Guidance for Protecting Building Environments From Airborne Chemical, Biological, or Radiological Attacks

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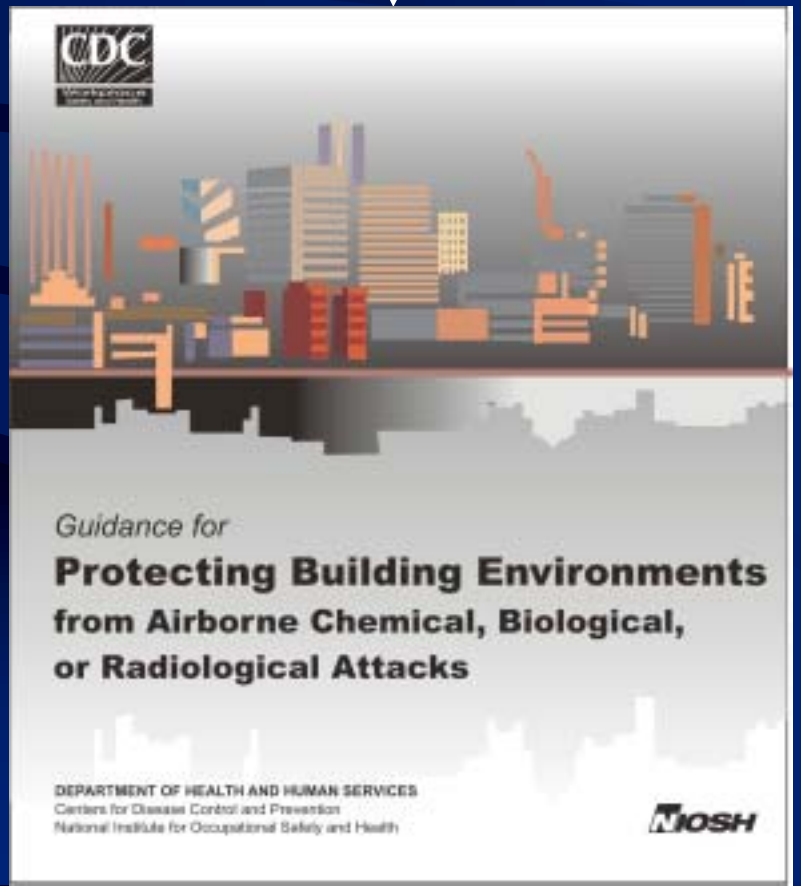
A Merging of Missions

NIOSH Building Vulnerability Evaluations

OHS Building Air Protection Workgroup



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Document History

- Building Vulnerability Evaluations
  - NIOSH Activity (ongoing)
    - 59 buildings (Nov '01 – Apr '02)
    - 15 NIOSH engineers & scientists
    - 1 Scientist from Sandia National Lab
    - 1 Industrial Hygienist from ATSDR
    - Vulnerabilities identified, recommendations provided to reduce vulnerabilities
    - Reports held confidential

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Document History

Office of Homeland Security: Building Air Protection Workgroup

- 1st Convened in Jan '02
- Purpose: Identify guidance on building protection issues associated with an airborne CBR attack
- Membership…

Building Air Protection Workgroup

-White House Office of Homeland Security (WG Chair)

-Dept. Of Defense (DARPA, DTRA, NAVFAC, SBCCOM, USACE)

-Dept. of Energy (DOE, LBNL)

-Dept. of Health and Human Services (CDC/NIOSH)

-U.S. Environmental Protection Agency

-U.S. General Services Administration

-Dept. of Commerce (NIST)

-Dept. of State

-U.S. Postal Service

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Document Scope

- Building Air Protection from terrorist release of airborne Chemical, Biological, or Radiological contaminant
- Provides hierarchy of reasonable recommendations implementable w/o undue delay
- Primarily directed to building owners, managers, facilities personnel

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Scope (continued)

- Covers Public, Private, Government Buildings.
  - -Office
  - -Retail
  - -Hospitals
  - -Public Venues
  - -Transportation Terminals
  - -Schools
- Does not cover:
  - -Military or Law Enforcement Facilities
  - - Subways
  - - Industrial Facilities
  - - Single-family or Low Occupancy Housing

