
Laboratory Biosecurity Components – Part I

Laboratory Biosafety and Biosecurity Workshop

**Cairo, Egypt
3-5 April 2007**

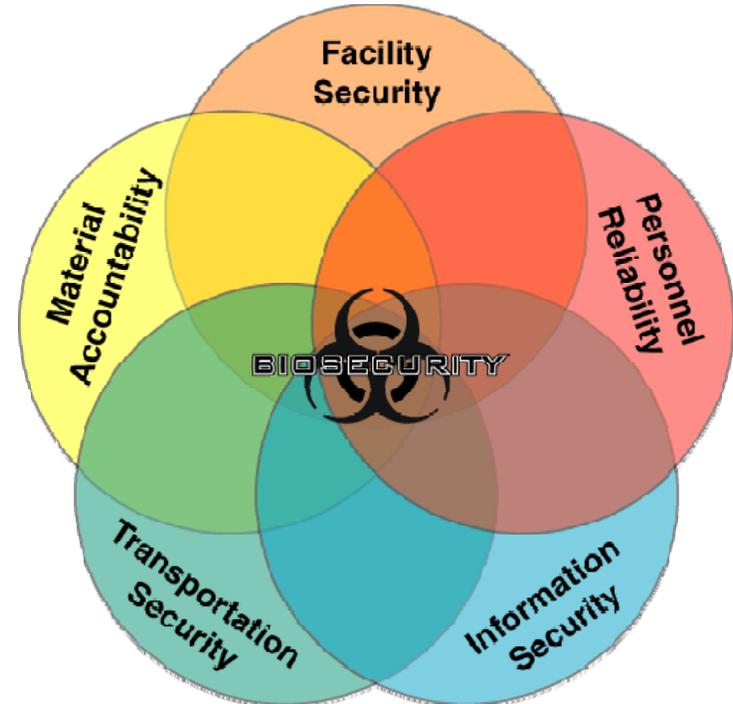
www.biosecurity.sandia.gov

SAND No. 2005-7121C

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Biosecurity System

- **Biosecurity system components**
 - Physical security
 - Personnel security
 - Material handling and control measures
 - Transport security
 - Information security
 - Program management practices
- **Each component implemented based on results of risk assessment**
- **In general, biosecurity for**
 - Moderate risk focuses on the insider
 - High risk focuses on both the insider and the outsider



Elements of a Physical Security System

- **Graded protection**
- **Access control**
- **Intrusion detection**
- **Response force**



Physical Security: Concentric Layers of Security

- **Property Protection Areas**

- **Low risk assets**

- Grounds
- Public access offices
- Warehouses

- **Limited Areas**

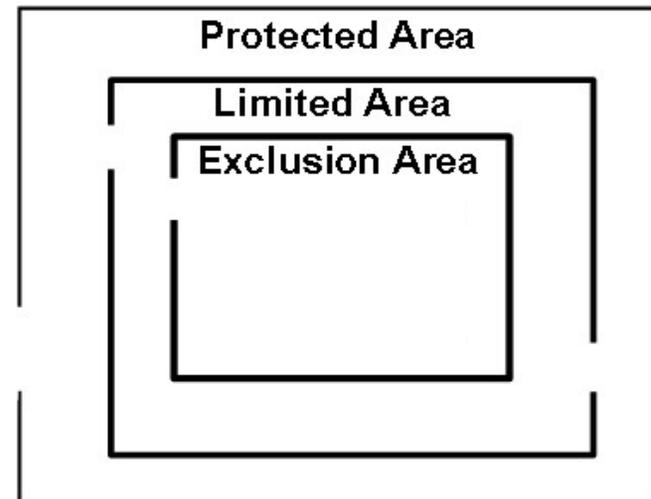
- **Moderate risk assets**

- Laboratories
- Sensitive or administration offices
- Hallways surrounding Exclusion Areas

- **Exclusion Areas**

- **High risk assets**

- High containment laboratories
- Computer network hubs



Physical Security: Property Protection Control

- **Fences**
 - **Mark the boundaries of your property**
 - **Announce your intention to protect the property**
 - **Elicit strong statement of intent from intruder**
 - **Terrain features can also serve this purpose**



Physical Security:

Limited and Exclusion Area Access Control

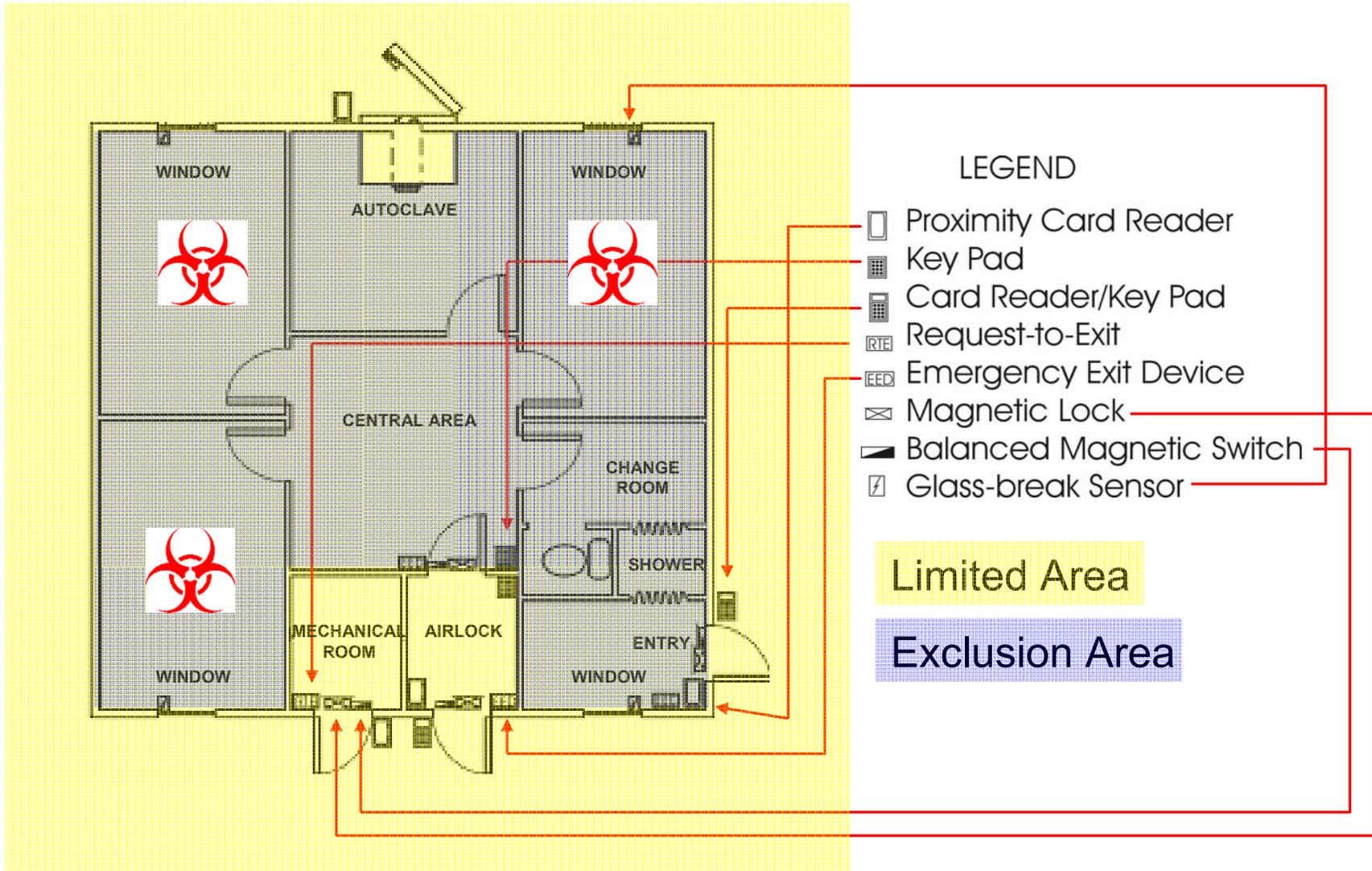
- **Access control ensures that only authorized individuals are allowed into certain areas**
 - Increasingly strict controls as you move toward higher risk assets
- **Limited Areas**
 - Unique item
 - Controlled possession
 - Electronic or physical key
- **Exclusion Areas**
 - Unique item
 - Unique knowledge
 - Controlled possession
 - Electronic key card and keypad or biometric deviceor
 - Controlled key and second individual to verify identity



