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Summary Report:
Peer Review Workshop on Environmental Sampling for Anthrax Spores at Morgan Postal Processing and Distribution Center

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New York City, New York

Submitted by:
U.S. Environmental Protection Agency
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NOTICE

This report was prepared by the US Environmental Protection Agency with assistance from ICF Consulting, an EPA contractor, as a general record of discussions during the Peer Review Meeting on the Environmental Sampling at the Morgan Postal Processing and Distribution Center. The report captures the main points and highlights of discussions held during the one-day meeting. It is not a complete record of all details discussed nor does it embellish, interpret, or enlarge upon matters that were incomplete or unclear. The peer review was intended to provide an evaluation of technical issues related to anthrax contamination of sites. It was not intended to constitute policy or management decision-making. Nor does it serve as a guidance document. The report is available to interested parties and serves as public information.

EXECUTIVE SUMMARY

On May 30, 2002, a peer review panel of experts in epidemiology and environmental sampling met to evaluate the 2001 environmental sampling activities at the Morgan Processing and Distribution Center in New York City, in light of the existing epidemiological findings available at the time of sampling. The panel developed consensus responses to the six questions in the technical charge submitted to the members prior to the meeting; these responses are included in the Meeting Summary section of this report. In addition, the panel reached agreement on a number of overarching issues.

The peer review panel concluded that the environmental sampling performed at the Morgan facility was appropriate for several reasons. Firstly, no cases of anthrax were observed among the 5000 employees at the facility over the more than thirty day time period between the passage through the facility of letters contaminated with *B. anthracis* and the discovery that the facility may have been contaminated by these letters. In addition, no cases of inhalational anthrax had been identified in any of the persons handling the contaminated letters. Hence, the risk of contracting anthrax among workers at Morgan was deemed to be negligible, although not zero.

Secondly, shortly after the Morgan management team determined that the contaminated letters to NBC and the New York Post had passed through Delivery Bar Code Sorting machines on the second and third floors of the South building, they isolated the two floors from the remainder of the building and decided to decontaminate all the machines on those floors, regardless of whether or not the environmental sampling on those machines showed *B. anthracis* contamination. This cleanup was performed to further reduce an already very low risk to the employees. Thirdly, the contamination of specific areas within the facility occurred in a period of national and local emergency, when rapid action was needed to address the problem.

A great deal has been learned on how to conduct environmental sampling for *B. anthracis* contamination since September 2001, as additional contaminated facilities have been sampled and then remediated. The US Postal Service has helped foster environmental sampling technology development through its experiences in addressing multiple contaminated facilities. Were another attack to occur at Morgan today, the panel would recommend that more extensive environmental sampling be performed than was conducted in 2001. However, the panel also concluded that for the reasons given above, the sampling that was conducted in late 2001 was still adequate.

The panel concluded that all sites determined to have anthrax contamination need to evaluated on an individual basis, taking into account both the available epidemiological data and the results of all types of environmental sampling that were performed. Epidemiological findings and environmental sampling results are complementary to one another and can provide powerful data to clarify the nature and extent of an attack with *B. anthracis* and to identify potentially exposed persons.

When investigating or remediating facilities with anthrax contamination, it is important to assemble a multi-disciplinary team of experts to collect and evaluate the available data. Experts in industrial hygiene and safety, environmental sampling, epidemiology and public health should be members of the team. Environmental sampling for biological agents differs from sampling for chemical contamination. Prior to undertaking environmental sampling, the team should be very clear as to the purpose of the sampling.

To date, a number of lessons have been learned about environmental sampling. Wipe samples should be used for sampling large surface areas, and wet techniques are more effective than dry techniques. Furthermore, air sampling of specific areas should be incorporated into the sampling plan, both before and after decontamination. The sampling results should be reported in as quantitative a form as possible.

Experience to date in sampling and remediating contaminated sites has also demonstrated the need for further research in several areas. Standard Operating Procedures are needed for reporting environmental sampling data in semi-quantitative terms, (e.g., "no", "light", "moderate" or "heavy" growth of *B anthracis*) to aid in characterizing exposure to *B. anthracis*. In addition, epidemiological approaches for different scenarios of environmental sampling should be developed. Some research in this area has already started. Finally, in order to perform credible risk assessments, it is essential to identify the minimum number of spores needed to cause inhalational and cutaneous anthrax.

MEETING SUMMARY

A. WELCOME/LOGISTICAL CONSIDERATIONS

Mark Durno (USEPA Region 5), Chair of the peer review panel, stated that the peer review would be an opportunity to evaluate the appropriate roles of epidemiological investigations and environmental sampling at sites contaminated with *B. anthracis* spores, as well as to provide information for evaluating future incidents based upon the emerging science. He confirmed that none of the members of the peer review panel had a real or perceived conflict of interest with respect to any aspect of the assessment of *B. anthracis* contamination at the Morgan Processing and Distribution Center (PDC) and to the subsequent decontamination of the facility.

He then finalized the agenda for the meeting, which included:

- presentations by staff from the US Postal Service (USPS) and its contractors, and by representatives from the Centers for Disease Control and Prevention (CDC),
- a tour of the mail sorting areas of the facility which were decontaminated, and
- the peer review by the panel of the six questions in its technical charge.

The introductory presentations were intended to assist the Peer Review Panel Members in understanding the chronology of the assessment and clean up of the Morgan site and the rationale for the sampling decisions made at the Morgan facility.

In response to a question on the reasons for undertaking the peer review, Dr. Dorothy Canter, US EPA, stated that questions were initially raised in conjunction with litigation filed by the postal workers at the Morgan facility, particularly as to the adequacy of the environmental sampling and the extent of decontamination. Over time the focus expanded to include not only an evaluation of the epidemiological investigations and environmental sampling at the site, but also an analysis of the appropriate roles of both types of assessments in addressing future attacks. The cleanup at the Morgan facility can be used as a case study for determining the extent and scope of environmental sampling to be performed when epidemiological findings are available prior to developing an environmental sampling plan.

It was emphasized to the panel members that the peer review was intended to provide an evaluation of technical issues related to anthrax contamination of sites. It was not intended to constitute policy or management decision-making. The peer review report will not serve as a guidance document. The final report will, however, be public information and available to interested parties.

B. PRESENTATION ON ENVIRONMENTAL SAMPLING

Thomas Cash, USPS, stated that the USPS and its contractors would present a comprehensive

summary on the issues relating to the environmental sampling and decontamination performed at the Morgan PDC. Other persons participating in the presentation were Nicholas DeCarlo, USPS, and Thomas Lewis and Timothy Burke, both of Louis Berger Group, Inc. The Morgan facility is the largest single mail processing and distribution center in the USPS network. The USPS pro-actively sought advice and guidance from a number of sources: federal agencies, including CDC, US EPA, and the Occupational Safety and Health Administration (OSHA); the New York City Department of Health; health and medical experts; union and employee representatives; and contractors with experience relating to anthrax contamination. The site assessment and decontamination decisions were made using information available as of late October 2001. The USPS hired Clean Harbors Environmental Services to perform the decontamination of the Morgan facility. Clean Harbors had conducted the cleanup of the NBC studios and was the only contractor at the time with anthrax cleanup experience at civilian sites.

USPS Personnel Protective Measures

The USPS instituted a number of personnel protective measures for the Morgan personnel. USPS management met with the postal unions to explain the situation, recognizing that anthrax contamination was an emotional issue, especially after the deaths of two postal employees from inhalational anthrax from the Brentwood PDC in Washington, DC. USPS held mandatory safety and awareness talks for Morgan employees and provided personal protective equipment (PPE) to employees, including N-95/100 filtering face pieces and nitrile gloves. USPS management instituted a liberal leave policy and arranged voluntary re-assignments for concerned employees. At the recommendation of the CDC and with on-site medical professionals and materials submitted by the CDC, the USPS provided postal employees with chemoprophylaxis (i.e., antibiotics) and access to confidential medical consultation. Facility-wide awareness meetings were held with all employees, and CDC conducted multiple follow-up surveys. After Christmas about 10 employees received the anthrax vaccine.

USPS Maintenance Operations for Hazard Reduction

No compressed air was ever used for cleaning the mail sorting machines on the third floor of the Morgan South facility, where the contaminated letters were sorted. After the anthrax attacks, its use was discontinued for cleaning machines on other floors. The HVAC system supplying the contaminated area was shut down, and filters were replaced with high efficiency filters. It is also important to note that the HVAC system for the third floor is an independent unit serving the third floor only. All shop vacuums were tested for *Bacillus anthracis* and found to be negative. They were replaced by high efficiency particulate air (HEPA) vacuums. Dry sweeping was prohibited, being replaced by wet mopping, and fan usage was discontinued. Finally, the use of bleach was instituted for regular maintenance on a long term basis.

Chronology of Events

USPS staff then presented a chronology of events at the Morgan facility (Appendix 4), noting

that in the eight months since the contaminated letters entered the Morgan PDC, no cases of either cutaneous or inhalational anthrax had occurred in New York City postal workers. On September 18, the letters to NBC and the New York Post were unknowingly processed in the Hamilton PDC in Trenton, N.J. and then transported to the Morgan facility. Following confirmation by CDC that *B. anthracis* was in the letter to NBC, USPS management at Morgan and its contractor URS met with CDC experts.

On October 21, the USPS contractor URS started collecting environmental samples from the second and third floors of the Morgan South facility. A total of 148 samples were collected. On October 23 preliminary results were positive from four samples collected on Delivery Bar Code Sorter (DBCS) machines numbered 10, 15, 20, and 25, which were then shut down and cordoned off. These results were confirmed by CDC. Fifty six additional samples were collected by CDC on October 25; the results confirmed the URS positives and identified positive samples on DBCS 24 as well.

On October 26, following meetings with CDC and the USPS cleanup contractor, the USPS decided on the decontamination approach to use. Later in October, additional downstream facility sampling took place; all results were negative for *B. anthracis* spores. By October 31, the initial cleanup contractor finished site preparation and isolated the area containing all 26 DBCS machines and associated equipment on the third floor.

On November 1, Clean Harbors and the USPS Environmental Monitoring Consultant Louis Berger mobilized on site, and cleaning commenced. Berger provided independent oversight of operations on a twenty-four hour per day/seven days per week basis.

From November 6-9, a Court hearing was held on the petition filed by the Postal Workers Union for an injunction to close the facility. On November 15, the Judge denied the petition.

Cleaning of all 26 DBCS machines on the third floor was completed on November 13. Twenty three post-cleaning wet swab samples were collected; all of them were negative for *B. anthracis.* The five machines with contamination prior to the start of cleaning (#10, 15, 20, 24, 25) were then triple wrapped with polyethylene and sealed. The cleaning of the entire third floor of the South Building was completed on November 20.