Get Prepared: Know Your Building

- Understand how building systems were designed and currently function.
- Encourages a detailed building walkthrough:
  - Does installation resemble your design info.?
  - Building zoning, AHU locations, smoke control?
  - Mechanical condition of equipment?
  - Equipment appropriately installed/connected?
  - Filtration systems (type, efficiency, installation)?
  - Damper cond. & location (OA, RA, bypass, fire/smoke)
  - HVAC control systems, including fire response
  - Building access points, current security practices
  - ……

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Recommendations

- Non-mandatory
- Implementation Based Upon Building Security Assessments
- Recognized, not all recommendations applicable/feasible to all buildings
- Four Categories of recommendations
- Recommendations prioritized within category
- Highly Critical items annotated with “***” in the document

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Recommendation Categories

1. Things Not To Do
2. Physical Security
3. Ventilation & Filtration
4. Maintenance, Administration & Training

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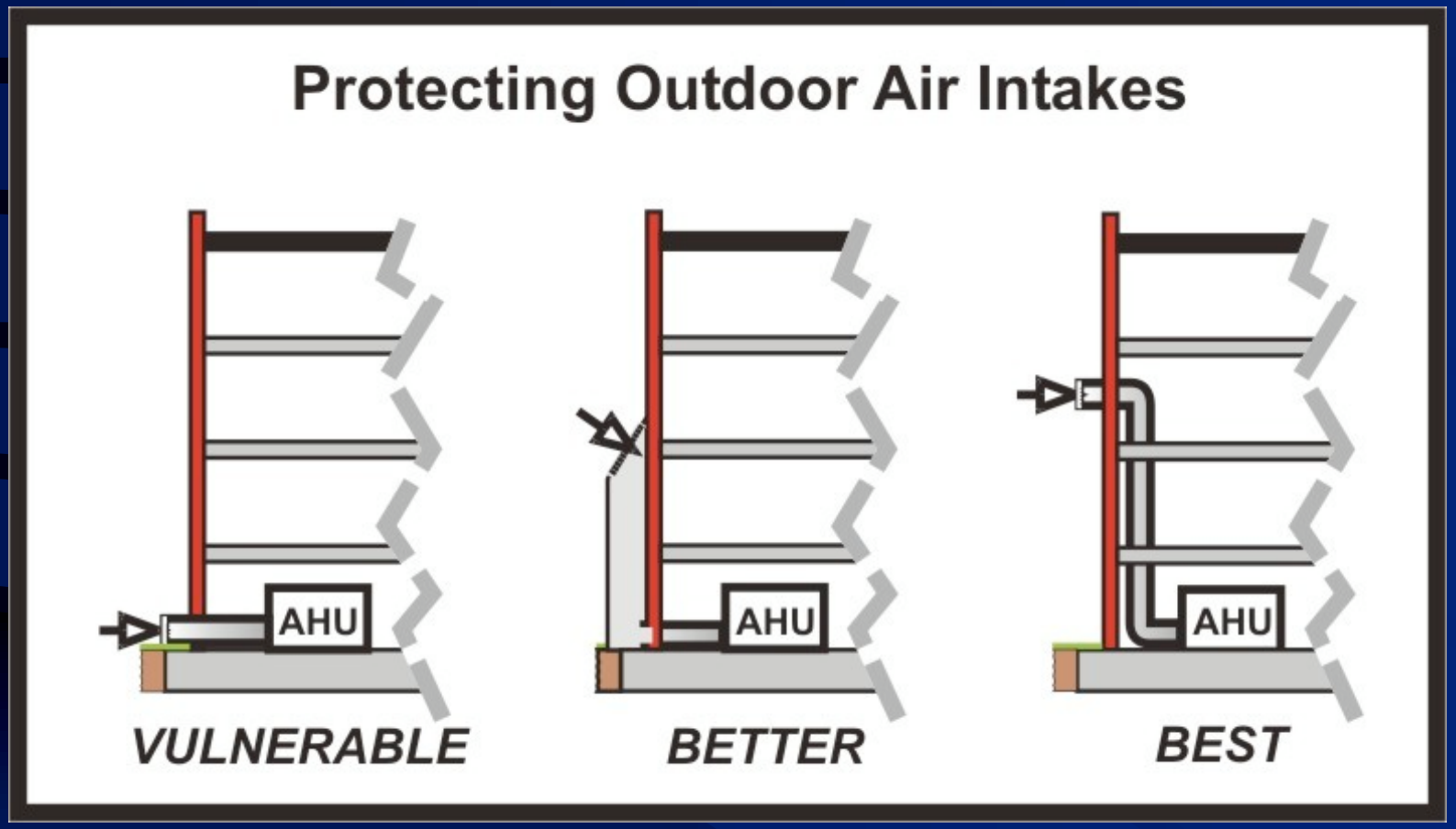
Things Not To Do