Physical Security: Intrusion Detection and Response

- **Intrusion Detection**
 - Guards
 - Electronic sensors
- **Alarm Assessment**
 - Validation of violation before response
 - Can be direct (guards) or remote (video)
- **Response**
 - **On-Site Guard Force**
 - Supports electronic systems
 - Patrols or guards perimeter and buildings
 - Summons and directs local law enforcement
 - **Local law enforcement (police) support**
 - Reinforces or substitutes for on-site guard force
 - Memorandum of understanding

Physical Security: Example Laboratory Building



Physical Security: Procedures

- **Impose consequences for security violations**
- **Log personnel (including visitor) access to restricted areas**
- **Establish controls on animal and supply handling**
- **Enforce escort policies**
 - **Visitors**
 - **Maintenance and cleaning personnel**
 - **Delivery personnel**
- **Train personnel on what to do about:**
 - **Unrecognized persons**
 - **Unusual or suspicious activity**

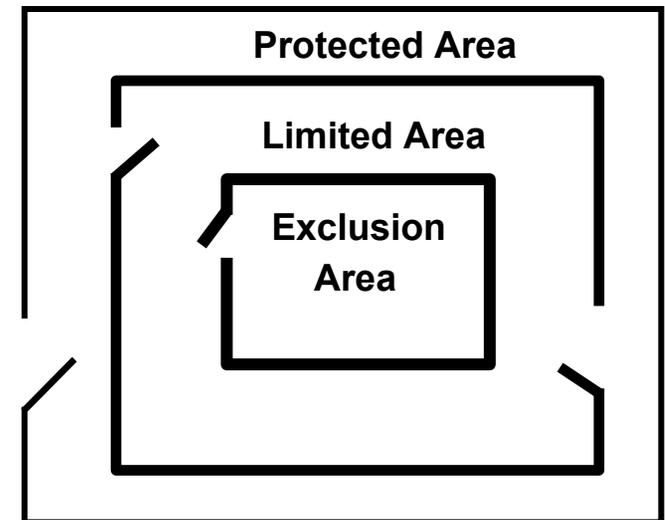
Physical Security: Performance Testing and Maintenance

- **Create security performance test plan and procedures**
- **Schedule periodic testing of hardware and policy implementation**
- **Schedule periodic testing of response force procedures**
- **Document test results**
- **Take corrective action**
 - **Schedule maintenance and repair of hardware**
 - **Corrective training and policy adjustments as appropriate for policy implementation failures**
 - **Corrective training and exercises for guard force**

Physical Security

- **Moderate**
 - Store and use pathogens (and infected animals) within Limited Areas
 - Restrict access using controlled keys and secured windows
 - Control visitors

- **High**
 - Store and use pathogens (and infected animals) within Exclusion Areas
 - Electronic Intrusion Detection System and/or guards
 - Controlled and authenticated key
 - Something you *have* (key) plus something you *know* (PIN)
 - Restrict and control visitors
 - Maintain records of entry/exit



Elements of a Personnel Security Program

- **Personnel Screening**
- **Badges**
- **Visitor Control**
- **Training**



Personnel Security: Screening

- **Conduct screening for authorized individuals**
 - **Degree of scrutiny commensurate with level of risk associated with the position**
 - **Need for unescorted access to restricted areas**
 - **Types of assets held in the restricted areas**
 - **Level of authority in association with high risk materials**

- **Mechanisms**
 - **Verify credentials**
 - **Check references**
 - **Criminal history**
 - **In-depth background investigation**



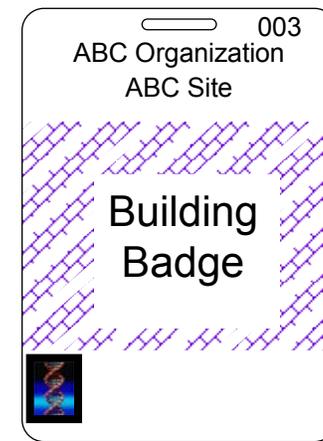
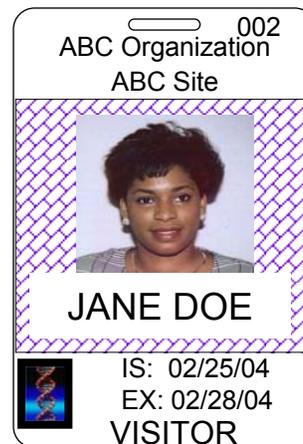
Personnel Security: Visitor Controls

