VARIANCE FEES
MGO $50.00
COMM $490.00
Priority – Double above

Amount Paid $490.00 5-7-08

PETITION FOR VARIANCE APPLICATION

City of Madison
Neighborhood Preservation
& Inspection Division
215 Martin Luther King Jr. Blvd.
Madison, WI 53703
(608) 266-4568

Name of Owner Greg Hyer Associate Director	Project Description Alteration and Addition	Agent, architect, or engineering firm Steve Freson Flad Architects
Company (if applies) University Research Park, Inc		No. & Street 644 Science Drive
No. & Street 510 Charmany Drive, Suite 250	Tenant name (if any) Influenza Research Institute	City, State, Zip Code Madison, WI 53711
City, State, Zip Code Madison, WI 53719	Building Address 575 Science Drive, Madison, WI 53744	Phone 608-238-2661
Phone 608-441-8020		Name of Contact Person Lauri Kempfer

1. The rule being petitioned reads as follows: (Cite the specific rule number and language. Also, indicate the nonconforming conditions for your project.)
Section 1003.3.1.8 Locks and Latches

See Attached.

2. The rule being petitioned cannot be entirely satisfied because:
See Attached.

3. The following alternatives and supporting information are proposed as a means of providing an equivalent degree of health, safety, and welfare as addressed by the rule:

See Attached.

4. See Attachments 1, 2, 3 and 4.

Note: Please attach any pictures, plans, or required position statements.

VERIFICATION BY OWNER – PETITION IS VALID ONLY IF NOTARIZED AND ACCOMPANIED BY A REVIEW FEE AND ANY REQUIRED POSITION STATEMENTS.

Note: Petitioner must be the owner of the building. Tenants, agents, contractors, attorneys, etc. may not sign the petition unless a Power of Attorney is submitted with the Petition for Variance Application.

GREG HYER, being duly sworn, I state as petitioner that I have read the foregoing
Print name of owner
petition, that I believe it to be true, and I have significant ownership rights in the subject building or project.

Signature of owner: Greg Hyer ASSOCIATE DIRECTOR	Subscribed and sworn to before me this date: May 5, 2008
Notary public: Julie M. Diemer	My commission expires: 2-1-2009 STATE OF WISC. COUNTY OF DANE

NOTE: ONLY VARIANCES TO COMM CODES ARE REQUIRED TO BE NOTARIZED.

Attachments to:
City of Madison -- Petition for Variance Application: Locks and Latches
Influenza Research Institute, 575 Science Drive, Madison WI 53744
Following is supporting information to be attached to Petition for Variance Application
Applicable Code is: Wisconsin Enrolled Commercial Building Code, prior to March 1, 2008

1. The rule being petitioned reads as follows: ***Section 1003.3.1.8 Locks and latches. Egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort.*** *(ALSO, indicate the nonconforming conditions for your project.)*

Code section being petitioned: Section 1003.3.1.8 Locks and latches:
This code section requires that egress doors shall be readily openable from the egress side without the use of a key or "special knowledge or effort".

- Within Section 1003.3.1.8 there are four exceptions, but none of the exceptions apply to this building. This code section applies to internally located doors that provide exit access within the building, and exit access is required at all times -- during normal building operations and also during any emergency building operations. None of the doors being petitioned are doors to the exterior.

Nonconforming condition / issue being petitioned:
Within the building, there are several access-controlled doors providing security to prevent unauthorized entry into bio-safety secure laboratory suites. These doors are locked at all times for entry into the suites and cause no code violation for locked entry. These same doors providing exit access out of the suites are the subject of this petition for variance as follows:

- Egress is provided at all times out of the secure bio-safety suites; but because these doors are magnetically locked, operation of the hardware requires some "special knowledge or effort", which will be provided by in-house training, so that those who will be authorized to enter the suites will understand how to properly operate these doors for entry into and exit access out of the suites. Because these security doors require some training for proper operation, these doors do not entirely meet all the criteria of Section 1003.3.1.8.

2. The rule being petitioned cannot be entirely satisfied because:

Access Security is required for BSL3a Suites:

- **Federal security guidelines** required BSL3a facilities to follow certification and licensing requirements for this facility. Doors being petitioned are required to be secured and locked for entry into the secure suites at all times, because these suites contain select biological agents. People having authorized access to the bio-secure BSL-3E and BSL-3AG classified suites can enter and exit only through vestibules having two interlocking doors equipped with electro-magnetic (MAG) locks.
- **Doors cannot be remotely or automatically unlocked**: To enforce the mission of bio-security, doors are not permitted to be unlocked remotely or automatically, as unauthorized entry would then be possible. Entry doors cannot be automatically unlocked for power outage, or by smoke detection or fire alarm. Unlocking for entry can only be done by persons authorized to posses secure keying and/or recognition as authorized by use of biometric security access system. The following Federal regulations will not allow the locks to be automatically released in the event of a fire or loss of power:
    - CDC: The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188, June 12, 2002) requires

institutions approved of possession of specific select pathogen agents of high consequence, as defined by USDA, to be accountable per regulatory oversight, and which requires limiting access to them to persons who have legitimate need to handle or use such agents. Access control of doors into select agent areas is by use of keys or other security devices to permit entry. Further information is contained in Reference Document: CDC MMWR 2002; 51 (No. RR-19) as **Attachment 1**.

- USDA ARS (Agricultural Research Service) Manual 242.1 – ARS Facility Design Standards, Chapter 9 – Biohazard Containment Design: Feature number 2 (BMBL) and Section 9.4.4 'C' feature number 2 (ARS 242.1): "Access doors are self-closing and lockable. Emergency exit doors are provided, but are locked on the outside against unauthorized use." Per Section 9.5.2: "Facility doors shall have locks and/or key card access to control admittance." See **Attachment 2**.

Two doors in tandem -- only one door can be open at a time:

- Access into the bio-secure area is through access-controlled doors at both ends of a security vestibule. Authorized access into the vestibule is by use of key and/or biometric access security system. Persons authorized access may personally enter or others may be escorted by an authorized person into the bio-secure area. The vestibule doors are interlocked – one door remains locked while the other door is in use. This door arrangement provides two levels of security and helps maintain negative air pressurization within the bio-suite. Since only one door is permitted open at a time, the other door cannot open until the first door is closed. This is true for both entry and exit access. These doors are monitored by the security system. If one door is ajar, the door position monitor will sense that the door is not closed, and will prevent the second door from opening. This condition is true for both entry and exit access, and requires some special knowledge for operation, which in-house training will provide.
- Magnetic locks are used on these security doors to assure that both security doors will positively close and do not remain ajar.

Hardware operation requires "special knowledge or effort":

- Egress out of the bio-secure suite is accomplished with a request to exit signal switch located within the hardware. Additionally, all magnetically locked doors out of the bio-secure suite are also equipped with an emergency exit button which will override the interlocking mechanism for a programmable period of time -- during which an occupant can exit the space without any time delay. Power is protected at all times by battery back-up and emergency generator systems.
- Once inside the bio-secure area, request to exit is either by use of the door latching handle or emergency exit button located adjacent to the doors.

3. The following alternatives and supporting information are proposed as a means of providing an equivalent degree of health, safety, and welfare as addressed by the rule:

Training will be provided:

- The Campus bio-safety officer will conduct training and periodic re-training to maintain building certification. All researchers using the bio-secure suites will be specially trained in this environment and will be familiar with the select-agent suites. They will be familiar with the locations of security doors and proper operation for entrance and egress. Personnel who are trained and authorized for entry will have

the special knowledge required to properly operate the hardware for exit access. See **Attachment 3**: Summary of security hardware egress operation.

- Authorized key-holders will be available from Campus Police and authorized personnel on site can escort emergency responders into and out of bio-secure zones.
- Other BSL-3 secure areas on Campus have similar security requirements. Similarly, training for authorized entry and exit access using magnetic security hardware is required and arranged for these other facilities.

General public will not have access to these secure areas:

- The intent of the code is met by limiting only those persons who already have been trained in the special knowledge required for proper hardware operation for secure entry and exit access.

Signage:

- A sign will be posed on the wall next to each exit access door to provide a summary of proper door operation for exit access.

Fire Extinguishing Equipment:

- Portable fire extinguishers will be located within the select agent spaces and are readily available for use by occupants inside the security zones. The quantities of flammable and combustible materials are expected to be low density within the suites.

Emergency and battery back-up power capability:

- During an emergency alarm or loss of power, the magnetic locks remain energized and doors remain locked for entry security. Battery backup power is provided to the security system and magnetic locking mechanism for immediate door operation if the house power is lost; and the emergency generator power system will provide a longer-term power outage. Therefore, entry and exit access capability is always provided.

4. *See the following attachments to be considered part of the petition for variance application:*

Attachment 1: CDC MMWR 2002; 51 (No. RR-19)

Attachment 2: USDA ARS (Agricultural Research Service) Manual 242.1, selected sections.

Attachment 3: Summary of security hardware egress operation.

Attachment 4: Madison Fire Department Position Statement.

ATTACHMENT 4

Owner's Name	Project Location	Plan Number
Greg Hyer, Associate Director	575 Science Drive, Madison	

Page 2 of _____

Fire Department Position Statement

To be completed for fire or life-safety related variances requested from Comm 61-65, Comm 10, Comm 16, and other fire related requirements.

I have read the application for variance and recommend: (check appropriate box)
☐ Approval ☒ Conditional Approval ☐ Denial ☐ No Comment

Explanation for recommendation including any conflicts with local rules and regulations and suggested conditions:
Madison Fire supports this variance as establishing an equivalent means of safety based on the following items stated in the petition: a) Signage @ the emergency exit button indicating operation; b) limited access to this area of building; c) doors monitored by UWPD; d) interlocking of doors is necessary for bio containment. The one condition is that the periodic training on emergency operations shall occur at least annually, along with fire drills.

Fire Department Name and Address
City of Madison 325 W. Johnson St.

Name of Fire Chief or Designee (type or print)	Telephone Number
Bill Sullivan	(608) 261-9658
Signature of Fire Chief or Designee	Date Signed
	4-15-08

MUNICIPAL BUILDING INSPECTION RECOMMENDATION

To be completed for variances requested from Comm 20-23. Also to be used for Comm 16 electrical petitions, if Comm 61-65 plan review is by municipality or orders are written on the building under construction; optional in other cases. Please submit a copy of the orders

I have read the application for variance and recommend: (check appropriate box)
☐ Approval ☐ Conditional Approval ☐ Denial ☐ No Comment

Explanation for recommendation including any conflicts with local rules and regulations and suggested conditions:

Municipality Exercising Jurisdiction

Name and Address of Municipal Official (type or print)	Telephone Number of Enforcement Official
Signature of Municipal Enforcement Official	Date Signed

SBD-9890X (R. 10/2007)

ATTACHMENT 1

MMWR™

Morbidity and Mortality Weekly Report

Recommendations and Reports | December 6, 2002 / Vol. 51 / No. RR-19

Laboratory Security and Emergency Response Guidance for Laboratories Working with Select Agents

CENTERS FOR DISEASE CONTROL AND PREVENTION

SAFER • HEALTHIER • PEOPLE™

Laboratory Security and Emergency Response Guidance for Laboratories Working with Select Agents

Prepared by
Jonathan Y. Richmond, Ph.D.[1]
Shanna L. Nesby-O'Dell, D.V.M.[2]
[1]*Office of the Director*
Office of Health and Safety (Retired)
[2]*Office of the Director*
Office of Health and Safety

Summary

In recent years, concern has increased regarding use of biologic materials as agents of terrorism, but these same agents are often necessary tools in clinical and research microbiology laboratories. Traditional biosafety guidelines for laboratories have emphasized use of optimal work practices, appropriate containment equipment, well-designed facilities, and administrative controls to minimize risk of worker injury and to ensure safeguards against laboratory contamination.

The guidelines discussed in this report were first published in 1999 (U.S. Department of Health and Human Services/CDC and National Institutes of Health. Biosafety in microbiological and biomedical laboratories [BMBL]. Richmond JY, McKinney RW, eds. 4th ed. Washington, DC: US Department of Health and Human Services, 1999 [Appendix F]). *In that report, physical security concerns were addressed, and efforts were focused on preventing unauthorized entry to laboratory areas and preventing unauthorized removal of dangerous biologic agents from the laboratory. Appendix F of BMBL is now being revised to include additional information regarding personnel, risk assessments, and inventory controls. The guidelines contained in this report are intended for laboratories working with select agents under biosafety-level 2, 3, or 4 conditions as described in Sections II and III of BMBL. These recommendations include conducting facility risk assessments and developing comprehensive security plans to minimize the probability of misuse of select agents.*

Risk assessments should include systematic, site-specific reviews of 1) physical security; 2) security of data and electronic technology systems; 3) employee security; 4) access controls to laboratory and animal areas; 5) procedures for agent inventory and accountability; 6) shipping/transfer and receiving of select agents; 7) unintentional incident and injury policies; 8) emergency response plans; and 9) policies that address breaches in security. The security plan should be an integral part of daily operations. All employees should be well-trained and equipped, and the plan should be reviewed annually, at least.

Introduction

Traditional laboratory biosafety guidelines have emphasized use of optimal work practices, appropriate containment equipment, well-designed facilities, and administrative controls to minimize risks of unintentional infection or injury for laboratory workers and to prevent contamination of the outside environment (*1*). Although clinical and research microbiology laboratories might contain dangerous biologic, chemical, and radioactive materials, to date, only a limited number of reports have been published of materials being used intentionally to injure laboratory workers or others (*2–7*). However, recently, concern has increased regarding possible use of biologic, chemical, and radioactive materials as terrorism agents (*8,9*). In the United States, recent terrorism incidents (*10*) have resulted in the substantial enhancement of existing regulations and creation of new regulations governing laboratory security to prevent such incidents.

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (the Act) required institutions to notify the U.S. Department of Health and Human Services (DHHS) or the U.S. Department of Agriculture (USDA) of the possession of specific pathogens or toxins (i.e., select agents†), as defined by DHHS, or certain animal and plant pathogens or toxins (i.e., high-consequence pathogens), as defined by USDA. The Act provides for expanded regulatory oversight of these agents and a process for limiting access to them to persons who have a legitimate need to handle or use such agents. The Act also requires specified federal agencies to

The material in this report originated in the Office of Health and Safety, Robert H. Hill, Jr., Ph.D., Acting Director.

* Public Law 107–188, June 12, 2002.

† Throughout this report, the term *select agent* refers to specifically regulated pathogens and toxins as defined in Title 42, Code of Federal Regulations (CFR), Part 73, including pathogens and toxins regulated by both DHHS and USDA (i.e., overlapping agents and toxins). The reader should note that 42 CFR Part 73 has not been published yet, and is still under federal review with anticipated publication in December 2002.

withhold from public disclosure, among other requirements, site-specific information regarding the identification of persons, the nature and location of agents present in a facility, and the local security mechanisms in use. In addition, the Uniting and Strengthening America by Providing Appropriate Tools Required To Intercept and Obstruct Terrorism (USA PATRIOT) Act of 2001[§] prohibits restricted persons from shipping, possessing, or receiving select agents. Violation of either of these statutes carries criminal penalties.

Appendix F of the 4th edition of the CDC/National Institutes of Health, Biosafety in Microbiological and Biomedical Laboratories (BMBL) was the first edition to address laboratory security concerns (*1*). However, that publication primarily addressed physical security concerns (e.g., preventing unauthorized entry to laboratory areas and preventing unauthorized removal of dangerous biologic agents from the laboratory). The guidelines presented here are provided to assist facility managers with meeting the regulatory mandate of 42 Code of Federal Regulation (CFR) 73 and, therefore, include information regarding personnel, risk assessments, and inventory controls. These guidelines are intended for laboratories where select agents are used under biosafety levels (BSL) 2, 3, or 4 as described in Sections II and III of BMBL. Appendix F of BMBL is being revised to include consideration of the following biosecurity policies and procedures:

- risk and threat assessment;
- facility security plans;
- physical security;
- data and electronic technology systems;
- security policies for personnel;
- policies regarding accessing the laboratory and animal areas;
- specimen accountability;
- receipt of agents into the laboratory;
- transfer or shipping of select agents from the laboratory;
- emergency response plans; and
- reporting of incidents, unintentional injuries, and security breaches.

Definitions

Biosafety: Development and implementation of administrative policies, work practices, facility design, and safety equipment to prevent transmission of biologic agents to workers, other persons, and the environment.

Biosecurity: Protection of high-consequence microbial agents and toxins, or critical relevant information, against theft or diversion by those who intend to pursue intentional misuse.

Biologic Terrorism: Use of biologic agents or toxins (e.g., pathogenic organisms that affect humans, animals, or plants) for terrorist purposes.

Responsible official: A facility official who has been designated the responsibility and authority to ensure that the requirements of Title 42, CFR, Part 73, are met.

Risk: A measure of the potential loss of a specific biologic agent of concern, on the basis of the probability of occurrence of an adversary event, effectiveness of protection, and consequence of loss.

Select agent: Specifically regulated pathogens and toxins as defined in Title 42, CFR, Part 73, including pathogens and toxins regulated by both DHHS and USDA (i.e., overlapping agents or toxins).

Threat: The capability of an adversary, coupled with intentions, to undertake malevolent actions.

Threat assessment: A judgment, based on available information, of the actual or potential threat of malevolent action.

Vulnerability: An exploitable capability, security weakness, or deficiency at a facility. Exploitable capabilities or weaknesses are those inherent in the design or layout of the biologic laboratory and its protection, or those existing because of the failure to meet or maintain prescribed security standards when evaluated against defined threats.

Vulnerability assessment: A systematic evaluation process in which qualitative and quantitative techniques are applied to arrive at an effectiveness level for a security system to protect biologic laboratories and operations from specifically defined acts that can oppose or harm a person's interest.

Risk Assessment

Recommendation: Conduct a risk assessment and threat analysis of the facility as a precursor to the security plan.

Background: In April 1998, the General Accounting Office issued a report regarding terrorism (*11*). A key finding of that report was that threat and risk assessments are widely recognized as valid decision-support tools for establishing and prioritizing security program requirements. A threat analysis, the first step in determining risk, identifies and evaluates each threat on the basis of different factors (e.g., the capability and intent to attack an asset, the likelihood of a successful attack, and the attack's probable lethality). Risk management is the deliberate process of understanding risk (i.e., the likelihood that a threat will harm an asset with certain severity of

[§] Public Law 107–56, October 26, 2001.

consequences) and deciding on and implementing actions to reduce that risk. Risk management principles are based on acknowledgment that 1) although risk usually cannot be eliminated, it can be reduced by enhancing protection from validated and credible threats; 2) although threats are possible, certain threats are more probable than others; and 3) all assets are not equally critical. Therefore, each facility should implement certain measures to enhance security regarding select agents. The following actions should assist decision-makers in implementing this recommendation:

- Each facility should conduct a risk assessment and threat analysis of its assets and select agents. The threat should be defined against the vulnerabilities of the laboratory to determine the necessary components of a facility security plan and system (*12,13*).
- The risk assessment should include a systematic approach in which threats are defined and vulnerabilities are examined; risks associated with those vulnerabilities are mitigated with a security systems approach (*12,13*).
- Ensure the security plan includes collaboration between senior management, scientific staff, human resource officials, information technology (IT) staff, engineering officials, and security officials. This coordinated approach is critical to ensuring that security recommendations provide a reasonable and adequate assurance of laboratory security without unduly impacting the scientific work.

Facility Security Plans

Recommendation: Establish a facility security plan.

- Each facility should develop a comprehensive security plan that complies with 42 CFR Part 73 and reviews the need for policies in
  - — physical security;
  - — data and IT system security;
  - — security policies for personnel;
  - — policies for accessing select agent areas;
  - — specimen accountability;
  - — receipt of select agents into the laboratory;
  - — transfer or shipping of select agents from the laboratory;
  - — emergency response plans; and
  - — reporting of incidents, injuries, and breaches.
- Develop security policies based on site-specific assessments. Security plans should include measures that address physical security of building and laboratory areas. Policies should also address concerns associated with access, use, storage, and transfer of sensitive data. If sensitive electronic data are present, IT specialists should assess the security of hardware and software products in addition to the security of local area networks.
- Review safety, security, and IT policies and procedures at least annually for consistency and applicability. These procedures should also be reviewed after any incident or change in regulations. Necessary changes should be incorporated into the revised plans and communicated to all.
- Laboratory supervisors should ensure that all laboratory workers and visitors understand security requirements and that all employees are trained and equipped to follow established procedures. The security plan should be an integral part of daily operations. New employees should receive training when they first begin work, and all employees should receive training at least annually thereafter. Training should be updated as policies and procedures change. All training should be documented by maintaining records of training schedules and employee attendance.
- Security plans should receive periodic performance testing to determine their effectiveness. Test procedures can vary from a simple check of keys, locks, and alarms to a full-scale laboratory or facility exercise.

Security Policies for Personnel

Recommendation: Establish security-related policies for all personnel.

- Honest, reliable, and conscientious workers represent the foundation of an effective security program. Facility administrators and laboratory directors should be familiar with all laboratory workers.
- Establish a policy for screening employees who require access to select agent areas to include full- and part-time employees, contractors, emergency personnel, and visitors. Additional screening might be necessary for employees who require access to other types of sensitive or secure data and work areas. These screening procedures should be commensurate with the sensitivity of the data and work areas (e.g., federal security clearances for government employees and contractors).
- Ensure that all workers approved for access to select agents (e.g., students, research scientists, and other short-term employees) wear visible identification badges that include, at a minimum, a photograph, the wearer's name, and an expiration date. Facility administrators should consider using easily recognizable marks on the identification badges to indicate access to sensitive or secure areas.

Access Control

Recommendation: Control access to areas where select agents are used or stored.

- Consolidate laboratory work areas to the greatest extent possible to implement security measures more effectively. Separate select agent areas from the public areas of the buildings. Lock all select agent areas when unoccupied. Use keys or other security devices to permit entry into these areas.
- Methods of secure access and monitoring controls can include key or electronic locking pass keys, combination key pad, use of lock-boxes to store materials in freezers or refrigerators, video surveillance cameras, or other control requirements. Protocols for periodically changing combination keypad access numbers should be developed.
- Assess the need for graded levels of security protection on the basis of site-specific risk and threat analysis. This security can be accomplished through card access systems, biometrics, or other systems that provide restricted access.
- Lock all freezers, refrigerators, cabinets, and other containers where select agents are stored when they are not in direct view of a laboratory worker.
- Limit access to select agent areas to authorized personnel who have been cleared by the U.S. Department of Justice as indicated in 42 CFR Part 73. All others entering select agent areas must be escorted and monitored by authorized personnel.
- Record all entries into these areas, including entries by visitors, maintenance workers, service workers, and others needing one-time or occasional entry.
- Limit routine cleaning, maintenance, and repairs to hours when authorized employees are present and able to serve as escorts and monitors.
- Establish procedures and training for admitting repair personnel or other contractors who require repetitive or emergency access to select agent areas.
- Ensure visitors are issued identification badges, including name and expiration date, and escorted and monitored into and out of select agent areas. Such visits should be kept to a minimum.
- Ensure procedures are in place for reporting and removing unauthorized persons. These procedures should be developed through collaboration among senior scientific, administrative, and security management personnel. These procedures should be included in security training and reviewed for compliance at least annually.

Select Agent Accountability

Recommendation: Establish a system of accountability for select agents.

- Establish an accounting procedure to ensure adequate control of select agents and maintain up-to-date inventory of seed stocks, toxins, and agents in long-term storage. Records should include data regarding the agent's location, use, storage method, inventory, external transfers (sender/receiver, transfer date, and amount), internal transfer (sender/receiver, transfer date, amount), further distribution, and destruction (method, amount, date, and a point of contact).
- Establish procedures that maintain accurate and up-to-date records of authorizations for entry into limited access areas (i.e., a current list of persons who possess door keys and those who have knowledge of keypad access numbers or the security system).

Receiving Select Agents

Recommendation: Develop procedures for bringing select agent specimens into the laboratory.

- A centralized receiving area for select agents is recommended to maximize safety and minimize security hazards associated with damaged or unknown packages.
- Facilities should establish procedures for inspecting all packages (i.e., by visual or noninvasive techniques) before they are brought into the laboratory area. Suspicious packages should be handled as prescribed by federal and state law enforcement agencies.
- Biologic safety cabinet or other appropriate containment device should be used when opening packages containing specimens, bacterial or virus isolates, or toxins. Packages should be opened by trained, authorized personnel.

Transfer or Shipping of Select Agents

Recommendation: Develop procedures for transferring or shipping select agents from the laboratory.

- Package, label, and transport select agents in conformance with all applicable local, federal, and international transportation and shipping regulations, including U.S. Department of Transportation (DOT) regulations.[¶] Materials that are transported by airline carrier should also comply with packaging and shipping regulations set by

[¶] U.S. Department of Transportation, Research and Special Programs Administration, 49 CFR, Parts 171–180.

the International Air Transport Association (IATA). Personnel who package, handle, and ship these agents (including import and export) should be subject to all applicable training. The responsible facility official should be notified of all select agent transfers, internal or external.

- Ensure required permits (e.g., granted by the U.S. Public Health Service, USDA, DOT, U.S. Department of Commerce, and IATA) are obtained before select agents are prepared for transport. Standard operating procedures should be in place for import and export activities.
- Decontaminate contaminated or possibly contaminated materials before they leave the laboratory area.
- Avoid hand-carrying select agents when transferring them to other external facilities. If select agents are to be hand-carried on common carriers, all applicable packaging, transport, and training regulations should be followed.
- Develop and follow a protocol for intrafacility transfer of all select agents.

Emergency Response Plans

Recommendation: Implement an emergency response plan.

- Limiting access to select agent laboratory and animal areas can make implementing an emergency response more difficult. This should be considered as emergency plans are developed.
- Evaluate select agent laboratory and animal areas for safety and security concerns before an emergency plan is developed.
- Develop and integrate laboratory emergency plans with facilitywide plans. These plans should also include such adverse event assessments as bomb threats, severe weather (e.g., hurricanes or floods), earthquakes, power outages, and other natural or man-made disasters.
- Include facility administrators, scientific directors, principal investigators, laboratory workers, maintenance and engineering support staff, facility safety officers, and facility security officials in emergency planning.
- Include provisions for immediate notification of and response by laboratory and animal directors, laboratory workers, safety office personnel, or other knowledgeable persons when an emergency occurs.
- Establish advance coordination with local police, fire, and other emergency responders to assist community emergency responders in planning for emergencies in select agent laboratory and animal areas. Discussion should address security concerns associated with sharing of sensitive information regarding secure work areas.
- Consider circumstances that might require the emergency relocation of select agents to another secure location.
- Reevaluate and train employees and conduct exercises of the emergency response plan at least annually.

Incident Reporting

Recommendation: Establish a protocol for reporting adverse incidents.

- Ensure that laboratory directors, in cooperation with facility safety, security, and public relations officials, have policies and procedures in place for reporting and investigating unintentional injuries, incidents (e.g., unauthorized personnel in restricted areas, missing biologic agents or toxins, and unusual or threatening phone calls), or breaches in security measures.
- DHHS or USDA should be notified immediately if select agents are discovered to be missing, released outside the laboratory, involved in worker exposures or infections, or misused. Additionally, all incidents involving select agents (e.g., occupational exposure or breaches of primary containment) should be reported to local and state public health authorities.

Acknowledgments

CDC is grateful to the members of the Select Agent Interagency Workgroup, Biosecurity Subcommittee, and recognizes the contributions of Rachel E. Levinson, M.A., Chairman Biosecurity Subcommittee and Jonathan Y. Richmond, Ph.D., Assistant Chairman, Biosecurity Subcommittee.

References

1. US Department of Health and Human Services/CDC and National Institutes of Health. Biosafety in microbiological and biomedical laboratories. Richmond JY, McKinney RW, eds. 4th ed. Washington, DC: US Department of Health and Human Services, 1999.
2. Török TJ, Tauxe RV, Wise RP, et al. Large community outbreak of salmonellosis caused by intentional contamination of restaurant salad bars. JAMA 1997;278:389–95.
3. Kolavic SA, Kimura A, Simons SL, Slutsker L, Barth S, Haley CE. Outbreak of *Shigella dysenteriae* type 2 among laboratory workers due to intentional food contamination. JAMA 1997;278:396–8.
4. US Nuclear Regulatory Commission. Report to Congress on abnormal occurrences July–September 1995; dissemination of information. Federal Register 1996;61:7123–4.
5. US Nuclear Regulatory Commission. Incident investigation report: ingestion of phosphorus-32 at Massachusetts Institute of Technology, Cambridge, Massachusetts, identified on August 19, 1995 [NUREG-1535]. Washington, DC: US Nuclear Regulatory Commission, 1995.
6. US Nuclear Regulatory Commission. Preliminary notification of event or unusual occurrence PNO-1-98-052. Subject: intentional ingestion of iodine-125 tainted food (Brown University), November 16, 1998. Washington, DC: US Nuclear Regulatory Commission, 1998.

received from the RPSO, because of leakage, dirt and insect control. Light fixtures must be recessed and sealed to minimize dirt deposits. Ceiling diffusers should be sealed to control air leaks from the containment space.

7) Containment greenhouses must be glazed with double-paned laminated glass. Containment greenhouse design requirements are discussed further in the referenced APHIS documents.

8) Any windows in a BSL-3 facility must be inoperable and sealed in the shut position. All facility doors must be self-closing.

9) Provisions for dealing with scheduled maintenance or equipment repair problems must be incorporated into BSL-3 facility design. The design should minimize the need for non-research personnel to enter the containment space to perform maintenance functions. Where possible, compressor monitors or gas supplies which can be isolated should be made accessible from outside the containment space. Compressed gas cylinders supplying carbon dioxide, nitrogen and other gases should be stored outside the containment space, and manifold piping should be used to provide the gases inside the area. Central vacuum systems are not recommended, because of the potential problems of radiological and biological contamination of their piping, and the potential for exhaust air contamination. Small individual vacuum pumps equipped with in-line HEPA filters shall be used within the containment space.

10) The HEPA filtered exhaust air from Class II , Type A ("Laminar Flow") BSC's may either be returned to the laboratory environment or discharged to the outdoors. Class I, Class II, Types B1 and B2 (the new 100 percent exhaust "Laminar Flow" cabinet), and Class III cabinets usually require external exhaust fans and may be directly connected to a building's exhaust system. The treated exhaust from these BSCs must be discharged outdoors. Room supply and exhaust systems, and the exhaust systems for these cabinets, must be designed and operated in a manner that does not interfere with the air balance of the rooms and the BSCs. The cabinets must be located so that they can easily be maintained, decontaminated and certified.

D. For a summary of the general containment guidelines for a BSL-3 facility, see Table 9-1.

9.4.4 Biosafety Level 3 Agriculture (BSL-3Ag)

A. In ARS, special features are required when research involves certain biological agents in large animal species. To support such research, ARS has developed a special facility designed, constructed and operated at a unique containment level called Biosafety Level 3 Agriculture (BSL-3Ag). Using the containment features of the standard BSL-3 facility as a starting point, BSL-3Ag facilities are specifically designed to protect the environment by including almost all of the features ordinarily used for BSL-4 facilities as enhancements. All BSL-3Ag containment spaces must be designed, constructed and certified as primary containment barriers.

The BSL-3Ag facility can be a separate building, but, more often, it is an isolated zone contained within a facility operating at a lower biosafety level, usually a BSL-3. This isolated zone has strictly controlled access, and special physical security measures, and functions on the "box within a box" principle.

B. All BSL-3Ag facilities require the features listed in sections 9.4.2(A) through 9.4.2(F), and sections 9.4.3(C)(1) through 9.4.3(C)(3), and 9.4.3(C)(8).

C. In addition, the mandatory special features for a BSL-3Ag facility include:

1) Personnel change and shower rooms that provide for the separation of street clothing from laboratory clothing and that control access to the containment spaces. The facility is arranged so that personnel ingress and egress are only through a series of rooms (usually one series for men and one for women) consisting of: a ventilated vestibule with compressible gaskets on the two doors, a "clean" change room outside containment, a shower room at the non-containment/containment boundary, and a "dirty" change room within containment. Complete laboratory clothing (including undergarments, pants and shirts or jump suits, and shoes and gloves) is provided in the "dirty" change room, and put on by personnel before entering the research areas. In some facilities, complete laboratory clothing and personal protective equipment (PPE) are provided in the "clean" change room, where they can be stored and stowed for use without entry into containment.

In general, when leaving a BSL-3Ag laboratory, where all open handling of infectious materials is done in BSCs or other physical containment equipment, personnel need not take a shower to go to any other containment space within the facility, and would be required to take only the access control shower to leave the facility.

However, when leaving a BSL-3Ag large animal space (an animal room, necropsy room, carcass disposal area, contaminated corridor, etc.) that

acts as the primary barrier and that contains large volumes of aerosols holding highly infectious agents, personnel usually would be required to remove their "dirty" lab clothing, take a shower, and put on "clean" lab clothing immediately after leaving this high risk BSL-3Ag animal space and before going to any other part containment space within facility. When leaving the facility, these personnel would take another shower at the access control shower and put on their street clothing.

It is very important for the A-E to realize that the location, size and number of change rooms and showers within a facility need to be programmed very carefully with the scientists and staff at the location due to the unique circumstances at each research center.

Soiled clothing worn in a BSL-3Ag space is autoclaved before being laundered. Personnel moving from one space within containment to another will follow the practices and procedures described in the biosafety manual specifically developed for the particular facility and adopted by the laboratory director.

✳ 2) Access doors to these facilities are self closing and lockable. Emergency exit doors are provided, but are locked on the outside against unauthorized use. The A-E shall consider the practicality of providing vestibules at emergency exits.

3) Supplies, materials and equipment enter the BSL-3Ag space only through an airlock, fumigation chamber or an interlocked and double-doored autoclave.

4) Double-door autoclaves engineered with bioseals are provided to decontaminate laboratory waste passing out of the containment area. The double doors of the autoclaves must be interlocked so that the outer door can be opened only after the completion of the sterilizing cycle, and to prevent the simultaneous opening of both doors. All double door autoclaves are situated through an exterior wall of the containment area, with the autoclave unit forming an air tight seal with the barrier wall and the bulk of the autoclave situated outside the containment space so that autoclave maintenance can be performed conveniently. A gas sterilizer, a pass-through liquid dunk tank, or a cold gas decontamination chamber must be provided for the safe removal of materials and equipment that are steam or heat sensitive. Disposable materials must be autoclaved before leaving the BSL-3Ag space, and then incinerated.

5) Dedicated, single pass, directional, and pressure gradient ventilation

systems must be used. All BSL-3Ag facilities have independent air supply and exhaust systems. The systems are operated to provide directional airflow and a negative air pressure within the containment space. The directional airflow within the containment spaces moves from areas of least hazard potential toward areas of greatest hazard potential. A visible means of displaying pressure differentials is provided. They can be seen inside and outside of the containment space, and sound an alarm when the preset pressure differential is not maintained. The air supply and exhaust systems must be interlocked to prevent reversal of the directional airflow and the containment spaces becoming positively pressurized, in the event of an exhaust system failure.

6) Supply and exhaust air to and from the containment space is HEPA filtered, with special electrical interlocks to prevent positive pressurization during electrical or mechanical breakdowns. The exhaust air is discharged in such a manner that it cannot be drawn into outside air intake systems. The HEPA filters are outside of containment but are located as near as possible to the containment space to minimize the length of potentially contaminated air ducts. The HEPA filter housings are fabricated to permit the scan testing of the filters in place after installation, and to permit filter decontamination before removal. Backup HEPA filter units are strongly recommended to allow filter changes without disrupting research. (The most severe requirements for these modern, high level biocontainment facilities include HEPA filters arranged both in series and in parallel on the exhaust side, and series HEPA filters on the supply side of the HVAC systems serving "high risk" areas where large amounts of aerosols containing BSL-3Ag agents could be expected [e.g., large animal rooms, contaminated corridors, necropsy areas, carcass disposal facilities, etc.])

   For these high risk areas, redundant supply fans are recommended, and redundant exhaust fans are required. The supply and exhaust air systems should be filtered with 80-90 percent efficiency filters to prolong the life of the supply and exhaust HEPA filters. Air handling systems must provide 100 percent outside conditioned air to the containment spaces.

7) Liquid effluents from BSL-3Ag areas must be collected and decontaminated in a central liquid waste sterilization system before disposal into the sanitary sewers. Equipment must be provided to process, heat and hold the contaminated liquid effluents to temperatures, pressures and times sufficient to inactivate all biohazardous materials that reasonably can be expected to be studied at the facility in the future. The system may need to operate at a wide range of temperatures and holding

times to process the facility's effluents economically and efficiently. Double containment piping systems with leak alarms and annular space decontaminating capability should be considered for these wastes. Effluents from laboratory sinks, cabinets, floors and autoclave chambers are sterilized by heat treatment. Under certain conditions, liquid wastes from shower rooms and toilets may be decontaminated by chemicals. Facilities must be constructed with appropriate basements or piping tunnels to allow for inspection of plumbing systems.

8) Each BSL-3Ag containment space shall have its interior surfaces (walls, floors, and ceilings) and penetrations sealed to create a functional area capable of passing a pressure decay test with a leak rate established by the ARS RPSO. This requirement includes all interior surfaces of all BSL-3Ag spaces, not just the surfaces making up the external containment boundary. All walls are constructed slab to slab, and all penetrations, of whatever type, are sealed airtight to prevent escape of contained agents and to allow gaseous fumigation biological decontamination. This prevents cross contamination between individual BSL-3Ag spaces and allows gaseous fumigation in one space without affecting other BSL-3Ag spaces. Exterior windows and vision panels, if required, are breakage-resistant and sealed.

   Greenhouses constructed to meet the BSL-3Ag containment level will undergo the following tests, or the latest subsequent standards: (a) an air infiltration test conducted according to ASTM E 283-91; (b) a static pressure water resistance test conducted according to ASTM E 331-93; and (c) a dynamic pressure water resistance test conducted according to AAMA 501.1-94.

9) All ductwork serving BSL-3Ag spaces shall be airtight and pressure tested (see Appendix 9B for testing and certification details).

10) The hinges and latch/knob areas of all passage doors shall be sealed to meet pressure decay testing requirements.

11) All airlock doors shall have air inflated or compressible gaskets. The compressed air lines to the air inflated gaskets shall be provided with HEPA filters and check valves.

12) Restraining devices shall be provided in large animal rooms.

13) Necropsy rooms shall be sized and equipped to accommodate large farm animals.

14) Pathological incinerators, or other approved means, must be provided for the safe disposal of the large carcasses of infected animals. Redundancy and the use of multiple technologies need to be considered and evaluated.

15) HEPA filters must be installed on all atmospheric vents serving plumbing traps, as near as possible to the point of use, or to the service cock, of central or local vacuum systems, and on the return lines of compressed air systems. All HEPA filters are installed to allow in-place decontamination and replacement. All traps are filled with liquid disinfectant.

16) Biological Safety Cabinets must be provided and must be installed where their operations are not adversely affected by air circulation and foot traffic. Class II BSCs use HEPA filters to treat their supply and exhaust air. The exhaust from most Class II cabinets must be connected to the building's exhaust system. Supply air to a Class III cabinet is HEPA filtered, and the exhaust air must be double HEPA filtered (through a cabinet HEPA and then through a HEPA in a dedicated building exhaust system), before being discharged to the atmosphere.

    A BSL-3Ag facility will be provided only at those locations where the research mission requires this special type of facility; that is, where the facility barriers, usually considered secondary barriers, now act as primary barriers. Examples are sealed interior surfaces (walls, ceilings and floors of each containment space), ventilation systems, pathological incinerators, effluent sterilization systems, HEPA filters, etc. This requirement exists, in most cases, to contain biologically hazardous aerosols.

    The BSL-3Ag facility must undergo special testing and certification procedures.

    See Appendix B, "Testing and Certification Requirements for Critical Components of the Biological Containment System," at the end of this chapter, and the Design Details Manual.

D. For a summary of the general containment guidelines for a BSL-3Ag facility, see Table 9-1.

9.4.5 Biosafety Level 4 (BSL-4)

A. A BSL-4 facility is designed to support the safe conduct of research involving biological agents that are extremely hazardous to individuals, or that may cause serious epidemic disease. Some of these viruses are zoonotic and infect large

9.5.1 General

This section provides special design issues to be addressed in the design of BSL-3, BSL-3 Ag and BSL-4 facilities. If a feature is required only for a specific biocontainment level, it will be noted.

9.5.2 Architectural Elements

A. Facility Layout

A containment area shall be separated, by controlled access zones, from areas open to the public and from other laboratory personnel, who do not work within the containment area.

During the development of the POR, the A-E, the RPM, the RPR and the RPSO will coordinate to ensure maximum possible compliance with the requirements of UFAS, consistent with the successful performance of the facility's research mission.

Each laboratory module of the containment facility shall be capable of accommodating a biological safety cabinet.

Adequate means of egress shall be provided from all laboratories without breeching containment or promoting cross contamination. Airlocks, when required, shall be provided and located at transitional points between the spaces of different biocontainment levels through which personnel and/or materials must pass. The design must include storage areas for chemicals and chemical wastes.

Animal facilities shall be designed to provide an adequate number of rooms to assure proper separation of species or tests, isolation of individual projects, quarantine of animals, and routine or specialized housing of animals. Separate areas will be provided for the diagnosis, treatment and control of the diseases of laboratory animals. These areas will provide effective isolation for the housing of animals either known or suspected of being diseased, or of being carriers of disease, from other animals.

When animals are housed, storage facilities shall be provided for feed, bedding, cages, supplies and equipment. Storage areas for feed and bedding shall be separate from the areas where any tests are conducted, and shall be protected from infestation and contamination. Perishable supplies shall be preserved by appropriate means. Portable fencing or dividers, restraining devices, and tables

and carts as needed are to be provided.

B. Room Envelope and Interior Finishes

The design shall include construction materials and finishes that are compatible with research programs, activities taking place in the spaces, and decontamination methods. Materials and finishes for spaces that will accommodate large animals (holding rooms, corridors, necropsy facilities, etc.) need to be especially durable, to withstand impact and abrasion, and high temperature and humidity, and high pressure cleaning agents. Floors should be of seamless or epoxy or trowled epoxy materials, impervious, abrasion resistant, nonslip when wet, cleanable, and able to withstand animal feces, urine and disinfectants, and to be washed with 180 degree F water containing detergents and deconning liquids under hose pressure. The floor must be non-skid, but not abrasive to the animals. The facility's animal care veterinarian must be consulted on the proper flooring material. The flooring materials for containment greenhouses shall be vinyl ester resin, polyurethane resinous mortar, or a similar material. Walls should be constructed of glazed masonry units with an epoxy grout, or of concrete blocks with an industrial-grade epoxy paint. Drywall ceilings are not acceptable for animal spaces; cement board or plaster with an impervious finish that can withstand the same cleaning conditions as the walls is required. For insect facilities, the A-E will select lighting systems and color schemes that will draw insects away from exits and toward locations where they can be easily captured.

Openings in walls, floors, and ceilings through which utility services and air ducts penetrate shall be sealed to prevent release and to permit space decontamination. These openings can be effectively sealed by the use of sleeves and the application of a liquid silicone plastic. Seals shall be installed on both sides of all penetration openings, at locations that can be easily inspected and maintained.

Facility doors shall have locks and /or key card access to control admittance.

Airlock doors must have flat or low thresholds to provide for easy movement of carts and animals, and to allow accessibility for physically challenged personnel. The sill must be high enough above the finished floor to prevent water from pooling and causing corrosion, and to prevent abrasion of the door gasket.

All laboratories shall be provided with adequate casework, and storage areas for respirators, if required. Work surfaces shall be impervious to water and resistant to acids, alkalis, organic solvents, and moderate heat.

Any window in the laboratory will be breakage-resistant and sealed.

9.5.3 Mechanical Elements

A. Airflow Patterns. For isolation purposes, separate air handling systems shall be provided for non-containment and containment areas.

Each air handling system serving a containment space shall be designed to supply 100 percent outside air for heating, ventilation and air conditioning. The **A-E** will perform a life cycle cost analysis on all 100 percent outside air systems to determine if an exhaust air heat recovery is economically feasible. The HVAC system shall be on emergency power.

Direction of flow. The established direction of air flow shall be from less contaminated to more contaminated spaces, and shall remain unchanged under all conditions. Airflow direction within a containment space shall be from the entrance door toward the rear of the space. All rooms must be provided with a visual monitoring device that indicates and confirms directional inward airflow at the laboratory entry.

SEQUENCE OF OPERATION FOR MAGNETICALLY LOCKED DOORS THAT REQUIRE SPECIAL KNOWEDGE BY THE USER

TYPICAL EXITING PROCEDURES FOR DOORS: (118a & 118b), (120a & 120b), 129a & 130), (219a & 219b), (220a & 220b)

To exit from transfer room turn lever and the lock will send a signal to the security system to allow exiting without engaging security system. (Also by turning the inside lever the lock sends a signal to verify that the second door in sequence is magnetically locked). Open the door and exit. The closer, in conjunction with the magnetic lock, will pull the door into a closed position. If door is not closed, door position switch will activate a local alarm, which will sound after a specified period of time. This time may be approximately 60 seconds.

EMERGENCY EXITING PROCEDURES FOR DOORS: (118a & 118b), (120a & 120b), (129a & 130), (219a & 219b), (220a & 220b)

Emergency exit scenario will exist in the following conditions.

- If someone is trying to exit from the inner door, and the outer door is in an open position.
- If one or both of the doors experience a hardware failure.

When exiting, push emergency request to exit button. RX signal button sends a (manual) pneumatic burst to the electrical current and deactivates the magnetic lock for approx. 10-15 seconds. Turn lever handle and open door.

When general power goes out in the building, the battery backup on each door will keep the doors secure until the generator starts up. The generator will supply power to the doors for a specified period of time. If the generator exhausts itself, all magnetically locked doors will fail safe.

TYPICAL EXITING PROCEDURES FOR DOORS: (129b & 139), (131a & 131b)

Push door open button. The door signals the door position switch on the second door within the airlock to engage the magnetic lock. The door also signals the HVAC to ramp up the exhaust air within the space. After verification of these two processes, the door open indicator (green light) turns on. At this time, both the green and red lights are on to signal that the door is in a transition phase. The door energizes the seal deflate solenoid. After approximately 8 seconds (time delay is programmable), the door's maglock de-energizes. The closed door indicator (red light) turns off signaling that the door may be opened.

Once the door is closed, the plunger switch depresses, the maglock engages and the door closed indicator (red light) will energize and the seals will inflate. At this time, both indicator lights will be on to signal that the door is in transition. After approximately 8 seconds, the door open indicator (green light) will turn off and the door closed indicator (red light) will stay lit.

EMERGENCY EXITING PROCEDURES FOR DOORS: (129b & 139), (131a & 131b)

Exit through the door by activating the emergency switch. Emergency switch is located next to the pneumatic connections on the hinge side of the door. Flip open the switch cover and pull the button. Once activated, the seals will deflate and the maglock will disengage.

- The emergency switch will remain open and the doors will not reset themselves into a bioseal state until that switch has been manually reset by pushing the button back in.

When general power goes out in the building, the battery backup on each door will keep the doors secure until the generator starts up. The generator will supply power to the doors for a specified period of time. If the generator exhausts itself, all magnetically locked doors will fail safe.