- Do not permanently seal outdoor air intakes.
- Do not modify HVAC systems (includes filter upgrades) without understanding the effects on building systems or occupants.
- Do not interfere with fire protection and life safety systems.

Physical Security

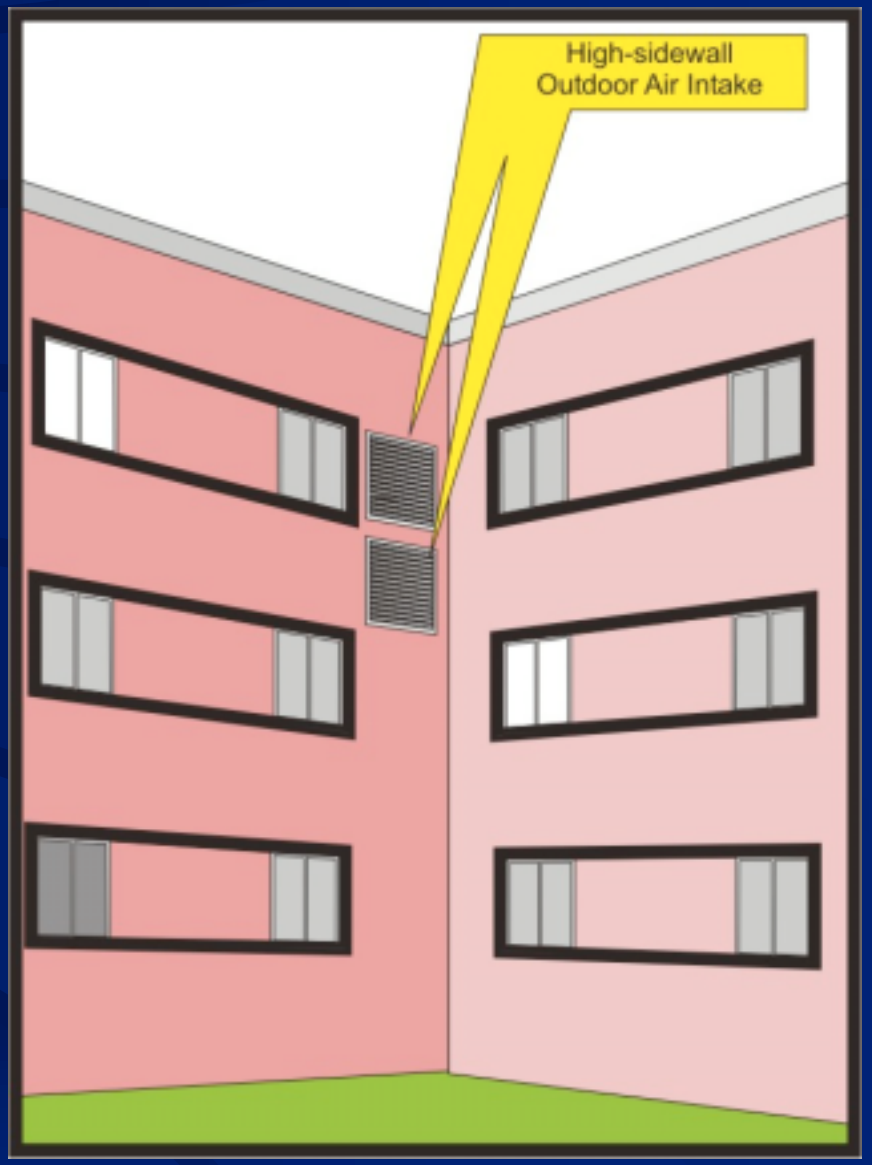
1. Prevent access to outdoor air intakes.
   - Relocate outdoor air intakes to inaccessible areas.
   - Build extensions to protect vulnerable intakes.
     - 12’ minimum
     - sloped metal mesh inlet
   - Security Zones: Place intake areas off-limits.
     - Enforce with guards, CCTV, proximity sensors

Secure Vulnerable Air Intakes



Relocation

Relocate OA intake to a high sidewall or <u>secure</u> roof



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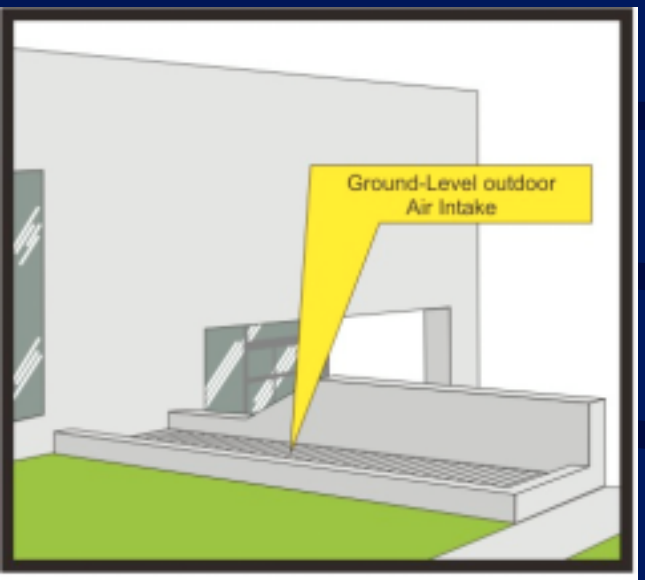
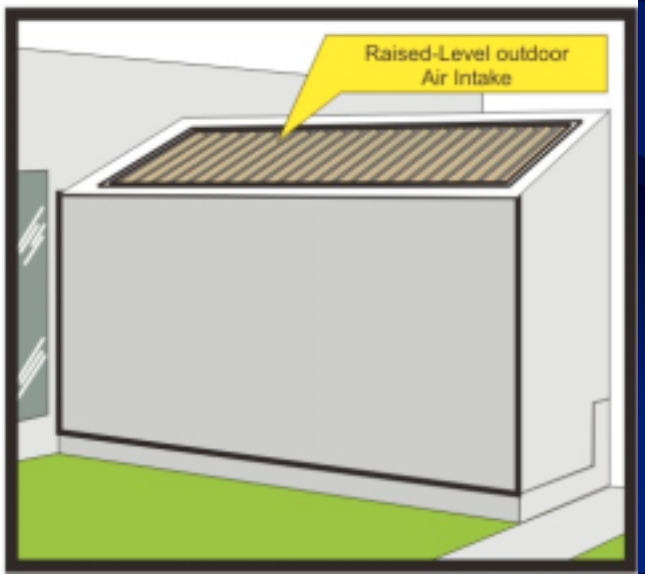
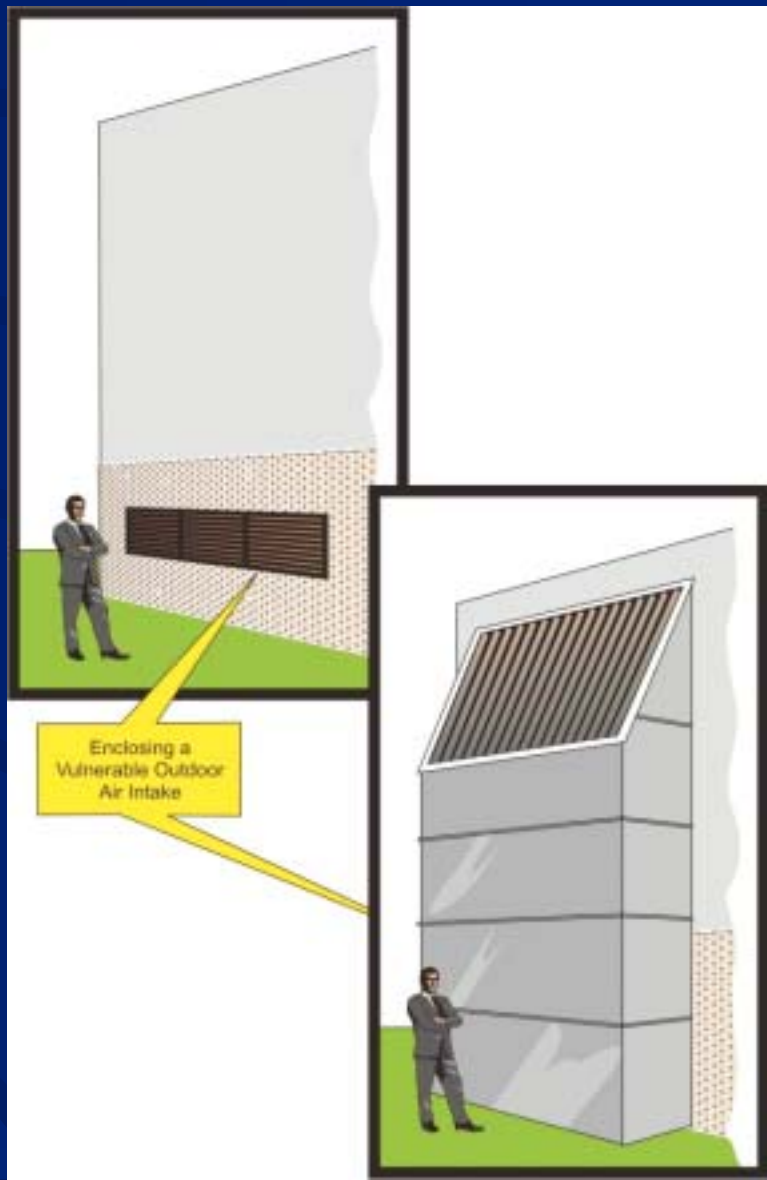
Build Intake Extensions

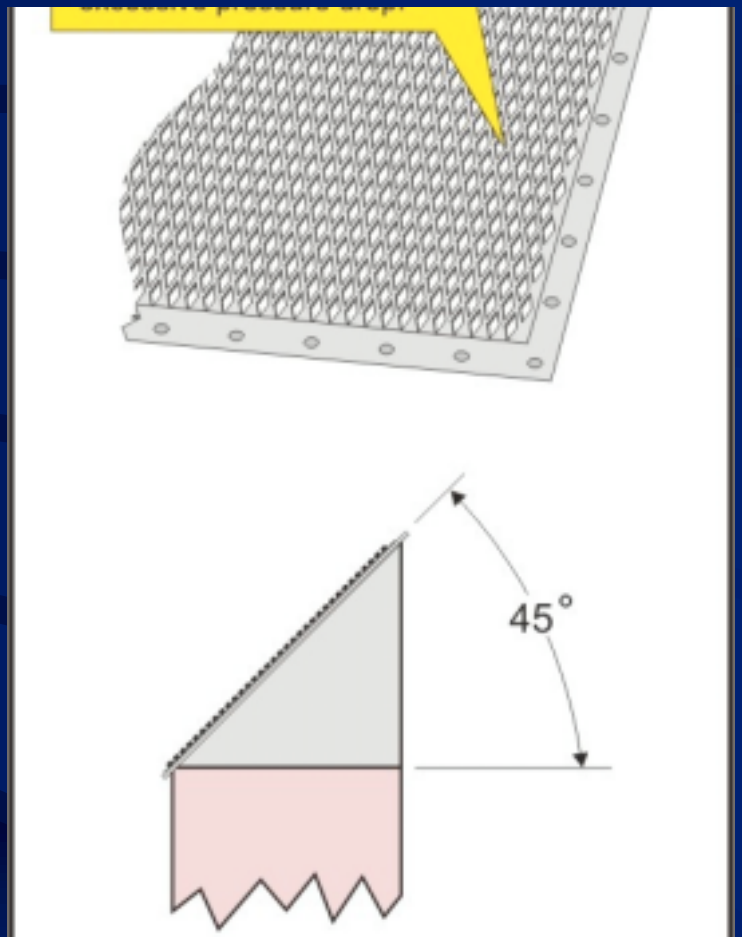






Extension Design Recommendations

- Lowest edge as high as poss. (≥ 12ft.)
- Sloped inlet (min. 45 deg. recommended)
- Metal mesh protecting inlet



This figure shows the minimum recommended inlet angle of 45 degrees. Extensions with greater inlet angles may provide greater inlet protection while increasing the inlet face area.

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Security Zones

Third choice in recommended security techniques for OA intakes (may be most feasible for some)

- Goal to keep public away from intake
- Iron fencing or similar see-through barriers preferred
- Open buffer zones to help make intrusion more obvious
- Enhance with physical security, CCTV, security lighting, intrusion alarms to increase security

Physical Security

2. Restrict access to mechanical areas and roofs
   - Mechanical areas located throughout building
   - Provide access to centralized mechanical systems (HVAC, elevator, water, etc.)
   - Unauthorized roof access can lead to building ingress and/or access to roof-mounted mechanical equipment
   - Mechanical systems are susceptible to tampering & contamination
   - Access to these areas should be strictly controlled, maintain log and accountability for keys, key codes, access cards etc.

Physical Security

3. Non- ”***” items
   - Increased security, guards, alarms, CCTV, fencing
   - Isolate lobbies, mailrooms, loading docks, storage
   - Secure return air grills (in public buildings)
   - Escorted or pre-approved maintenance contractors for sensitive areas
   - Restrict access to building information (design, operations, emergency plans, …)

Ventilation & Filtration

1. Evaluate HVAC control options (building specific)
   - System shutdown
   - Zone pressurization
   - Air Purge (e.g. 100% OA if internal release)
   - Specialized exhaust for some areas
   - Pressurized egress routes (may already exist)
   - Procedures & training incorporated into building's emergency response plan

Ventilation & Filtration

2. Assess Filtration
   - Intentionally not “Increase Filtration”.