- **Types**
 - **Personal Visitors**
 - Family members
 - **Casual Visitors**
 - Tours, seminars
 - Equipment repair technicians
 - **Working Visitors**
 - Visiting researchers
 - Facility maintenance personnel

- **Controls**
 - All visitors should have a host at the facility
 - Visitors should be escorted in restricted areas

Personnel Security: Badges

- Badges should be issued to those individuals authorized to be in restricted areas



- Badge return
 - Upon employee termination
 - Daily or at the conclusion of a limited term for visitors
- Report lost or stolen badges

Personnel Security: In-Processing and Out-Processing

- **In-Processing**
 - Complete all required forms, safety training, security training and immunizations as applicable for work environment

- **Out-Processing**
 - Access changes or termination
 - Retrieve property
 - Deactivate computer and electronic access accounts



Personnel Security: Employee Assistance Program

- **Provide resources to address problems associated with a variety of personal issues**
 - **Marital issues**
 - **Family issues**
 - **Eldercare/childcare issues**
 - **Job conflict**
 - **Grief**
 - **Financial issues**
 - **Legal issues**
 - **Stress**

Personnel Security: Security Violations

- **Security violations should be ranked according to the effects upon the organization**

Organization ABC keeps large quantities of HMUR agents in Building 1, Room 123, Freezer A.



Personnel Security

- **Moderate**
 - **Background investigation**
 - Criminal history
 - Verifiable compliance with rules and regulations
 - **Drug test**

- **High**
 - **Moderate plus**
 - Personal and associate interviews
 - Credit history
 - Terrorist/extremist/criminal affiliation
 - Periodically reinvestigate



Information Security

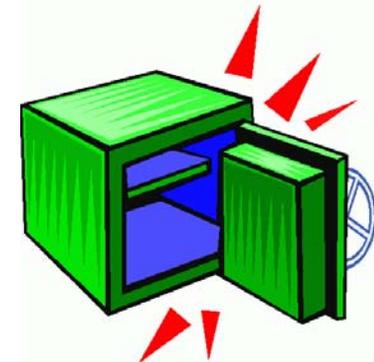
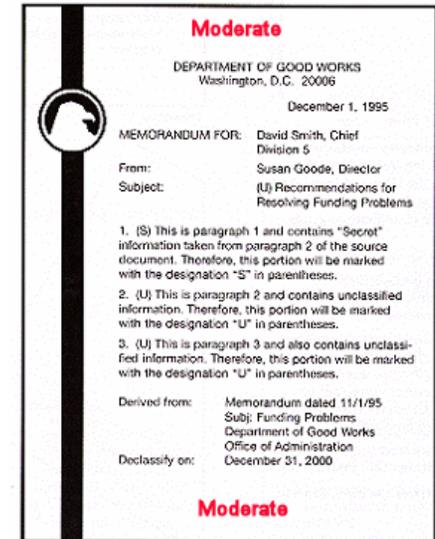
- **Protect information that is too sensitive for public distribution**
 - Label information as restricted
 - Limit distribution
 - Restrict methods of communication
 - Implement network and desktop security

- **Biosecurity-related sensitive information**
 - Security of dangerous pathogens and toxins
 - Risk assessments
 - Security system design
 - Access authorizations