Cleaning then began on the second floor of the South Building. It was completed on December 7, 2001. On December 23, 2001, based upon discussions with OSHA, 19 HEPA vacuum post-cleaning samples were collected from the five DBCS machines which had positive samples prior to the treatment and the surrounding areas. All samples were negative except for one on DBCS #10, which was then cleaned again. Then three wet-swab samples and four HEPA vacuum samples were collected from this machine, all of which were negative. DBCS 10 was placed back into service on January 5.

Initial Sampling Plan

The initial environmental sampling plan was devised by USPS environmental consultants, including private certified industrial hygienists, epidemiologists and certified industrial hygienists from CDC/National Center for Infectious Diseases (NCID) , and representatives from CDC/National Institute for Occupational Safety and Health (NIOSH). The consensus was that a biased sampling plan should be used that focused on sampling along the probable flow of the anthrax contaminated letters through the facility. The bar codes sprayed on the anthrax-contaminated letters recovered from NBC and the New York Post were used to determine through which DBCS machines at Morgan the letters most likely passed.

Sampling was conducted in two independent stages. URS collected 148 dry swab samples from DBCS machines on the second and third floors of Morgan South. URS collected three to four samples per DBCS; not all DBCSs were sampled (e.g., DBCS 24 was not sampled), only those thought to be in the path of the source letters. Four of the 148 samples were positive (DBCSs 10, 15, 20, 25). CDC/NIOSH then collected 56 samples, of which 50 were taken on the DBCS machines and 6 were taken in other areas. Seven of the samples were positive; the positive samples were from the same four machines plus DBCS 24. Sampling of individual machines was biased towards places where letters were expected to undergo significant trauma or where there was an electrostatic charge. Most of the positive samples came on the mail induction section of the machines where letters are aggressively handled and the electrostatic charge is high.

Samples were not a standard size, but depended on the area of the machine being sampled. Composite samples were not taken. No attempt was made to quantify the number of spores as procedures to do so were not available at that time. The URS samples were analyzed by PathCon Laboratory; the initial positive samples were confirmed by the CDC lab.

Only the second and third floors were sampled because the CDC and USPS experts concluded that based upon the evidence from the recovered letters and the destinations of the two presumptive letters, the risk of contamination on other floors was negligible.

Decontamination

The process for decontaminating the facility was agreed upon by CDC, the environmental consultants (Louis Berger), the environmental contractors (Clean Harbors), and the USPS. On the third floor, the section consisting of the 26 DBCS machines, the manual sorting area, all horizontal surfaces, and all non-porous remaining items, was cordoned off with a floor-to-ceiling polyethylene barrier. This area comprised 120,000 square feet. The five contaminated machines (10, 15, 20, 24, 25) were decontaminated first and then individually triple wrapped with polyethylene and duct tape, which was attached to the floor. The other 21 DBCS machines were then cleaned, even though all of the environmental samples from them were negative. The remaining areas of the third floor, including piping, utilities, lighting and ducts from floor to ceiling (24 feet) were then cleaned. All porous items were disposed of. During the

decontamination the HVAC system remained off. The interiors of the elevators were not cleaned, but the elevator doors on the third floor were cleaned.

The cleanup process for the DBCS machines on the third floor consisted of four steps:(1) pre-cleaning of all components for removal of visible debris using HEPA vacuuming, wet wiping, brushes and Q-tips; (2) wet wiping of all surfaces with a 0.5% pH-adjusted, sodium hypochlorite solution delivered through a Hudson sprayer, with a minimum contact time of 15 minutes; (3) neutralization of all surfaces with sodium thiosulfate solution; and (4) clean water rinse. Thereafter, there was a waiting period until surfaces were dry, followed by polyethylene plastic wrapping and sealing.

Cleanup of the Second Floor included decontaminating the 16 DBCSs, 16 Optical Character Recognition (OCR) machines, two Bar Code Sorters (BCSs), and the areas surrounding these machines.

Other cleanup technologies were considered by USPS and their advisers but were discarded in favor of the hypochlorite solution.

Post Decontamination (Decon) Sampling

Post decon sampling was conducted using wet swabs, which had proven to be more accurate than dry swabs at other cleanup operations. Two swab samples were collected for every initial positive sample in approximately the same area. All 23 post decon wet swab sample results came back negative. The USPS after consultation with OSHA at the national level re-sampled all initial locations that were positive and the surrounding areas with transitional HEPA vacuum samples. One of the 19 samples, collected on DBCS 10, was positive. Further cleaning was performed on DBCS 10, followed by another round of surface sampling using wet swabs and additional HEPA vacuum samples. All seven of the swabs were negative.

In sum, a total of 256 environmental samples were collected in the facility before and after decontamination. Of these 12 (4.7%) were positive.

Discussion

The USPS was asked to identify the DBCS machines through which the anthrax-contaminated letters passed. The USPS believes that DBCS 10 was probably contaminated by the letters to NBC and the New York Post; that DBCS 15 was contaminated by the presumptive letter to ABC; and DBCS 25 by the presumptive letter to CBS. USPS is uncertain how DBCSs 20 and 24 were contaminated. There is an end of run sort during which letters pass through multiple machines. CDC/NIOSH collected several samples on the air intake unit above DBCS 16, but did not sample any rafters or high horizontal surfaces.

All DBCSs were operational prior to the USPS/HEPA vacuum transitional sampling. DBCS 10

was in operation for three weeks while the "transition" samples were processed.

C. PRESENTATION ON EPIDEMIOLOGICAL FINDINGS

Dr. Steven Ostroff, CDC/NCID began the presentation by emphasizing that no cases of anthrax had occurred in workers at the Morgan facility as a result of the contamination of that facility in September 2001. He expressed the opinion that the absence of any form of anthrax disease since the attack provides strong evidence that the correct decisions were made during the assessment and cleanup operations at the facility.

He summarized the locales and dates of the anthrax episodes resulting from the contamination of the mail system with letters containing *B. anthracis*. He noted that the CDC definition of a confirmed case of anthrax is the existence of clinically compatible disease confirmed by isolation of *B. anthracis* or other laboratory evidence based upon two supportive tests. A suspected case is the existence of clinically compatible illness with one supportive lab test or linked to a confirmed environmental exposure.

Bioterrorism-associated Anthrax: Inhalation and Cutaneous Cases, New York

Seven cases of cutaneous anthrax (four confirmed, three suspected) and one confirmed case of inhalation anthrax were diagnosed in New York City. The first cutaneous cases were diagnosed as infected insect bites and treated with antibiotics, which was coincidentally also the appropriate treatment for anthrax. They were diagnosed as cutaneous anthrax between October 12 and 17. The second round of infections, which appeared on and after October 19, 2001, were attributed to mishandling of the contaminated letter to the New York Post in the paper's office building. That letter, postmarked September 18, was never opened. On or about October 14, 2001, an e-mail message was sent to New York Post employees indicating that all suspicious mail should be deposited in bins on each floor, from which they would be taken to the mail room. The letter was collected between October 15 and 16. During transport to the mail room, the mail bag carrying the letter developed a hole from being dragged on the floor. Anthrax contamination was confirmed in the building on October 17-18, 2001. Three New York Post employees developed cutaneous anthrax from contact with that letter.

A female hospital employee in New York City was diagnosed with inhalational anthrax on October 29. She later died. The source of her illness has not been determined, but does not appear to be similar to the cutaneous cases. It is notable that there is no linkage of this case to the Morgan facility.

CDC is not aware of any other anthrax letters that may have passed through the Morgan facility other than those sent to NBC and the New York Post, and the presumptive letters to CBS and ABC.

CDC Interactions with USPS

Initially CDC focused on sites where cases of anthrax had been identified such as the media offices in New York City. None of the early work related to the various media facilities included the participation of USPS. On October 19, 2001, CDC staff first met with USPS representatives and its contractor to consider environmental sampling for the Morgan facility. At that meeting, there were extensive discussions about the nature and role of the environmental sampling. Dr. Ostroff recommended that USPS not sample the Morgan facility because there had been no cases of inhalational or cutaneous anthrax among the 5,000 Morgan workers in the month since the source letters had passed through the facility. Further, the cases downstream of the facility, at sites where letters were opened or mishandled, were cutaneous anthrax only. The risks of developing disease at the facility were therefore considered to be very low. Environmental sampling would only provide more data on what was already known; namely, that *B. anthracis* contamination existed in the facility. CDC's opinion at that time was that decisions could not be made based on environmental sampling results which could be misleading; no amount of sampling could prove a total absence of contamination. He believed that USPS should focus on cleaning all sorting machines as thoroughly as possible, regardless of sampling findings. He concluded that the main purpose of the decontamination was to clean the environment, not to significantly reduce the risk of disease. CDC believed that the Morgan facility did not need to be closed based upon the epidemiological findings of no disease among exposed workers at Morgan and other Manhattan postal facilities. Thus, USPS should commence cleanup immediately to allay worker concerns.

The USPS had already decided, however, to perform a round of environmental sampling, which took place on October 20-21. Results from culturing of the samples became available on October 23, which showed four positive samples. Also, on October 23-24 two workers from the Brentwood P&DC died of inhalational anthrax. A follow-up meeting took place at Morgan on October 24. That same day the USPS/CDC decided to offer chemoprophylaxis to all postal workers. The offer of medical prophylaxis when there was a negligible risk of infection gave the appearance of mixed messages to Morgan workers and caused confusion and some problems.

The CDC and the New York Department of Health concluded that the known risks at the Morgan facility did not justify closing the entire facility. All of the machines on the second and third floors were to be cleaned in an identical manner, regardless of the sampling results. These areas were closed and cordoned off from the rest of the facility; the areas of known contamination were cleaned first.

The USPS offered use of personal protective equipment for workers at Morgan and instituted changes in equipment handling and cleaning (see above). Any concerned employee was reassigned to another duty. The USPS also committed to perform post-remediation sampling and repeat cleaning where any positive samples were found, until all subsequent samples were negative.

Employee monitoring

CDC also decided to monitor postal employees from the Morgan facility for illness and death. Accordingly, a number of fatalities were investigated in late October/early November, 2001. Autopsies were performed. No form of anthrax was identified as a result of this surveillance. CDC also conducted passive surveillance for disease in other postal workers in New York City. Based upon follow-ups with Morgan employees, it was determined that their adherence to medical prophylaxis was the lowest of any of the sites in the postal system where prophylaxis was offered.

Hospital employee inhalational anthrax case

The person who contracted inhalational anthrax worked in the basement stock room of a New York City hospital, which is adjacent to the mail room. Most deliveries to the hospital are not from the USPS. The hospital did, however, receive mail from Morgan. Four letters in the October 9 sort from the Hamilton postal facility (the sort containing the highly contaminated letters to the two U.S. Senators) did go to the hospital, but letters from this sort also went to virtually all other hospitals in the Manhattan area. The woman lived in the Bronx and received her home mail through the Bronx processing center. It is known that she visited multiple post offices to purchase money orders since she did not have a checking account. All environmental sampling conducted to identify the potential cause of her illness was negative, and no data exist to connect her illness to the Morgan facility.

Anthrax material used in New York City attacks

As reported to CDC staff, the small amount of anthrax-contaminated material in the letter to NBC was brown and granular. It had been moistened during processing, which led to a change in the material. The material in the New York Post letter was described as sandy. These materials are known to contain compounds not found in the letters sent to Senators Daschle and Leahy, which have been described as containing a highly milled and potent white powder.

Summary

The epidemiological data suggest that the "risk" of infection from the letters sent to the media offices in Manhattan was different from that experienced in other locations such as Washington, D.C., where a total of five workers at postal facilities contracted inhalational anthrax, and two died. This is supported by the observed outcomes at other facilities. Following the passage of the letters to the New York media offices through the Hamilton PDC in Trenton, NJ, only cutaneous anthrax cases developed. After the later passage through that facility of the letters to the two Senators, two inhalational anthrax cases were diagnosed. Moreover, the risk seems to have been different as well in Boca Raton, FL, where two workers at a media office contracted inhalational anthrax, and one died. Thus, the contaminated material sent to New York City behaved differently than that from the other locations.

Moreover, no postal workers in New York City contracted any form of anthrax. Accordingly, no

postal facility was closed in New York City because the risks were judged to be negligible, although not zero. The cleanup actions were performed to decrease the risk to as close to zero as reasonably possible, while minimizing the social and economic disruption to the workers and other residents of New York City in the critical time period after the September 11 terrorist attacks. Appendix 5 contains the slides from Dr. Ostroff's presentation.

Discussion

In response to a question on the cleanup methods used at the media offices, Dr. Ostroff said that NBC performed the most extensive decontamination. The area in which the letter was opened was gutted, and surfaces were treated with bleach solution. Equipment, including high tech equipment in the newsroom, was treated with bleach and removed for disposal.

At ABC, the only positive environmental sample was found in the mail slot in the mail room. Thus, the decontamination activities were limited. At CBS, contamination was found in Dan Rather's suite and the area occupied by his secretary; these areas were decontaminated. At the New York Post, the ground level contamination which originated from the contaminated letter in the mail bag required more extensive aerosol and surface decontamination.

Several residences also tested positive for anthrax spores. The homes of Tom Brokaw's intern and assistant had *B. anthracis* contamination. The contamination was more extensive in the home of the intern. Positive environmental samples were also found in the apartment of a woman who worked for CBS. In each case, it is likely that the employees tracked the contamination home. These homes were all cleaned using surface treatment methodologies.

The most extensive pre-remediation environmental sampling was performed at NBC, which was the first organization to perform a cleanup. The heating ventilation and air conditioning (HVAC) systems at all of the media offices were sampled. A positive sample was found at NBC; an elevator shaft also tested positive. The building housing the NBC offices was not closed down.

Dr. Ostroff concluded that the environmental sampling data were not as critical as the existing epidemiological findings, although the environmental sampling was used to confirm the epidemiological data.

D. COMMENTS OF CDC/NIOSH RESOURCE PERSONS

CDC/NIOSH investigators Steven Lenhart and Dan Hewett summarized the CDC/NIOSH sampling for *Bacillus anthracis* performed at Morgan. The primary goals were to sample 14 DBCS machines not previously sampled by URS to reveal downstream pathways that may have been contaminated; to sample 5 DBCS machines previously sampled by URS; and to collect samples in downstream post offices. They selected sampling locations to ascertain air flows, sampled areas where force is applied to the mail in the DBCS machines, and sampled areas of

impact. The CDC/NIOSH investigators also selected sampling locations on DBCS machines where they believed dust would accumulate but be overlooked during routine cleaning, and locations where dust may have settled near DBCS machines that had positive results for *B. anthracis*. Laboratory capabilities limited the number of samples that could be collected.

The CDC/NIOSH sampling at the Morgan facility was subject to certain limitations. CDC/NIOSH staff had initially considered using wet wipes to sample all 42 of the DBCS machines, which they estimated would require more than 100 samples. However, the director of the New York City Public Health Laboratory informed them that the laboratory staff could test only 56 samples, because they were overwhelmed with samples from so many places. Also, only dry samples and no other sampling media were being tested at the laboratory. Another limitation was that mail routing information recorded by the DBCS machines at Morgan had been erased, since that information was only held at that time for one week for memory storage reasons (this practice has been changed by USPS). Therefore, it was impossible to know with which machines the contaminated letters did or did not come into contact. Finally, they knew that the USPS had already made a decision to clean all of the DBCS machines in the Morgan facility..

The sampling strategy used by the CDC/NIOSH investigators was consistent with CDC's Comprehensive Procedures for Collecting Environmental Samples for Culturing *Bacillus anthracis*, April 2002 (www.bt.cdc.gov/Agent/Anthrax/environmental-sampling-apr2002.asp). The details of the sampling done at the Morgan PDC are included in *Environmental Sampling for Bacillus anthracis in Selected New York City Postal Facilities New York City, New York October and November, 2001.* After the report has been finalized following the CDC cross–clearance review process, it will be provided to the members of the Morgan Peer Review Panel.

In response to a question from the panel, NIOSH staff stated that environmental sampling can be used to determine if aerosolization has occurred during an anthrax release by identifying the places to which contamination has spread (e.g., into HVAC systems, in areas without human traffic). A panel member noted that a sample taken 24 feet above ground at the U.S. Department of State mail facility was positive. At Brentwood a positive sample was found 150 feet from the machine through which the two contaminated letters passed. At the American Media, Inc. facility in Boca Raton, FL, a sample taken from the top of cubicle walls was positive.

E. TOUR OF MORGAN FACILITY

The Peer Review Panel Members and Meeting Attendees then took a brief tour of the Morgan Mail Processing and Distribution Center, South Building. The walk-through was lead by the Morgan Manager of Maintenance Operations, Rafael Vias (USPS). The tour included an inspection of the DBCS machines on the third floor where anthrax contamination had been detected. The panel members watched an operating DBCS sort mail. The tour also included a stop at the loading docks where mail is transferred from delivery trucks into the Morgan facility's sorting system.

Personnel from the USPS and Louis Berger answered technical questions from Peer Review Panel Members. They pointed out the places on the DBCS machines where samples were taken and provided information on cleanup activities.

F. RESPONDING TO THE TECHNICAL CHARGE

The Technical Charge was comprised of six questions prepared by EPA Headquarters staff. Questions 1 through 3 refer directly to activities that occurred at the Morgan facility, while questions 4 through 6 address general recommendations for the future. At least three lead reviewers were assigned to each question. One of the lead reviewers served as the discussion leader, who was responsible for summarizing the panel's conclusions/recommendations on that question for inclusion in the final report of the peer review.

USPS staff inquired as to how the questions that address future responses are applicable to the past cleanup operation at the Morgan facility. The peer review process is aimed at synthesizing the experience gained from Morgan to produce better responses in the event of future attacks. The Morgan facility cleanup is a case study that the experts can use to develop recommendations based upon epidemiological findings and environmental sampling data.

EPA observers provided a short explanation of the National Response Team (NRT), the National Coordination Council (NCC), and their activities, particularly with respect to preparing a Technical Assistance Document (TAD) for Anthrax Response. The NRT is comprised of sixteen federal agencies that cooperate in planning and preparedness for emergency responses. The NCC was formed to include the USPS in the NRT's activities with respect to anthrax contamination assessment and cleanup. The NCC formed subgroups that addressed different aspects of anthrax response including: First Response, Health and Safety, Sampling, Decontamination, Disposal, and Public Outreach. Each subgroup authored a chapter of the TAD.

EPA staffers stated that the NRT TAD was nearing completion and would soon be released as a public document. It will be a dynamic document and will be revised as needed to incorporate new information, technology, etc. as it becomes available. The TAD is not intended to be guidance, but will be a useful reference tool for responders conducting future anthrax cleanups.

Similarly, the peer review of the environmental sampling in light of the epidemiological findings at the Morgan facility constitutes a technical review of complex scientific issues. The conclusions and recommendations of the panel are not intended to serve as guidance.

Question 1. At the Morgan facility epidemiologic data exist that demonstrate that no cases of inhalational or cutaneous anthrax were reported in workers either up to the time that it was discovered that letters contaminated with anthrax spores had passed through the facility (about five weeks following passage of the letters) or since then. Given these data, was the environmental sampling performed in the Morgan facility adequate to ascertain the nature, location and extent of B. anthracis contamination with respect to risks to human health? Please

explain the basis for your response. (Ashford, Bell, Durno, Ostrowski)*

The group redefined the original question into three parts.

...Given these data:
1a) was the environmental sampling performed in the facility adequate to identify whether contamination existed?
1b) Was it adequate to characterize the extent of that contamination within the facility?
1c) Was it appropriate for the situation with the known epidemiologic data? Please explain the basis for your response. (Ashford, Bell, Durno, Ostrowski)

Answers:

1a) The sampling was adequate to determine that *B. anthracis* was present in the facility on surfaces.

1b) It was not adequate to assess the full nature of the surface contamination, but the epidemiological data already had defined that there was practically nil inhalational risk and that there was minimal risk for cutaneous anthrax. So, the sampling was adequate because of the decision to clean all surfaces and because of the epidemiologic information.

1c) Yes. The results of the environmental sampling supported the epidemiologic data in that the limited distribution within the facility and the low number of positives confirmed the suspicion of a limited risk. There were no cases of anthrax, either inhalational or cutaneous, in the Morgan facility.

Question 2. Following the cleanup performed to remove B. anthracis contamination, was the nature, location and extent of post-decontamination sampling appropriate to determine the effectiveness of the decontamination process? For example, was the sampling more or less extensive than the pre-decontamination sampling? Were post-cleanup samples taken in all areas at which contamination was identified prior to the decontamination? To what extent were statistical approaches used in developing the sampling plans? Please provide reasons for your conclusions (Bell, Gillen, Hartle, Werner).*

The answers to these questions relate back to two key factors: 1) the appropriateness of the post-decontamination sampling to address site-specific contamination, epidemiology, and remediation details; and 2) how the methods used compare with the best available sampling methods known at that time. Responses are provided below following a brief description of key details and methods.

The initial mail trail assessment sampling performed at Morgan during October 2001 targeted areas of the DBCS machines where spores were most likely to have impacted onto surfaces. The

collection of 204 dry swab samples on all 42 machines by URS and NIOSH resulted in finding 11 positive samples on 5 machines. No further characterization sampling to examine the extent and spread of contamination was done as the need for characterization sampling was reduced, if not eliminated, by the decision to use a "universal" cleaning strategy to clean all machines and surfaces regardless of sampling findings *(Note: 6 of the assessment samples did address the spread of contamination by targeting surfaces above machines - all were negative).* Upon completion of remediation in mid-November, post-decontamination sampling was performed using wet swabs on the five machines. A total of 23 wet swab samples were used (2 for every initial positive sample plus one blank). Based on these results, the remediation was judged to be successful, and all areas including the 5 machines were returned to service. Additional discussions among staff from USPS, OSHA, NIOSH, and others about the need for "transitional" sampling led to a decision to collect 11 additional HEPA vacuum samples in mid-December at the previously contaminated machine locations, with 8 additional samples taken on columns surrounding the machines. One positive sample on DBCS machine #10 triggered an additional round of cleaning and post-decontamination sampling, and the machine was returned to service after all 3 wet swabs and 4 HEPA vacuum samples were reported negative.

The nature, location and extent of post-decontamination sampling was adequate to determine the effectiveness of the decontamination process, given the total picture and factors unique to this location. All original contamination locations were re-sampled, and while the total number of post-cleanup samples was less than the total number collected for initial assessment, they were targeted so that twice as many samples were collected at each original positive location. This was a minimally adequate number of samples given the universal cleaning strategy used. The full inspection approach, where 100% of the previously contaminated locations were sampled, is acceptable and the lack of a statistical approach is not seen as a limitation in this case. It is important to note that many more characterization and post-decontamination samples would have been required had a targeted cleaning strategy been used.

The sampling methods employed at Morgan did change over the course of the project, appropriately reflecting ongoing improvements in sampling methods that occurred during the project time frame. For example, wet swabs were used for post-cleanup sampling instead of dry swabs, and HEPA vacuum sampling was used for transition sampling. This is important because available information indicates that dry swabs appear to be the least sensitive of available sampling methods. HEPA vacuum sampling allows sampling of a much larger surface area than with a swab, and it appears to be more efficient at extracting spores from surfaces. Wipe samples, which also allow sampling of larger surface areas, were not used during the project. The value of the HEPA vacuum sampling is borne out by the fact that it did result in a positive finding on a machine that had been previously cleared using wet swab methods. The fact that supplemental HEPA vacuum sampling was performed is a major factor (in concert with the universal cleaning strategy and the epidemiological findings) supporting the determination that the overall sampling effort was adequate. For purposes of question #2, this assumes that the "transitional" sampling results can be considered to be part of the total post-decontamination sampling approach.

Two issues that link together pre- and post-cleanup sampling deserve additional discussion: 1) What re-cleaning decision would have been made had the first round post-decontamination sampling resulted in a positive sample? Would the specific location or machine be re-cleaned? Or would the sample need to be interpreted as requiring the entire zone or the entire two floor area to be re-cleaned? Additional pre-cleanup classification of areas, characterization sampling, and use of statistical approaches might have put the remediation project in a more technically defensible position for any decision short of a full re-cleaning.

2) Was evaluation of aerosolization potential an explicit goal of the sampling design? The positive samples were all found on parts of the machine close to where the letters pass, and do reflect some degree of aerosolization. However, a limited number of samples taken on surfaces further away, such as intake grills of air cleaners above the machines, or the tops of the machines, were negative, suggesting that more extensive aerosolization did not occur. A design that collected additional samples, and that used wet wipe samples or HEPA vacuum sock methods would have offered better assurance that contamination had not spread further. The fact that compressed air was not used for cleaning DBCS machines at Morgan was an important engineering factor to lower concern about the potential for secondary aerosolization and spread of spores. The lack of illness among workers one month after processing of the contaminated letters also provided important additional epidemiology evidence that wider aerosolization did not occur. Had evidence of more extensive aerosolization been found, it would have triggered the need to consider the use of aggressive air sampling as a supplemental step after surface clearance testing. Air sampling was reportedly considered during discussions on transition sampling, but a lack of agreement on methods led to the use of HEPA surface sampling instead. The HEPA surface sampling did include evaluation of immediate areas surrounding the machines, so provided some additional evaluation of aerosolization.

In sum, while the sampling could have been more extensive, the availability of site-specific epidemiology data, combined with the remediation strategy selected, reduced the need for more extensive sampling. The overall information available for Morgan provides strong support for the finding that post-decontamination sampling was adequate and appropriate to demonstrate that the cleanup effort was successful.

Question 3. What additional environmental sampling, if any, should be performed at the Morgan facility to demonstrate that residual B. anthracis contamination is very low to negligible? Please describe the type, extent and locations of sampling that are needed, as well as the reasons for such sampling (Bell, Gillen, Hartle).*

No additional environmental sampling should be performed at the Morgan facility because there is no sufficient purpose for such sampling. Prior to any environmental sampling, consideration must always be given to the purpose of the sampling and how the results are to be used. Without a clear purpose and a general understanding of sampling/analytical limitations, data is open to misinterpretation. This situation is further complicated since the stated intent of any additional

sampling (as described in the question) is to demonstrate that *B. anthracis* contamination is "very low to negligible" in the Morgan facility, with the inferred *purpose* to demonstrate a low risk of disease. However, there are no appropriate exposure criteria or even a definition of "very low to negligible." The problem is compounded by the array of surface sampling, air sampling, and analytical methods for *B. anthracis*, and their respective efficiencies and sensitivities. Researchers are only just beginning to understand the strengths and limitations of these methods. The experience and practice in other anthrax-contaminated facilities during the last several months is to sample (typically surface sampling), clean, re-sample, and re-clean until no spores are detected, with an important qualifier that non-detection does not necessarily mean that *there are no spores*. Therefore, any remaining contamination in these facilities is directly related to the efficacy and sensitivity of the sampling and analytical method. With so many uncertainties, the absence of a clearly defined purpose and no outline for appropriate uses or interpretations of sampling results, additional sampling seems inappropriate, particularly in light of the epidemiologic data.

Question 4. What modifications, if any, to the sampling plans would have been appropriate had it been discovered within hours or a few days that B. anthracis-contaminated letters had passed through the Morgan facility rather than almost five weeks after their passage, when epidemiological information was available? Explain the reasons for such modifications (Ashford, Gillen, Hartle, Werner).*

The general response approach, regardless of when potential contamination is discovered, is consistent – isolation, sampling, decontamination and re-sampling. However, when the potential for contamination is identified prior to any epidemiological information being available, a more conservative response commensurate with the scope of the unknown information is appropriate. If this situation had occurred at Morgan, investigators most likely would have needed to assume a worst case scenario that included the potential for aerosolization of the spores. An immediate first response would still have been to shutdown the air handling systems for the area or areas suspected of having been affected by the release, as was done in the delayed-discovery situation at Morgan. However, immediate discovery conditions allow other types of information to be used for assessment purposes. For example:

- The computerized mail tracking information that is typically purged after 30 days would be available to identify the specific machines that processed the contaminated letters. Sampling could be targeted to these machines, and their operators could be identified and interviewed for additional information useful for assessment.
- Interview information could be used to understand operator movements on the day of exposure to support sampling to evaluate potential cross contamination of other areas further away from the machines. This would allow a better understanding of contamination boundaries and a more complete inventory of possible exposure pathways (foot traffic, mail trail, HVAC, and other machinery) to support a more systematic evaluation of contamination both upstream and downstream.

Where positive results were found using these additional sources of information, more intensive characterization sampling could have been performed to determine the further extent of contamination. Sampling plans might then have then included additional areas (e.g., loading dock, elevator bays, HVAC service areas, and common work areas that the letters or the workers who handled the letters might have moved through). This additional sampling would have included not only targeted "hot spot" sampling in areas strongly suspected of being contaminated, but also in evenly spaced areas around these targeted areas and in those areas identified as potentially susceptible to cross-contamination. The characterization results could then have provided additional information for use in generating decontamination options. In other words, the results might have provided sufficient information to support a smaller scale decontamination option.

A significant difference that would have affected the sampling plans in the absence of epidemiological information would have been the need to thoroughly examine the potential for aerosolization. It would have been prudent to consider personal dosimeters around the workers, and air sampling with impactors. (Note that our understanding of the need for, and how to implement, air sampling for *B. anthracis* spores has evolved considerably subsequent to the Morgan response.) Nasal swabs might also have provided additional information to help establish whether aerosolization had occurred. Nasal swabs are only useful if discovery of the release occurred within hours to one to two days of the release event. Nasal swabs have no bearing on a person's likelihood to develop disease and therefore do not have any personal clinical relevance, but can provide epidemiological and environmental evidence that spores were released into the air space in the immediate aftermath of a potential exposure.

Had the contamination been discovered before the letters moved out of the facility, another potential change in sampling would have been that it would not have been necessary to implement downstream sampling.

The availability of epidemiological information effects and supports subsequent decisions about the extent and type of characterization sampling, decontamination, and post-decontamination sampling needed in a particular situation. The epidemiological information at Morgan provided investigators with an important understanding of the markedly reduced potential for harm to human health in this specific exposure situation.

Question 5. In the event of a future attack through the mail, what roles should epidemiological findings play in the design of environmental sampling plans to determine the nature and extent of B. anthracis contamination? Is it possible to design a decision-tree approach for sampling plans which incorporates consideration of epidemiological data? Please provide sufficient details to explain your reply (Ashford, Durno, Ostrowski).*

Epidemiological data and environmental sampling were found to be complementary aspects of

recent anthrax contamination investigations. During the course of the panel's briefings, it appears that actually several other types of information were of similar importance.

1) Knowledge of the characteristics of the threat material – According to Dr. Ostroff's briefing to the panel and the record of his testimony (submitted to the panel prior to the May 30 meeting), the physical characteristics of the material obtained from the threat letters that passed through the Morgan PDC were substantially different from the material associated with the Capitol Hill letters. Unlike the material in the Capitol Hill threat letters, it apparently posed minimal risk of inhalational disease, either from initial aerosol exposure or secondary re-suspension.

2) Environmental sampling to determine the extent of contamination was performed during the initial characterization effort. Results confirmed that contamination of postal equipment appeared to be limited to surfaces in direct contact with contaminated pieces of mail.

3) Knowledge of the workplace processes allowed USPS to determine that 4 threat letters had passed through the Morgan facility DBCS machines during a certain time frame, and the machines that were in use on those dates (as opposed to shut down for maintenance, etc.). This "process knowledge" provided clear indications of where to begin selective ("biased") environmental sampling, e.g., with the machines that were in service on those dates and the immediate environment around them.

4) Epidemiological data

   a) Epidemiological findings shared by Dr. Ostroff regarding the NYC threat targets (4 media offices) indicated that only cutaneous cases of anthrax were identified in association with exposure to the threat letters and cross-contaminated mail received by those facilities. The lack of inhalational anthrax cases supported the observation that the physical characteristics of the material did not appear to allow it to be readily aerosolized.

   b) A USPS review of worker absenteeism at the Morgan postal facility relative to manpower employed during each work-shift indicated that:
      i. approximately 180,000 worker-hours (5 weeks, 3 shifts per day) of potential exposure had occurred before the threat was traced back to the Morgan PDC and prophylactic antibiotics were offered to workers; and
      ii. no cases of either cutaneous or inhalational anthrax were detected in any postal workers at the Morgan facility, or have been since that time.

