lindsay Kurnath – EPA
Stan Terusaki – Environmental Analyst, LLNL; Livermore, CA
Paula Krauter – Environmental Engineer, SNL; Livermore, CA
Sean Nolan – Program Analyst, DTRA; Alexandria, VA
Bruce Hinds – Electrical Engineer, DTRA; Albuquerque, NM
Brooke Pearson – Senior Scientist, Cubic; Alexandria, VA
Katrina McConkey – Cubic; Alexandria, VA
Bobby Goodfellow – DHS S&T; Washington, DC
Larry Coco – Senior Associate, Booz Allen Hamilton; Johnstown, PA
Elizabeth Snee – Booz Allen Hamilton; Washington, DC

Appendix E
Complete List of Issues by Session

Appendix E

Complete List of Issues by Session

E.1 October 13th – Waste Facility Owners, Haulers, Associations

- Regulatory/Permitting
 - Proclamations – Where does this subject fit within the current regulatory structure, and at what level?
 - Who is in charge and who classifies the material?
- Education
 - Workers
 - Volunteers
 - Communities
 - Risk Communication
 - Credibility and Messaging
 - Anthrax and Impacts
 - Regulatory Requirements
- Employee Training
 - What is needed to meet OSHA regulations?
 - Information on characterization, treatment, disposal that is available to workers
- The Plan
 - Availability of medicines/vaccine
 - Suppliers (liners, medicines, PPE)
 - Consolidation
 - Respirator Fit Testing
 - Medical Monitoring for response workers
 - Waste Disposal Process
 - Risk Communication
 - Worker's Compensation Insurance
 - Process for waste handling and collection
 - Load Security

- Certification of contaminant destruction
- Credentials for response workers
- Plans for MSW diversion to other areas
- Disposal pathway and impact on decontamination strategy
- Economics
 - Monofilling and the inability to use that space in the future
 - Competition with current businesses
 - Shareholder concerns
 - Reimbursement
 - Pre-existing tariffs and contracts
 - Indemnification
 - Who owns the waste?
 - Who pays for it and how timely is reimbursement released?
- Research Questions
 - Can anthrax waste be combined with other waste?
 - What happens to anthrax in POTW? – is it processed or bypassed to Puget Sound before it reaches the treatment plant?
 - What happens to the contaminated biosolids produced at wastewater treatment plants?
 - Do anthrax spores in water pose a biological aerosol danger during the treatment process of contaminated wastewater?
 - What is survivability/viability?
 - How is clean verified?
 - What are treatment options?
 - What can be treated onsite? What cannot be treated onsite and needs to be transported?
 - What happens to anthrax in a natural environment when it is released untreated?

E.2 October 14th AM Session – State and Local Participants

- Transportation
 - Packaging/encapsulation
 - Decontamination (in and out)
 - Monitoring en route
 - Mitigation en route

- Treatment
 - Treatment in place and its effectiveness (Do the methodologies exist?)
 - Understand all decontamination methods and what can and cannot be treated
 - Use of incineration so it can be classified as MSW and any air quality-related concerns
- Disposal
 - Monitoring
 - Designation of dedicated landfill
 - Unload in negative pressure
 - Who owns the liability of the waste
 - What is the long-term liability for the disposed waste?
- Roles
 - Who is in charge
 - Who is at the table?
- Regulations
 - Need to understand who/what regulates this waste
 - Coordination among counties under common regulatory authority
- Research
 - What can be done to mobilize and destroy?
 - What is behavior of anthrax in fresh/salt water?
 - What packaging would be acceptable to prevent leakage?
 - What is behavior of anthrax under landfill conditions (is it mobile)?
 - Fate and transport of anthrax in water, landfill biomass including leachate and gas
 - Effectiveness of decontamination (chemical neutralization)
 - Effectiveness of treatment (incineration)
 - Lessons learned from past experiences
 - Legal evaluation of the long-term liability of disposed waste
- Education
 - Anthrax 101
 - Treatment methods
 - Health and safety

E.3 October 14th PM Session – Federal Participants

- Waste Classification
 - Access to information to perform a risk assessment of treatment/disposal activities
 - What is an acceptable treatment level for different disposal pathways?
 - Triage of waste/debris
- Waste Disposal
 - Who decides final disposal site location
 - Who works politics/negotiations
 - What regulations apply to residual decontamination agents bound with the waste
 - Selection of areas for staging, onsite treatment, temporary storage
- Resources
 - Availability of equipment and people
 - Prioritization of waste disposal resources that are needed for other parts of the response (e.g., laboratory capacity)
- Education and Training
 - Provide operational information to POTW (in English and not jargon)
 - Worker safety; just-in-time training
 - Perception/stigma
- Treatment
 - Determine waste disposal pathway
- From Interviews
 - Federal guidance on POTW disposal (WWT Policy)
 - Guidance on decontamination of vehicles that leave the site
 - What are risks of outdoor contamination
 - Who does long-term monitoring
- Guidance
 - Critical pathways
 - Template
 - Decision framework

- Research

- Develop certifiable technologies to treat the contaminated waste for final disposal or re-use
- Accurate, timely sampling and analytical methods
- Availability of large capacity of waste treatment
- Availability of onsite waste treatment
- Risk assessment

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