Information Security: Identification, Control, and Marking

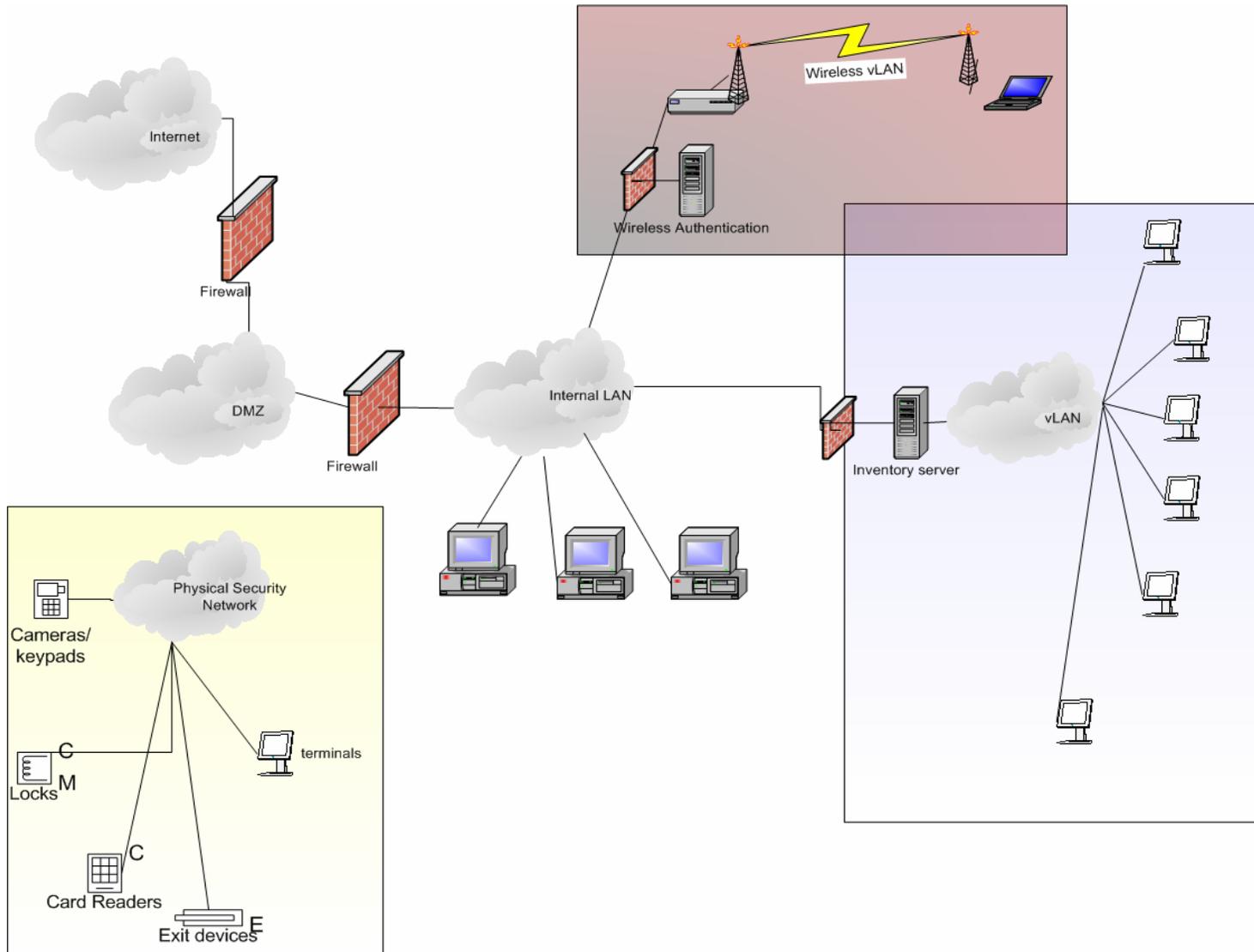
- **Identification**
 - **Designated sensitivity level**
 - **A review and approval process aids in the identification of sensitivities**
 - Critical prior to public release of information
- **Control**
 - **Individual responsible for control of sensitive information**
 - Physical security
 - Communication security
 - **In the US, in order to refuse public access upon request, information must be exempt from the Freedom of Information Act**
- **Marking**
 - **Sensitivity level designation**
 - Top and bottom of each page / cover sheet
 - **Marking and control methods should be well understood by those working with information**



Information Security: Communication and Network Security

- **Communication Security**
 - Mail, email, or fax security is required
 - Limited discussions in open areas
 - Information should only be reproduced when needed and each copy must be controlled as the original
- **Network Security**
 - Firewalls
 - User authentication
 - Virus protection
 - Layered network access
 - Desktop security
 - Remote and wireless access controls
 - Encryption
 - Authentication

Example Network Design



Components of Biosecurity