The lack of inhalational cases in any exposed postal facility workers -- in association with the ability to document a very large number of worker-hours of exposure at the Morgan PDC over approximately a 5 week period -- provided strong support of the initial environmental assessment that contamination appeared to be limited to the actual DBCS machinery (and

immediate surrounding workplace environment), and that clean-up of these machines should be the priority focus for environmental aspects of response activities.

Decision-tree analysis:
It is likely that any decision-tree proposed will need to be modified by the specifics of the situation, and by new knowledge as it becomes available. Presumably, a decision-tree would consider including questions such as the ones below to guide responders and planners.

1. Consistency of material?

2. Average particle size?

3. Ease of aerosolization and subsequent re-suspension after settling?

4. Extent of contamination as determined by sampling, including the HVAC system

5. Cutaneous anthrax cases identified?

6. Inhalational anthrax cases identified?

7. Any unexplained/ unverifiable deaths or illness identified significantly above background rates?

8. Elapsed time since contamination event:
    a. < 72 hrs (acute exposure)
    b. 1-3 incubation periods (2-6 weeks)
    c. > 6 weeks (>3 incubation periods)

Question 6. Given the experience and expertise gained to date in conducting environmental sampling of the Morgan facility and of other B. anthracis-contaminated sites, what types of environmental sampling should be performed at all sites shown to have some contamination in future attacks using B. anthracis spores? (Durno, Ostrowski, Werner)*

A combination of accepted surface and air sampling techniques should be considered in any case. In the future, the contaminant may be developed (weaponized) differently and therefore behave differently. The key to any response is to put together a multi-disciplinary team of professional leaders who can bring their perspectives to the team to attack the problem. Included in that team should be an individual who can consult on the latest findings of available research and field experienced persons. Prior to any sampling event, it is critical to define the purpose of environmental sampling so the program can be developed appropriately and work conducted efficiently. At any site of contamination, where the substance has been found to have dispersed,

an aggressive air sampling technique, similar to the program developed at the U.S. Capitol Anthrax Response, should be considered.

Through evaluation of all the responses conducted to date, an epidemiologic (person/place/time) review had been found to be a critical component to developing an appropriate characterization sampling strategy. There needs to be a clear understanding that every response will be unique, and accepted practices may need to be modified to accommodate a particular response or site.

Clearly, there is a necessity to define the science for *B. anthracis* response, so that methods and guidance can be applied privately and without direct public oversight (e.g., periodic facility monitoring, investigation of a suspicious item, etc.). The NRT Technical Assistance Document (TAD) will offer the first generation of this type of assistance, although the TAD will be a reference tool and will not offer specific methodology.

APPENDIX A

LIST OF PEER REVIEWERS

PEER REVIEWERS

David Ashford
Centers for Disease Control
1600 Clifton Rd
MS - C09
Atlanta 30333

Beth Bell
Mailstop G-37
Centers for Disease Control
1600 Clifton Rd
Atlanta, GA 30033

Mark Durno
US EPA
25089 Center Ridge Road
Westlake, OH 44145

Matt Gillen
NIOSH Office of the Director
Room 739G
Hubert H Humphrey Building
200 Independence Avenue, SW
Washington, DC 20201

Richard Hartle
Centers for Disease Control
NIOSH - R-9
5555 Ridge Road
Cincinnati, OH 45213

Stephanie Ostrowski
Agency for Toxic Substances and Disease Registry
37 Executive Park Drive
Bldg. 37, Room 3726
Atlanta, GA 30329

Lora Siegmann Werner, MPH
Regional Representative
Agency for Toxic Substances and Disease Registry (ATSDR)
1650 Arch Street, 3HS00
Philadelphia, PA 19103

APPENDIX B

TECHNICAL CHARGE TO PEER REVIEWERS

TECHNICAL CHARGE TO PEER REVIEWERS

MAY 30, 2002, MEETING ON MORGAN MAIL PROCESSING AND DISTRIBUTION CENTER

1) At the Morgan facility epidemiological data exist that demonstrate that no cases of inhalational or cutaneous anthrax were reported in workers either up to the time that it was discovered that letters contaminated with anthrax spores had passed through the facility (about five weeks following passage of the letters) or since then. Given these data, was the environmental sampling performed in the Morgan facility adequate with respect to risks to human health? Please explain the basis for your response. (Ashford,* Bell, Durno, Ostrowski)

2) Following the cleanup performed to remove *B. anthracis* contamination, was the nature, location and extent of post-decontamination sampling appropriate to determine the effectiveness of the decontamination process? For example, was the sampling more or less extensive than the pre-decontamination sampling? Were post-cleanup samples taken in all areas at which contamination was identified prior to the decontamination? To what extent were statistical approaches used in developing the sampling plans? Please provide reasons for your conclusions (Bell, Gillen,* Hartle, Werner).

3) What additional environmental sampling, if any, should be performed at the Morgan facility to demonstrate that residual *B. anthracis* contamination is very low to negligible? Please describe the type, extent and locations of sampling that are needed, as well as the reasons for such sampling (Bell, Gillen, Hartle*).

4) What modifications, if any, to the sampling plans would have been appropriate had it been discovered within hours or a few days that *B. anthracis*-contaminated letters had passed through the Morgan facility rather than almost five weeks after their passage, when epidemiological information was available? Explain the reasons for such modifications (Ashford, Gillen, Hartle,Werner*).

5) In the event of a future attack through the mail, what roles should epidemiological findings play in the design of environmental sampling plans to determine the nature and extent of B. anthracis contamination? Is it possible to design a decision-tree approach for sampling plans which incorporates consideration of epidemiological data? Please provide sufficient details to explain your reply (Ashford, Durno, Ostrowski*).

6) Given the experience and expertise gained to date in conducting environmental sampling of the Morgan facility and of other *B. anthracis*-contaminated sites, what types of environmental sampling should be performed at all sites shown to have some contamination in future attacks using *B. anthracis* spores? (Durno,* Ostrowski, Werner)

APPENDIX C

PEER REVIEWERS PRE-MEETING COMMENTS

BETH BELL, CDC

1. *At the Morgan facility epidemiological data exist that demonstrate that no cases of inhalational or cutaneous anthrax were reported in workers either up to the time that it was discovered that letters contaminated with anthrax spores had passed through the facility (about five weeks following passage of the letters) or since then. Given these data, was the environmental sampling performed in the facility adequate to ascertain the nature, location and extent of B. anthracis contamination? Please explain the basis for your response. (Ashford,* Bell, Durno, Ostrowski)*

Environmental sampling can be conducted for many reasons; epidemiological data is used to inform the purpose and thus the scope of this sampling. In the case of the Morgan facility, the epidemiologic finding that no anthrax cases occurred among the large number of postal workers who worked in the facility during the approximately five weeks after the letters were processed through the facility and before any intervention was undertaken is most consistent with two scenarios: a) any contamination that resulted from handling the letters in the facility was limited in scope; or b) widespread contamination occurred, but exposure to the powder did not cause infection in people. Since cases of cutaneous anthrax had been detected in recipients of these letters, the second scenario would have been less likely. The results of the environmental sampling were consistent with the first scenario, also indicating that contamination was probably limited to the machines through with the recognized letters were processed. Thus the environmental and epidemiologic findings were consistent with each other and the environmental sampling supported the most plausible explanation for the epidemiologic findings. For these reasons, I think the sampling that was done was adequate. My thinking and approach would be quite different if any cases of inhalational anthrax been detected in association with these letters.

2. *At the Morgan facility epidemiological data exist that demonstrate that no cases of inhalational or cutaneous anthrax were reported in workers either up to the time that it was discovered that letters contaminated with anthrax spores had passed through the facility (about five weeks following passage of the letters) or since then. Given these data, was the environmental sampling performed in the facility adequate to ascertain the nature, location and extent of B. anthracis contamination? Please explain the basis for your response. (Ashford,* Bell, Durno, Ostrowski)*

I am not an expert on this topic. Also, I would like to have a clearer sense of exactly where on the DBCS machines the pre- and post-cleanup samples were taken to fully answer this question. Nonetheless, based on what I can glean from the information provided and if I understand correctly where the HEPA samples were taken, after all the post-cleanup sampling was completed, i.e., including the HEPA samples, it appears that this sampling was adequate. Other sampling methods, such as surface wipes that can encompass a larger area than swab samples, might have been helpful. I see no mention of statistical approaches in the information provided,

but am not sure that this would have been the most important setting in which to apply such techniques anyway.

I do not think that additional sampling is warranted at this time. As has been demonstrated in other circumstances involving environmental contamination with *B. anthracis*, it is extremely difficult to completely eradicate spores from the environment, and, although unlikely, I do not think it is completely outside the realm of possibility that residual spores could be found somewhere in the facility, even at this late date, with extensive enough looking. However, as other instances of exposure to *B. anthracis* have shown, the opportunity for exposure does not mean that infection or disease necessarily will result. In the case of the Morgan facility, I do not think any residual contamination poses any significant risk of anthrax because a) pre-cleanup, the contamination was limited in scope and not associated with disease in exposed persons at the facility; b) post-cleanup, no cases have occurred among workers who continue to work in the facility and are not on antibiotic prophylaxis; and c) in contrast to the powder contained in the letters sent to Washington D.C., there appears to have been no or an extremely low risk of inhalational anthrax from exposure to the powder contained in the letters that were processed in the Morgan facility.

MARK DURNO, EPA

3. *At the Morgan facility epidemiological data exist that demonstrate that no cases of inhalational or cutaneous anthrax were reported in workers either up to the time that it was discovered that letters contaminated with anthrax spores had passed through the facility (about five weeks following passage of the letters) or since then. Given these data, was the environmental sampling performed in the facility adequate to ascertain the nature, location and extent of B. anthracis contamination? Please explain the basis for your response. (Ashford,* Bell, Durno, Ostrowski)*

The epidemiology in this case is very critical to the determination of threat versus the necessity of extensive environmental sampling. In cases where secondary contamination exists and those affected not having been placed on a prophylaxis program; and, in those cases, targeted environmental sampling has indicated the presence of *B. anthracis*, there have been few cases, if any, of inhalational anthrax. It is assumed that all of the contaminated letters contained the same strain of *B. anthracis*. It is also assumed that the letters may have contained differing mixes of the agent used to make the spores more "respirable". Due to inefficiencies in most of the accepted means of sampling, the most likely opportunity to detect *B. anthracis* contamination is though targeted sampling of likely contaminated objects. Away from these objects, the dilution of the contaminant, coupled with the inefficiencies of surface sampling would likely lead to false negatives. This phenomenon was largely found to be true at the Capitol Hill response, where thousands of both targeted and evenly spaced sampling events took place. Given this, the characterization data was appropriate to determine likely areas were impacted; however, with the expanded knowledge that has been gained on other similar responses, some type of air sampling protocols and large area wipe samples would have been helpful to communicate to low risk with respect to reoccupation of these work areas.

4. *Following the cleanup performed to remove B. anthracis contamination, was the nature, location and extent of post-decontamination sampling adequate to determine the effectiveness of the decontamination process? For example, was the sampling more or less extensive than the pre-decontamination sampling? Were post-cleanup samples taken in all areas at which contamination was identified prior to the decontamination? To what extent were statistical approaches used in developing the sampling plans? Please provide reasons for your conclusions (Bell, Gillen,* Hartle, Werner).*

For purposes evaluating the effectiveness of decontamination, the sampling that was conducted could have been more extensive. The sampling was more extensive than the initial characterization sampling; however, large area wet wipe samples would have offered better assurance that the entire unit was clear of detectable *B. anthracis* rather than small surface area swab samples. The HEPA transitional sampling that was conducted in December was a good final clearance check of those areas. I did not observe any direct statistical references in the provided review product.

5. *What additional environmental sampling, if any, should be performed at the Morgan facility to demonstrate that residual B. anthracis contamination is very low to negligible? Please describe the type, extent and locations of sampling that are needed, as well as the reasons for such sampling (Bell, Gillen, Hartle*).*

Given the time that has elapsed and given the HEPA sock transitional sampling that occurred over the majority of the contaminated areas, I don't see the need for further sampling. If air sampling were to be conducted by means of high efficiency methods (i.e. impactors), the results would be meaningless with out accepted risk-based criteria to compare them to. At all of the clean-up sites, criteria was pre-established (zero detectable spores); however, a standard does not exist for "how many" and "by which method". Sampling is currently done on best professional judgement. In an active facility, where the risk has been determined to be negligible, air sampling with no appropriate criteria would be useless.

5) *In the event of a future attack through the mail, what roles should epidemiological findings play in the design of environmental sampling plans to determine the nature and extent of B. anthracis contamination? Is it possible to design a decision-tree approach for sampling plans which incorporates consideration of epidemiological data? Please provide sufficient details to explain your reply (Ashford, Durno, Ostrowski*).*

Epidemiological data was a critical component to the tracking of contamination at the Capitol Hill site. Interviews and nasal swab results assisted sampling teams in the development of the targeted sampling strategy. Over twenty distinct areas were found to be contaminated at the Capitol Hill response. All of these areas could be accounted for through the epi review with limited exception. If a decision tree / matrix were to be developed it would most definitely incorporate epi data. It is also important to recognize the overall risk curve that was developed from all of the cases of anthrax that occurred last fall. The risk curve showed conclusively that the spread of this disease was limited due to the eventual dilution of the contaminant and the controls that were put into place at the grossly contaminated facilities.

6) *Given the experience and expertise gained to date in conducting environmental sampling of the Morgan facility and of other B. anthracis-contaminated sites, what types of environmental sampling should be performed at all sites potentially affected by future attacks using B. anthracis spores? (Durno,* Ostrowski, Towle, Werner)*

A combination of surface and air sampling techniques should be considered in any case. In the future, the "bug" may be weaponized differently and therefore behave differently. The key to any response is to put together a multi-disciplinary team of professional leaders who can bring their perspectives to the team to attack the problem. Included in that team should be someone who can consult on the latest findings by our research and field experienced persons. In my opinion, there is no doubt that were are on the right track to developing a clearance sampling protocol that

will be accepted. The challenge to our scientific and research partners is to further develop the accepted sampling techniques to incorporate action and acceptance levels for *B. anthracis*. In other words, we obtain zero detectable growth; but, by what sampling regimen.

RICHARD HARTLE, CDC/NIOSH

2) *Following the cleanup performed to remove B. anthracis contamination ,was the nature, location and extend of post-decontamination sampling adequate to determine the effectiveness of the decontamination process?*

As best as I can tell from the printed material, the nature, location and extent of post-decon sampling seemed, in general, to be adequate. HEPA and swab samples were collected in the same vicinities as pre-decon positive samples. Based on a comparison of the "positive sample summary" figure with the "post sample summary" figure, the locations (as well as I can determine) seemed adequate.

...Was the sampling more or less extensive than the pre-decontamination sampling?

The overall sample numbers were, of course, fewer, because the points of contamination were presumably already identified. On a per location basis, the numbers seemed generally the same (although I had trouble deciphering the figure).

...Were post-cleanup samples taken in all areas at which contamination was identified prior to the decontamination*?*

Again, based upon my understanding of the figures, post-decon samples appear to have been collected in appropriate areas.

...To what extent were statistical approaches used in developing the sampling plans?

From what I've read to date, a statistical approach doesn't appear to have been used, which isn't necessarily a deficiency. If areas of contamination were identified, cleaned, then re-tested, I question the value of statistics.

(3) *What additional environmental sampling, if any, should be performed at the Morgan facility to demonstrate that residual B. anthracis contamination is very low to negligible? Please describe the type, extent and locations of sampling that are needed, as well as the reasons for such sampling.*

General Response

As a general rule, prior to any environmental sampling, consideration must be given to the **purpose** of the sampling, and how the results will be **interpreted**. Without a clear purpose and a general understanding of what information positive or negative results can provide, data is open to misinterpretation which may lead to erroneous conclusions. The reasons for environmental sampling can include any one or more a combination of the following:

(1) Determining the extent of personal exposure (typically in relation to existing

criteria; i.e., compliance or risk assessment);
(2) Associating the degree of exposure with a health outcome, or lack thereof;
(3) Determining the appropriate level of PPE;
(4) Identifying the extent of contamination or the spread of contamination from a breach of containment or unintended release;
(5) Providing guidance for remediation;
(6) Determining the effectiveness of remediation;
(7) Performing basic research;
(8) Performing applied research, such as hypothesis testing or method comparison;
(9) Assuaging public concerns, and,
(10) Responding to political factors or bureaucratic reasons.

In the Morgan facility, the purpose of additional sampling is unclear, and it should (must) be defined prior to development of any sampling plan. I suspect the "if any" clause in question 3 is designed to spur a discussion of whether there is a purpose for additional sampling. I am unwilling to answer the question directly, because the question suggests that the sampling be for the purpose of demonstrating that residual *B. anthracis* contamination is very low to negligible. However, I am unaware of any existing or proposed criteria which clearly define what is "very low to negligible" *B. anthracis* contamination. The problem is further compounded by the array of surface sampling, air sampling, and analytical methods for anthrax, and their respective efficiencies and sensitivities. Researchers are only just beginning to understand the strengths and limitations of these methods. The experience and practice in other anthrax-contaminated facilities during the last several months is to sample (typically surface sampling), clean, re-sample, and re-clean until no spores are detected, with an important qualifier that non-detection does not necessarily mean that *there are no spores*. Therefore, any remaining contamination in these facilities is directly related to the efficacy and sensitivity of the sampling and analytical method. With so many uncertainties, a clearly defined purpose and an outline for appropriate uses and interpretations of sampling results are essential prior to performing any sampling.

Specific Considerations

The preceding discussion aside, the following addresses the specific request to describe **type**, **extent**, and **location** of sampling.

Type

Surface Sampling:

Many surface sampling techniques are available, including dry swabs, wet swabs, wetted synthetic pads, wetted cotton pads, and HEPA socks. For smooth, hard, visibly dust-free surfaces, the method of choice appears to be wetted synthetic pads. For "tight", relatively small, inaccessible areas, wetted swabs are preferred. For collection of surface dust, HEPA socks have

been shown to be rather effective. A distinct advantage of the pads, and even more so for HEPA samples, is the ability to perform composite surface sampling. A thorough discussion of these methods is presented in "Comparison of Surface Sampling Methods for *Bacillus anthracis* Spore Contamination" (Sanderson, et.al.; May 23, 2002) based upon data from the Brentwood USPS facility. As a prerequisite, the selected analytical laboratory must be able to analyze the selected media.

Air Sampling:

Available techniques for determining air contamination include an array of filter media (MCE, PTFE, GEL, PFFD), and agar plate impaction (Anderson samples). While all methods appear capable, the advantages/limitations of each must be weighed against the purpose of sampling. While Anderson samples seem to be the most sensitive technique, their inherent short sample times (10 minutes) and cumbersome media may present problems. Conversely, while PFFDs appear to be the least sensitive, they can be operated for days at a time. A thorough discussion of air sampling methods will soon be available from data collected at the Trenton USPS facility.

Extent/Location

The numbers of samples to be collected and their locations will, again, relate to the purpose of sampling. For example, in the early phases of the anthrax emergency response, the primary question was whether anthrax spores were present. To this end, sampling was targeted in areas with the highest potential for contamination (i.e., mail streams, sorting machines, etc.) and relatively small numbers of samples were collected. At the other end of the spectrum is a complete, thorough, statistically-based sampling strategy with pre-determined confidence levels of whether and to what extent contamination is present (i.e., AMI draft sampling protocol), which requires hundreds, if not thousands, of samples.

Summary

If a clearly defined reason to sample the Morgan facility is identified, an appropriate sampling plan could be developed incorporating the above methods. However, I have to stress that a full discussion of the purpose for sampling and what the results will mean or could be used for must take place prior to the design of any sampling protocol.

4) *What modifications, if any, to the sampling plans would have been appropriate had it been discovered within hours or a few days that B. anthracis- contaminated letters had passed through the Morgan facility rather than almost five weeks after their passage, when epi info was available?*

If potential contamination info had been known immediately, the same type of response would have been appropriate; i.e, sampling, isolation, decon, and resampling. The availability of epi

info has more bearing on the current issue of additional sampling needs. Obviously, had the contamination been identified quickly enough, the need for downstream sampling would have been negated.

LORA WERNER, ATSDR

2.) *Following the cleanup performed to remove B. anthracis contamination, was the nature, location and extent of post-decontamination sampling adequate to determine the effectiveness of the decontamination process? For example, was the sampling more or less extensive than the pre-decontamination sampling? Were post-cleanup samples taken in all areas at which contamination was identified prior to the decontamination? To what extent were statistical approaches used in developing the sampling plans? Please provide reasons for your conclusions (Bell, Gillen,* Hartle, Werner).*

At this point in my review, I am not certain to what extent cross-contamination concerns were considered in the pre-decontamination sampling regimen. I expect this to be clearer after the site tour and technical presentations later this week. One area of concern for me is the thoroughness of the pre-decontamination sampling. Using the guidance available at that time, all of the pre-decontamination samples were taken using a dry swab technique. Evidence now available indicates that wet swabs are much more efficient (and this was the technique used for all of the post-decontamination swab sampling). If the pre-decontamination sampling missed any problem areas, this shortcoming would have remained because the decontamination activities and subsequent post-decontamination sampling were all focused on the areas where positive sampling results were originally detected. Also, it doesn't appear that sampling of air handling units was conducted in either the pre- or the post-decontamination sampling events. Why was the potential for aerolization of spores from the known contaminated machines into the air handling system eliminated as a potential contamination pathway?

In my opinion, aggressive air sampling is a priority for post-decontamination sampling. In contaminated areas, it provides another layer of information that is not dependent on the effectiveness of wipe/swab sampling techniques. Obviously aggressive air sampling has its own degree of uncertainty associated with it, but I think provides very useful complementary information to establish the effectiveness of decontamination efforts. It can also be used in areas where no contamination was identified, as another check. Were the HEPA sock samples intended to simulate aggressive air sampling in limited areas immediately near the machines?

In response to the "for example" questions included as part of this question, there were certainly more pre-decontamination samples than post-decontamination samples, so in that respect the pre-contamination sampling was more extensive. It does appear that the post-decontamination samples were taken in all areas where positive samples were detected. I could not find any documentation in the materials provided for our review that statistical approaches were used to develop the sampling plans (although I could have missed it). It sounds like a "biased" approach was used, whereby general areas that were suspected of likely having contact with the suspect letters were sampled, using information from run sheets and input from operational staff and union workers. Perhaps a statistical approach was used once the targeted machines/areas were identified, but this is not clear from the review materials.

4.) *What modifications, if any, to the sampling plans would have been appropriate had it been discovered within hours or a few days that B. anthracis-contaminated letters had passed through the Morgan facility rather than almost five weeks after their passage, when epidemiological information was available? Explain the reasons for such modifications (Ashford, Gillen, Hartle, Werner*).*

If the potential for contamination had been identified prior to any epidemiological information being available, the conservative response would have been to shutdown the facility as opposed to just isolating selected areas prior to sampling. It also would have been appropriate to consider the potential for cross-contamination throughout trafficked areas of the facility, and to consider sampling air handling equipment (in my opinion, these latter two modifications to the sampling plan would have been appropriate no matter when the contamination was identified, actually, given all of the uncertainties involved, as I discuss above). Most of my detailed comments from Question #2 would apply here, but some only in hindsight because I am taking into account information we have learned since last October (e.g., effectiveness of wet versus dry sampling, aggressive air sampling techniques, minimum number of spores possible to cause disease in individuals contacting contaminated mail, etc.).

(6) *Given the experience and expertise gained to date in conducting environmental sampling of the Morgan facility and of other B. anthracis-contaminated sites, what types of environmental sampling should be performed at all sites potentially affected by future attacks using B. anthracis spores? (Durno,* Ostrowski, Towle, Werner)*

Again, I have covered these issues in my responses above, but in my opinion wet wipe sampling, sampling of air handling equipment (when the exposure scenario makes this appropriate, such as when high volume air movement was known to occur), and aggressive air sampling should be included in any potential *B. anthracis*-contaminated facilities in the future.

APPENDIX D

MORGAN CHRONOLOGY SUMMARY

Morgan Chronology Summary

USPS Employee Anthrax Illnesses in New York City...

	In September:	Zero
+	In October:	Zero
+	In November:	Zero
+	In December:	Zero
+	In January:	Zero
+	In February:	Zero
+	In March:	Zero
+	In April:	Zero
+	In May:	Zero
=	9 Months Total to Date:	Zero

Morgan Chronology
September

September 18 & 20
NBC and NY Post Letters Enter Mail System in Trenton, NJ.

September 19-21
NBC and NY Post Letters Processed in Trenton and unknowingly transported downstream through Morgan P&DC.

Mail Flow – September 19 - 21
- Mail trucks arrive at Morgan Loading Dock with letters in mail trays, wrapped with tray sleeves and placed on "Postcons" (type of Mail Transport Equipment - MTE).
- MTE is opened at the Morgan P&DC on the 3rd Floor South.
- Sleeve is removed from tray.
- Letters are removed from tray and placed directly onto the induction area of DBCS Machines.
- Letters are sorted and placed into trays.
- Trays are then placed into and transported in MTE.
- Trays are shipped further downstream to other Facilities in New York City.

October

October 19
Based upon CDC Confirmation of Anthrax on NBC letter, USPS held meeting with USPS Environmental Consultant (URS) and CDC (Dr. Ostroff).
October 21
URS conducts environmental sampling for Anthrax. 148 Initial samples from 2nd and 3rd Floors based on analysis of Trenton mail flow through Morgan.

October 23- Evening
Preliminary Results of 148 Samples Identify 4 Positive Locations on DBCS Machines 10, 15, 20 and 25; later confirmed by CDC laboratory.
All other 144 samples were negative.

October 23- Night
All positive DBCS Machines shut down and cordoned off.

October 24
CDC implements 10-day chemo-prophylaxis. Later extended to 60 days.

October 25
CDC/NIOSH conducts independent environmental sampling. (56 Samples)

October 25 - Evening
USPS initiates meeting with CDC and USPS Cleanup Contractor. Cleaning protocols reviewed and contractor mobilized.

October 26
Consensus on cleanup procedures & protocol reached at site meeting at Morgan with USPS NYMA, USPS Morgan, CDC (including epidemiologists), NIOSH and USPS Environmental Contractor.

October 27
CDC/NIOSH results identify 7 positive locations from the four positive DBCS Machines identified on October 25, including 2 locations on DBCS 24.

October
Further *d*ownstream facility sampling was conducted separately by URS and CDC/NIOSH. All results were negative.

October 31
Initial cleanup contractor completes site preparation and cordons off all 26 DBCS machines on 3rd Floor South.

November

November 1
USPS Environmental Monitoring Consultant (Berger) and Clean Harbors mobilize on-site. Cleaning commences with Berger providing 24-hour/7-day independent oversight.

November 6
Postal Workers Union injunction hearing commences.

November 9
Preliminary Injunction Hearing Complete

November 13
Cleaning of all 26 3rd Floor DBCS Sorting Machines completed, five machines with positive results remain triple-wrapped with poly and sealed. 22 post-cleaning wet-swab samples collected.

Two additional machines also remained out of service due to proximity to waste handling area.

November 15
Judge denies preliminary injunction.

All 23 post-cleaning sample results are negative.

November 16

Post-Cleaning sample results presented to USPS employees.

November 20
After discussion with CDC, the remaining seven 3rd Floor DBCS machines return to service.

November 20 (Con't)
Cleaning of entire 3rd Floor South Building Complete. Cleaning operation moved to 2nd Floor. 2nd Floor cleaning initiated on "high-speed sorters" to meet all requirements of original CDC recommendations reiterated at the injunction hearing.

November 30
USEPA Region II representative meets with USPS representatives and observes Cleanup Activities.

December

December 7
Cleaning of entire 2nd Floor South building areas completed. Cleanup contractor demobilizes from Morgan P&DC.

December 10
Meeting with unions, CDC/NIOSH, consultants and USPS prior to continuing information sessions with employees.

December 23
In agreement with OSHA, HEPA Vacuum post-cleaning follow-up samples were collected by URS from DBCS #'s 10, 15, 20, 24, 25 and surrounding areas. (19 Total Samples)

December 24
60-day Chemo-prophylaxis period ends.

December 28 - Evening
Results received. All follow-up HEPA Vacuum samples are negative except one on DBCS 10.

December 29 - Morning
Location of positive sample on DBCS 10 is cleaned again. Three wet-swab samples (Berger) and four HEPA Vacuum samples (URS) collected following cleaning effort.

January

January 2
Secondary post-cleaning sample results for DBCS 10 are received for HEPA Vacuum follow-up samples and are all negative. DBCS 10 still out of service.

January 4
Secondary post-cleaning follow-up sample results for DBCS 10 are received for wet-swab samples and are all negative. DBCS 10 still out of service.

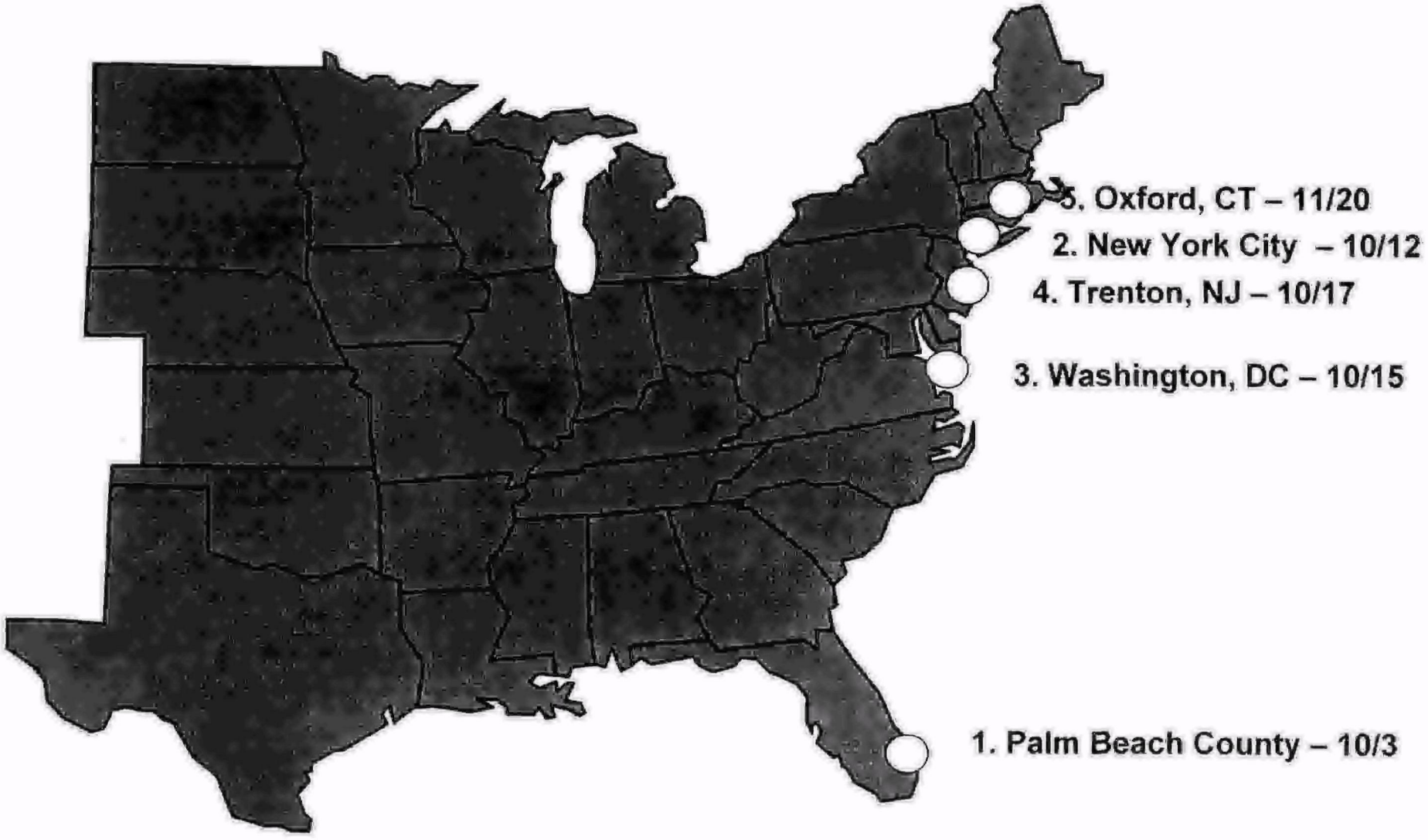
January 5
DBCS 10 placed back in service following consultation with CDC.

January 30
Region II provides confirmation that USEPA is in agreement with USPS actions to date.

APPENDIX E

SLIDES FROM DR. OSTROFF'S PRESENTATION

Locales & Dates of Anthrax Episodes



CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Case Definition

- Confirmed case:
  - Clinically compatible illness confirmed by isolation of *B.anthracis* or other lab evidence based on two supportive tests
- Suspected case:
  - Clinically compatible illness with one supportive lab test or linked to a confirmed environmental exposure

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

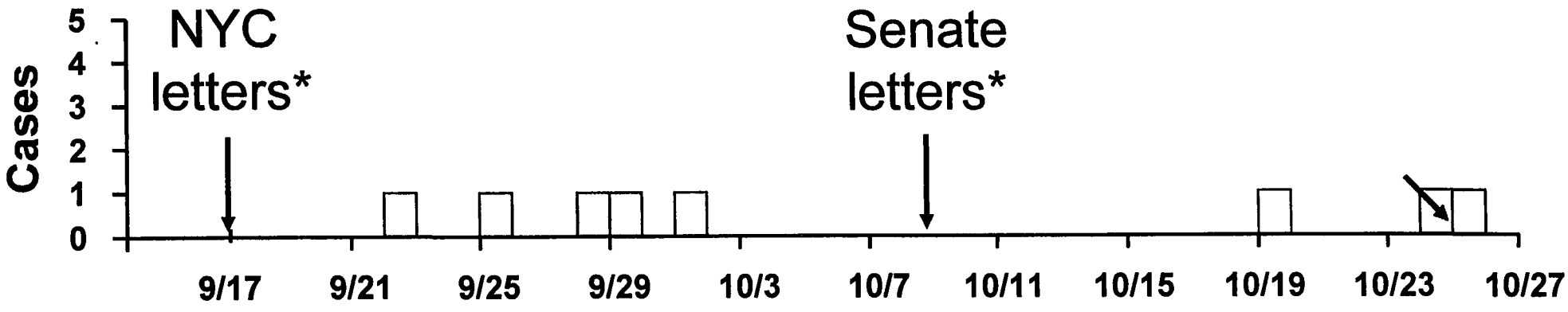
Confirmed and Suspected Cases of Anthrax, 11/13/2001

Confirmed	FL	NYC	DC	NJ	Total
Cutaneous	0	4	0	3	7
Inhalation	2	1	5	2	10
Suspected	FL	NYC	DC	NJ	Total
Cutaneous	0	3	0	1	4
Inhalation	0	0	0	0	0

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Bioterrorism-associated Anthrax: Inhalation and Cutaneous Cases; New York

↘ Inhalational Case



*Postmarked date of known contaminated letters.

CDC
Centers for Disease Control and Prevention

Chronology of NYC Cases

- NBC (2 cases) – 12 October
- ABC (1 case) – 15 October
- CBS (1 case) – 17 October
- NY Post (3 cases) – 19 October
- Hospital employee – 29 October

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Interactions with USPS

- Initial meeting concerning sampling with management & contractor – 19 October
- Decision had already been made to sample Morgan, Farley, & 5 substations that supplied networks/governor's office
- Forensic interest in stations associated with ABC & CBS
- Extensive discussions about nature & role of sampling

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

USPS interaction (cont'd)

- Approx. 5,000 workers at Morgan
- Exposed for 30 days since letters mailed w/o detectable illness
- High likelihood that contamination present
- Was it of sufficient quantity or nature to produce illness in workers?
- Data suggested disease risk was negligable
- Efforts should be directed at cleaning the environment

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Chronology

- Sampling done over weekend of 20-21 October
- Follow-up meeting on 24 October
- Brentwood incident occurs 23 October
- Positive samples identified at Morgan 23 October
- Decision made by USPS/CDC to offer prophylaxis to all workers on 24 October (initiated on 25 October)
- Reduce residual risk of illness as much as possible

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Decisions regarding facility

- Once positive samples identified & prophylaxis initiated, NYCDOH and CDC decision that known risk did not justify closure of facility
- No illness identified
- No inhalational disease identified in NYC
- Cutaneous disease "less" severe & more treatable
- Implications of closure of facility
- All machinery on 2nd & 3rd floors should be cleaned in same manner regardless of sampling results
- Start with areas known to be contaminated

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Other remedial actions

- Permissive use of PPE
- Changes in equipment handling & cleaning
- Any concerned employee reassigned to other duty
- Post-remediation sampling with repeat cleaning for any positives until all samples negative

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Employee monitoring

- All employees of Morgan under active surveillance for illness/death
- A number of fatalities investigated late Oct/early Nov (including autopsies)
- None with evidence of anthrax
- Passive surveillance for disease in other postal workers in NYC
- Adherence with prophylaxis lowest in NYC of any sites

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Hospital employee case

- Worked in stock room in basement; adjacent to mail room
- Most deliveries to hospital were not from USPS
- Hospital directly received mail from Morgan
- Four letters in 9 Oct sort for this hospital; mail from sort to all other Manhattan hospitals as well
- Lived in Bronx; home mail through Bronx processing center; visited multiple post offices for money orders
- All associated sampling negative; no data to connect her illness to Morgan facility

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

NY anthrax material

- By report, small amount of material in NBC letter was “brown & granular”; had been moistened during processing
- NY Post material also described as sandy
- Known to contain compounds not in DC letters

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Summary

- Epi data suggest "risk" in NY was different than in other locations (FL, DC)
- No illness in any postal worker compatible with anthrax
- No facility closed in NYC
- More limited sampling
- Material apparently different than other locations
- Public health risk repeatedly described as "negligable" but not zero
- Actions designed to bring risk as close to zero as reasonably possible while minimizing social & economic disruption

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

APPENDIX F

ATTENDEES AT PEER REVIEW WORKSHOP

Morgan Facility Peer Review
May 30, 2002
Meeting Attendees

Name	Affiliation	Phone	E-Mail
David Ashford (a)	CDC-NCID	404-639-3159	dba4@cdc.gov
Beth Bell (a)	CDC-NCID	404-371-5910	bzb8@cdc.gov
Karen Burgan (e)	EPA-OSWER	202-564-6557	burgan.karen@epa.gov
Tim Burke (c)	Louis Berger Group	212-363-4223 x43	tburke@louisberger.com
Tom Cash (b)	USPS	718-321-5856	tcash@email.usps.gov
Dorothy Canter (d)	EPA-OSWER	202-260-2014	canter.dorothy@epa.gov
James Daloia (e)	EPA Region 2	732-906-6907	daloia.james@epa.gov
Nicholas DeCarlo (b)	USPS-NYMA	212-330-3107	ndecarlo@email.usps.gov
Ralph Dollhopf (e)	EPA Region 5	734-612-5802	dollhopf.ralph@epa.gov
Mark Durno (a)	EPA Region 5	440-250-1743	durno.mark@epa.gov
Matt Gillen (a)	CDC-NIOSH	202-401-2193	mgillen@cdc.gov
Richard Hartle (a)	CDC-NIOSH	513-841-4533	rwh2@cdc.gov
Dan Hewett (b)	CDC-NIOSH	304-285-6306	dhewett@cdc.gov
Grant Hines (c)	ICF Consulting	703-934-3836	ghines@icfconsulting.com
Steven W. Lenhart (b)	CDC-NIOSH	513-841-4227	slenhart@cdc.gov
Tom Lewis (c)	Louis Berger Group	973-678-1960 x755	tlewis@louisberger.com
Stephen Ostroff (b)	CDC	404-639-3967	smo1@cdc.gov
Stephanie Ostrowski (a)	CDC-ATSDR	404-498-0633	sro1@cdc.gov
Martin Powell (d)	EPA-OSWER	202-566-1932	powell.martin@epa.gov
Sam Pulcrano (c)	USPS	202-268-2067	spulcrano@usps.gov
Rafael Vias (c)	USPS-Morgan	212-330-2305	rvias@email.usps.gov
Lora Siegmann Werner (a)	CDC-ATSDR	215-814-3141	1kw9@cdc.gov

a = Peer Reviewer b = Presenter c = Resource person d = Technical coordinator e = Observer

APPENDIX G

PEER REVIEW WORKSHOP AGENDA

PEER REVIEW OF MORGAN MAIL PROCESSING AND DISTRIBUTION CENTER ENVIRONMENTAL SAMPLING AND EPIDEMIOLOGICAL FINDINGS

May 30, 2002

Law Department Conference Room (#4516)
Main Post Office
380 West 33rd Street (entrance on 33rd St near 9th Avenue)
New York City, NY

DRAFT AGENDA

(9:00 a.m. - 12:00 p.m.)	
-Welcome/Logistical Considerations	Dorothy Canter, EPA Mark Durno, EPA (Chair)
- Presentations on Environmental Sampling	Nicholas DeCarlo Thomas E. Cash,USPS
-Presentation on Epidemiological Findings	Dr. Stephen Ostroff, CDC
-Comments of NIOSH/CDC Resource Persons	Steven Lenhart, NIOSH/CDC Dan Hewett, NIOSH/CDC
-Observer Comments	
-Tour of Morgan Facility	Nicholas DeCarlo, USPS Meeting Participants
Lunch (12:00 - 1:00 p.m.)	
(1:00 - 6:00 p.m.)	
-Responding to the Technical Charge	Durno
-Review of Ground Rules for Peer Review	Canter

Question 1
Lead Reviewers
(David Ashford,* CDC, Beth Bell, NCID/CDC,
Mark Durno, EPA, Stephanie Ostrowski, ATSDR)
Discussion

PEER REVIEW OF MORGAN MAIL PROCESSING AND DISTRIBUTION CENTER ENVIRONMENTAL SAMPLING AND EPIDEMIOLOGICAL FINDINGS

Question 2
Lead Reviewers
(Bell, Matt Gillen,* NIOSH/CDC,
Richard Hartle, CDC/NIOSH, Lora Werner, ATSDR)
Discussion

Question 3
Lead Reviewers
(Bell, Gillen, Hartle*)
Discussion

Question 4
Lead Reviewers
(Ashford, Gillen, Hartle, Werner*)
Discussion

Question 5
Lead Reviewers
(Ashford, Durno, Ostrowski*)
Discussion

Question 6
Lead Reviewers
(Durno,* Ostrowski, Werner)
Discussion

Conclusions	Peer Review Panel
Writing Assignments	Durno
Wrap Up/Next Steps	Canter

ADJOURN