GlobalEx Water and Air Technology

Anthrax spore decontamination using chlorine dioxide

On March 28, 2002, the Crisis Exemption for liquid chlorine dioxide was amended to specify its use to decontaminate hard surfaces only. Applications had to be conducted according to use instructions from federal, state, or local emergency response personnel following a plan that included the following steps:

- Pre-sampling to determine the extent of spore contamination at specific locations.
- Spot remediation of highly contaminated surfaces through HEPA filter vacuuming.
- Gross surface decontamination using a liquid solution of chlorine dioxide under the following conditions:
    - only hard surfaces may be treated;
    - a rate of 500 mg/L liquid chlorine dioxide may be applied;
    - applications will be made at room temperature (68 degrees Fahrenheit, 20 degrees Celsius); and
    - treatments will have a contact time of at least 30 minutes.

- Post-treatment, environmental sampling to determine whether viable anthrax spores remain.
- Re-treating with liquid chlorine dioxide if viable spores are detected; and
- Post-treatment testing to determine that the anthrax decontamination has been effective.

Any remaining liquid chlorine dioxide had to be removed from the treated areas of the building before people were allowed to re-enter. After treatment, experts had to determine through post-treatment sampling that the treatment was effective before anyone was allowed back into the building.

Use of gaseous chlorine dioxide for decontamination

Based on review of available data, EPA concluded that gaseous chlorine dioxide could be used in a facility decontamination procedure that included sampling, cleaning, treating, and re-sampling, followed by additional treatment if necessary.

The crisis exemptions for gaseous chlorine dioxide issued for fumigating:

- Senator Daschle's suite in the Hart Senate Office building (November 28, 2001),
- the exterior of mail packages (February 26, 2002); and
- an office building located in Boca Raton, FL
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involved products containing sodium chlorite as the active ingredient to generate gaseous chlorine dioxide on site, followed by post-treatment environmental sampling to confirm that the treated areas were free from anthrax spores (no sample could show growth when cultured in the laboratory).
The conditions of application are described below. These conditions did not necessarily apply to personal protective equipment and other debris that was further treated offsite.

- Initially at the Hart Building, a minimum target concentration 500-550 ppm chlorine dioxide gas was applied for a minimum of 12 hours, for a minimum total CT (concentration multiplied by time) of 6,000 ppm-hours.
- Later, the concentration was increased to 750 ppm for a total CT of 9,000 ppm-hours at the Hart Building and for the mail packages.
- At the Boca Raton, FL building, the target concentration was increased to 3,000 ppm and the contact time was reduced to 3 hour, but the total CT exposure minimum remained at 9,000 ppm-hours.
- The minimum temperature was 70 degrees Fahrenheit.
- The minimum relative humidity was 65 percent.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY