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Memo

To: Jerry Raymond, Paul Jenssen, Sal Dassaro
From: Dag Gonzalez, CMDSM
Date: December 7, 2001
Subject: Update on strategies for dealing with bio hazards in mail centers

The following new information is the result of several client visits, newly acquired research material and manufacturers recommendations.

With the ongoing threats posed by cross-contaminated letters, organizations are still considering what precautions can be taken. What constitutes a sound program for reducing exposure to biological terrorism?

Clients first need to determine if their risk is a result of contaminants within spore-laden mailings or cross-contamination. The appropriate handling strategy depends on their perception of risk.

In some cases, clients are opening mail and visually inspecting items for signs of powder. These clients are wearing gloves but no mask. Other clients are visually inspecting the mail and following published screening protocols, but have no consideration for mail with surface contamination. These clients (some of whom are in close proximity to major postal facilities in high risk locations) are not addressing what may be an unseen danger.

Clients who are opening mail need to take a few simple precautions:

Items should be screened in a secured room with secured ventilation (or ducts using UV / HEPA filtration). This simple precaution will minimize the danger of the entire facility becoming contaminated with the resulting interruption of business.

Clerks performing the primary screen should wear appropriate gloves, protective clothing (not necessarily a HAZMAT suit) and a disposable mask. Periodically, these items need to be visually inspected for damage and wear.

If the main concern is a threat of cross-contamination, the mail can be sterilized using surface irradiation (UV), gas (i.e. ozone, Ethylene Oxide, or a combination of elements) or heat (autoclaving). We have spoken to several manufacturers who offer systems to accommodate 2 to 16 buckets of mail at a time and treat them within hours. As noted in our earlier memos, under the proper conditions, ozone treatment combined with other factors is a terrific method. Autoclaving has some interesting advantages and new enclosures are available that could handle multiple mail buckets. Treatment times, biological testing using the appropriate bacteria elements and the effect on the mail are under review.

If the threat is spore-based mailings, mail must be opened in a secured environment. I am reviewing a manufacturer that offers biological safety cabinets measuring 2' to 6' wide, type II and III, with HEPA filtration. These cabinets would permit a mail clerk to open items without exposing the surrounding room and endangering themselves. Unlike the smaller units that are wonderful for screening single pieces, these larger units can be used to handle larger volumes and provide a good measure of protection to clerk and facility.



Another precaution that should be considered when opening mail using opening machines is selecting a unit that performs a mill-cut (which does not damage contents, reduces paper cuts and keeps the contents more secure). We have clients who are retrofitting their milling openers with HEPA-rated vacuums to catch the resulting chafe.

Once all the mail is screened, opened or sterilized, it should be placed in a clean mail bin and brought to a separate mail area for fine sort. As noted above, the same employees doing the initial screening should not be handling the mail in the clean room.

In addition, the table and equipment should be cleaned using a germicidal solution, hydrogen peroxide or bleach (see our earlier memos regarding chemical germicide solutions). Employees should dispose of their gloves and masks. Protective clothing should be removed and placed in a secured area.

Finally, and of greatest importance, all clerks should wash their hands with mild soap or antibacterial solution.

If an organization follows these precautions, contamination and personal exposure can be significantly reduced. Our next memo will discuss strategies for outsourcing mail handling.



Large Autoclaving Enclosure

Reference Material

Basic information on processes:

RADIATION

Radiation is a process by which energy is transferred from one location to another. One such form of radiation is ultraviolet light. Ultraviolet light is often used as a disinfectant in water and wastewater treatment. Radiation in high doses can permanently damage the building blocks of life. It is with this method that ultraviolet light is used to kill microorganisms and disinfect water. Ultraviolet radiation is powerful enough to break many covalent bonds. Alone it can degrade PCBs, dioxins, polyaromatic compounds, and BTEX. UV light has another affect: it enhances chemical oxidation. The way ultraviolet light enhances chemical oxidation is somewhat of a mystery. One theory is that organic compounds absorb light energy at visible or ultraviolet wavelengths and, as a result, are easier to destroy.

UV Lamp Comparisons:

Emitted wavelengths and output intensity: LP lamps emit essentially monochromatic UV light at a wavelength of 253.7nm in the germicidal region (200-300nm) and this emission is responsible for the germicidal capability of LP lamps. MP lamps are polychromatic with emissions at all wavelengths (but concentrated in select peaks) throughout the germicidal wavelength region. Of the total light emissions from low pressure lamps, approximately 88.6% is at 253.7nm which is near the peak wavelengths (260-265nm) for germicidal effectiveness. In contrast, depending upon lamp mercury charge and power level per cm arc length, about 27-44% of the total energy from a medium pressure lamp is in the germicidal wavelength range. MP lamps typically used for wastewater disinfection emit 9 to 14 germicidal watts per cm which is roughly 50 to 80 times higher than the output of LP lamps. Two of the strongest germicidal emissions from MP lamps occur near the peak of the germicidal wavelength region: the strongest of the two occurring around 265nm, and the second strongest around 254nm. The UV output intensity of MP lamps operated above the design temperature threshold necessary for total mercury vaporization, can be modulated without significant consequence for the distribution of energy between the germicidally effective wavelengths although some wavelengths tend to be slightly accentuated at higher power levels per cm arc length. Most importantly, the germicidal UV output intensity of any lamp is related to the power used to drive the lamp, and generally, the germicidal energy output is slightly more favorable at higher power levels per cm arc length.

CHEMICAL OXIDATION

Chemical oxidation is a process by which compounds, such as waste products are oxidized to a more environmentally benign state. Waste products that can be destroyed by oxidation include organic molecules, chlorinated VOCs, mercaptans, phenols, and some inorganics. Cyanide (NaCN) is one such product, which can be oxidized in the presence of ozone to a safer state.