

# **Minimizing the Risk to Building Occupants from a Biological Weapons Release**

An Aircond White Paper

**Alan L. Barnes, Jr.,**  
Chief Operating Officer  
Aircond Corporation

October 24, 2001



## **Foreward:**

This document is intended to be used as a general guideline for building owners. It is not intended to include every possible solution for each and every building. Every building is unique and offers specific challenges for the building owner in regards to protecting occupants from biological weapons. Aircond assumes no liability or risk in offering these recommendations to building owners. The recommendations made in this document are based on research and information received from the FBI, CDC (Centers for Disease Control), United States Postal Service, BOMA (Building Owners and Managers Association), and from our many years of expertise in the field of commercial and industrial HVAC design, installation, maintenance, and repair. This paper tries to give the building owner a practical set of recommendations geared towards protecting occupants from a biological weapons release. A chemical weapons release is not addressed in this paper. In fact some of the recommendations made here for protections against biological weapons release would be ineffective against a chemical weapons release.

## **Background Biological Weapons:**

Unlike an explosion or a tornado, a terrorist attack using biological weapons could be invisible and silent, and thus would be difficult to detect at first. The release of a biological agent might not have an immediate and visible impact because of the delay between exposure and onset of illness, or incubation period. The initial responders to such a biological attack would include local, county, and city health officers, hospital staff, members of the outpatient medical community and a wide range of response personnel in the public health system.

Therefore it is extremely important that building owners and managers have the necessary communications and information gathering infrastructure in place at their facility so that they are notified of a biological weapons release as early as possible. Once notified of a release, the building owner or manager could then implement emergency procedures developed for this situation.

## **Proactive Measures to consider:**

There are several initiatives that a building owner or manager should consider implementing in a proactive manner, i.e. BEFORE a biological weapons release is initiated. These potential safeguards are initiatives that could be implemented immediately. They range considerably in cost and in effectiveness. Therefore each building manager should make their own decision as to which measures to implement based on their specific needs and circumstances.

Obviously, if a biological weapon was released outside of the building (external release), the steps taken to protect occupants would be different from those necessary due to a release inside the building (internal release). Listed below are several proactive measures to be considered for both of these scenarios:

Proactive Measures for protecting against an External Release:

With an external release, we want to prevent contaminated outside air from entering the building.

- An emergency action plan for responding to an External Release should be developed and distributed to all building personnel.
- Periodic drills should be implemented to practice emergency procedures.
- If the facility was built before the Carter Administration (1976), it is most likely of “loose” construction. Measures can be taken to “tighten-up” the construction. Windows, doors, soffits, and other areas where outside air could infiltrate the building should be sealed. A General Contractor specializing in retrofit work should be consulted. The building owner or manager should, however, make sure that the building is still capable of delivering the appropriate amount of fresh air to the building occupants in accordance with ASHRAE standard 62-99 (go to [www.ashrae.org](http://www.ashrae.org) for more information on this standard).
- Outside air intakes should be identified and should have controls placed on them so that they could be closed quickly and easily from a central location if necessary, by a building operator. In addition to controls placed on outside air intakes, the dampers themselves should be evaluated. Consideration should be given to replace the existing dampers with new high efficiency, low leakage dampers.
- All exhaust fans in the building (including vent hoods) should have controls placed on them so that they could be turned off easily and quickly from a central location if necessary by a building operator. Shutting down vent hoods and fume hoods, however, should be carefully considered and measures should be undertaken to prevent the internal contaminants that the hoods are removing from entering into the building air system.
- If the building has an automated control system for the HVAC systems installed, an “External Release Emergency Program” should be created so that a building operator can “push a button” on his control screen that will implement specific measures as described below.

Proactive measures for protecting against an Internal Release:

With an internal release, we want to remove the contaminated air from the building as quickly as possible.

- First of all, it is important to have appropriate levels of security in and around the building to prevent access to individuals wanting to indulge in criminal behavior. Consult with a security company for recommendations.
- The outside air intakes for the building should be identified, secured, and camouflaged if possible.
- Mechanical rooms as well as all building entrances should be secured.
- An emergency action plan for responding to an Internal Release should be developed and distributed to all building personnel.
- Periodic drills should be implemented to practice emergency procedures.

- Mailroom personnel should be educated on identifying and handling suspicious packages (go to [www.usps.com/news/2001/press/pr01\\_1010tips.htm](http://www.usps.com/news/2001/press/pr01_1010tips.htm) for more information from the United States Postal Service)
- Automatic controls should be installed on all exhaust fans and outside air intakes and dampers. If the building has an automated control system for the HVAC systems installed, an “Internal Release Emergency Program” should be created so that a building operator can “push a button” on his control screen that will implement specific measures as described below.

**Emergency Actions to take in case of External Release of a Biological Weapon:**

- Initiate Emergency Action Plan.
- Notify all occupants that a biological weapon has been released EXTERNAL to the building and that no one should leave the building until further notice.
- Have building operator press the “External Release Emergency Program” button programmed into the building automation system if applicable. This action should automatically shut down air-side economizers, outside air intakes, exhaust fans, and give status of building entrances (closed or open and should alarm if opened).
- Have the building operator shut down all air-side economizer functions within the building manually (if building automation system is not programmed to do so)
- Have the building operator shut down all outside air intakes and exhaust fans manually (if building automation system is not programmed to do so).
- Secure all entrances to the building
- Monitor public health information system via radio or television to determine when the area is safe again and what medical counsel may be needed.

**Emergency Actions to take in case of Internal Release of a Biological Weapon:**

The specific course of action a building owner should take with an Internal Release should be determined based on the design of the HVAC systems in the building. If the building has centralized air handling equipment (i.e. several floors are served by a centralized air handler) then a procedure as outlined directly below should be followed to “flush” the building with fresh (and presumably uncontaminated) air. It should be determined, however, that the air outside of the building has not been contaminated before initiating these courses of action.

- Initiate Emergency Action Plan.
- Notify occupants that they should leave the building as quickly and as orderly as possible once it is certain that no biological weapons have been released externally.
- Have building operator press the “Internal Release Emergency Program” button programmed into the building automation system if applicable. This action should put the building into a fresh air “flush” mode that will automatically open up all outside air dampers, turn on all exhaust fans and turn on any applicable air-side economizer.
- Notify health services and the FBI.

- Monitor public health information system via radio or television to determine when the area is safe again and what medical counsel may be needed.

If the building has separate air handling systems with minimal outside air on each floor, then an “isolation” strategy should be implemented. This strategy would entail shutting down all HVAC systems completely thereby reducing the possibility that contaminated air could travel to uncontaminated areas. If the building HVAC system design allows, only the isolated area where the release occurred should be flushed with fresh air. The occupants should be evacuated as soon as possible. Many large buildings have smoke partitions that are required to have dampers with operators at all penetrations. It would be relatively easy to include a link from these smoke dampers to a control system that would close all of them in an emergency. Some buildings also have emergency smoke evacuation systems that could also be utilized to limit exposure.

**More Information:**

If you would like more specific recommendations for your particular building please contact your current HVAC service provider, or contact Aircond Corporation at 1-800-768-2472.

If you would like more information or recommendations from other sources regarding biological and/or chemical weapons protection, please go to the following websites:

Federal Bureau of Investigation: [www.fbi.gov](http://www.fbi.gov)

Centers for Disease Control: [www.cdc.gov](http://www.cdc.gov)

Building Owners and Managers Association: [www.boma.org](http://www.boma.org)