   - Seek highest filtration efficiency compatible with HVAC system capabilities and design requirements.
   - Installation integrity potentially more important than rated efficiency.
   - Efficiency increase must apply to both size and physical state of contaminant to be effective.

     (e.g. Particulate filters vs chemical gas attack)
   - Know benefits & limitations of selected upgrades.

Ventilation & Filtration

Non- “***” items:

- Ducted and non-ducted return air systems
- Low-leakage, fast-acting dampers
- Building air tightness

Maintenance, Administration and Training

1. Emergency Response Plans, Policies, Procedures
   - All buildings should have current emergency plans
   - Incorporate CBR scenarios into plans
   - Coordinate with local emergency response personnel
   - Train & Rehearse
   - Limit distribution of plan details
   - Detail Communication Capabilities
     - Upgrade as necessary
     - Will likely need specific instructions for CBR event

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Maintenance, Administration and Training

2. HVAC maintenance staff training
   - System upgrades will require new training.

3. Preventive maintenance and procedures
   - Maintenance is critical to keep protective systems operational.
   - Regularly test strategic equipment

Conclusions

- Reducing vulnerability to CBR attack requires comprehensive approach.
- Protective measures should be based on threat profile and risk assessment (See references).
- Preventing access to vulnerable areas is critical.
- Recommendations will not eliminate risk, should reduce the likelihood and impact of a CBR attack.

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Acknowledgements

- NIOSH Building Vulnerability Teams
- OHS Building Air Protection Workgroup
- Numerous Government & Industry Reviewers & Contributors
- NIOSH Document Development Team (editorial, graphics, layout)

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by Winston Hall

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Guidelines Availability

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