occurred through mechanical means. Additionally, positive samples were found at various locations before DBCS operation, suggesting that walking and light work in the enclosure were sufficient in re-aerosolizing *B. anthracis* spores at low concentrations. The positive samples from the re-analysis indicate that the entire filter sample should be analyzed to improve the sensitivity of the analysis. This determination can be a significant factor in the selection of air sampling methodologies when considering the intent of sampling, e.g., screening, characterization, or clearance.

Biological Aerosol Collector-Detector using a tacky Recordable Compact Disk (CD - R)

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We have developed a slit impaction type aerosol collector using a recordable compact disk (CD-R) coated with a tacky surface material that can be impregnated with a DNA specific dye. The impactor-collector operates at 150 lpm, 50 watts and weights less than 50 lbs. Presently we are using a fluorescent DNA-specific stain to aerosolize into the inlet at the end of each collection cycle to stain any collected microorganisms. The CD-R is then rotated to bring a clean area of the CD-R under the deposition slit and the strip on which a deposition has just been made under a fluorescence detection module. This module consists of a bifurcated linear array of fiber optics that uses laser light and small spectrometer to a spectral signature. The fluorescent signal is then stored and later written on the CD media. We currently deposit eight strips of aerosol on each CD-R. When the CD-R is full, mechanical control of the CD-R is returned to the CD read/write drive on which the CD-R has been sitting and all relevant electronic data is written to the CD-R producing a permanent record of the collection that is on the same medium as the deposited aerosol. The presentation will outline the sensitivity and signal-to-background (SNB) aerosol levels as measured by the present BAD-C instrument, instrument development and field test results. The BAD-C instrument provides a collection strip of deposited aerosol that can be removed in a laboratory and subjected to PCR or other analyses. This work was carried out under the auspices of the U.S. DOE and was supported by the Technical Support Working Group. LA-UR-04-8119

Bioaerosol Collection Efficiency and Extraction from Different Filter Materials Using a *Bacillus anthracis* Simulant

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A laboratory-based study was conducted to examine extraction efficiency and culturability using aerosolized *Bacillus subtilis* var. *niger* (BG) endospores as a surrogate for *B. anthracis*. Gelatin filters (3 µm pore size), mixed cellulose ester (MCE) filters (3 µm pore size), and polytetrafluoroethylene (PTFE) filters (of 1 and 3 µm pore sizes), in conjunction with Button Inhalable Aerosol Samplers were used to collect endospores for 15-minute, 1-hour, and 4-hour sampling periods. Physical collection efficiency (PCE) was determined by measuring the concentration of BG spores upstream and downstream of the filter sampler with an optical particle counter. Vortexing combined with ultrasonic agitation or shaker agitation extraction methods were compared in terms of extraction and culturability. Extraction fluid was plated on trypticase soy agar plates and colonies were counted after 18 hours incubation time. Total count was determined using an acridine orange staining method followed by epifluorescence microscopic counting. The gelatin, MCE, and 1 µm PTFE, filters with the Button Inhalable Aerosol Samplers had PCEs of 94% or more. The 3 µm PTFE filter with the Button Inhalable Sampler showed inconsistent efficiency characteristics between filters (64 ± 32%), likely due to leakage around the filters, and was not used in the rest of the study. No statistically significant differences between the MCE, 1 µm PTFE, and gelatin filters were found in the relative culturability (culturable count/total count) or physical extraction efficiency. MCE and 1 µm PTFE had the best performance among the tested filters and are expected to be effective for the collection of *B. anthracis* samples.

Water Environmental Sample Collection
Friday, January 28

Ultrafiltration-Based Techniques for Rapid and Simultaneous Concentration of Waterborne Bio-Threat Agents

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Breaches in water security usually result in a desire to simultaneously test drinking water for a broad range of biological agents because there is no other way to determine which pathogens, if any, may have been introduced. Collecting and processing drinking water samples to simultaneously concentrate and recover bacterial, parasitic, and viral threat agents is a challenge and requires a method that is rapid, efficient and effective. Filtration using hollow-

Burton, N.C., Adhikari, A., Grinshpun, S.A., and Reponen, T. (2005) Bioaerosol Collection Efficiency and Extraction from Different Filter Materials Using a *Bacillus anthracis* Simulant, *Abstracts of the 1st National Conference on Environmental Sampling for Bio-Threat Agents* (Baltimore, Maryland, U.S.A., January 27-28, 2005); CD publication.

NN:
Administrative Code: HCC52
CAN No.: 59278688