UC BSL-3 Laboratory Design Standards

Webinar for the University of California
October 2020

Brent Cooley
Deputy Director
Environment, Health & Safety
UC Office of the President
brent.cooley@ucop.edu

Erick Guandique
Associate Director
UCI National BSL-3 Training Center
University of California Irvine
eguandiq@hs.uci.edu

Sheryl Major
Biosafety Officer
High Containment Officer
University of California San Diego
smajor@ucsd.edu

Gary Landucci
Director
UCI National BSL-3 Training Center
University of California Irvine
glanducc@hs.uci.edu

UC BSL-3 Laboratory Design Standards

- High Containment Laboratory Oversight Committee
  - Governance and Structure of UC Program
- BSL-3 Laboratory Design Standards Overview
  - Application
  - Deviation Requests
  - Revisions
- BSL-3 Laboratory Design Standards Content
  - Document Layout
  - Section Highlights
- BSL-3 Laboratory Design Training Course

What is Biosafety Level 3?

Laboratory Practices & Procedures

Facility Design, Engineering & Performance

Why the focus at UC?

CDC: Up to 86 workers possibly exposed to anthrax (CNN June 27, 2014)

C.D.C. Closes Anthrax and Flu Labs After Accidents (New York Times, July 11, 2014)

Vials of Smallpox Found in F.D.A. Storage Room (New York Times July 8, 2014)

FDA found more than smallpox vials in storage room (Washington Post, July 16, 2014)

Smallpox find was among hundreds of other long-lost vials, FDA says (LA Times, July 16, 2014)

University of California

Prompted evaluation of BSL-3 program

Emphasize safety and consistency

Establish policies and minimum guidelines

University of California High Containment Initiative

High Containment Research Activities

- Facilities at 8 different campuses, 5 Medical Centers
- Thirty-two active research labs
  - Animal facilities
  - Insectaries
  - Plant facilities
- Select Agent use
- Approximately 235 researchers
- Medical Center Clinical Diagnostic Labs

UNIVERSITY OF CALIFORNIA

UC High Containment Lab Initiatives – Task Force Formed

2014

Biosafety / Biosecurity Task Force

All Recommendations Accepted by President Napolitano (2015)

5 Faculty
1 Campus Vet
2 High Cont. Experts
2 BSO's
2 Lawyers
1 AVC
3 OP Staff (EH&S, Compliance, Research)

Submitted 39 recommendations

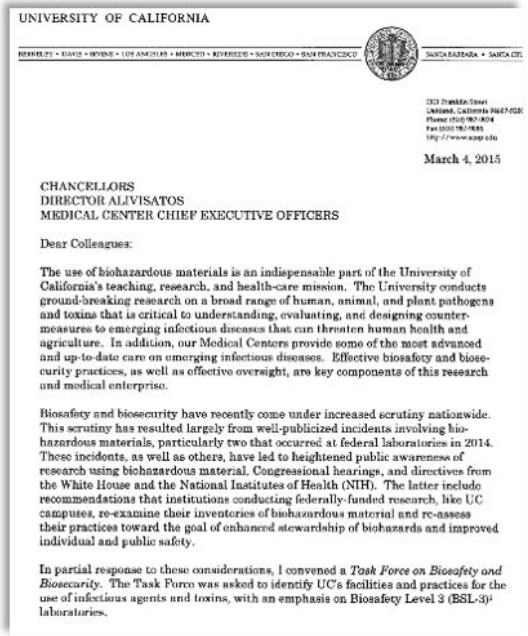
Survey
Best Practices
Training
Inventory
Design, Construction
Commissioning, Decommissioning

UC High Containment Lab Initiatives – Key Objectives Identified

2015

President's Communication

- Establish Systemwide High Containment Lab Oversight Committee
- Establish Local High Containment Lab Oversight Groups
- Establish High Containment Lab Director positions
- Provide High Containment Lab Directors Training
- Perform BSL3 Site Survey
- Conduct Biohazardous Materials Inventory



UNIVERSITY OF CALIFORNIA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO — SANTA BARBARA • SANTA CR

March 4, 2015

CHANCELLORS
DIRECTOR ALIVISATOS
MEDICAL CENTER CHIEF EXECUTIVE OFFICERS

Dear Colleagues:

The use of biohazardous materials is an indispensable part of the University of California's teaching, research, and health-care mission. The University conducts ground-breaking research on a broad range of human, animal, and plant pathogens and toxins that is critical to understanding, evaluating, and designing counter-measures to emerging infectious diseases that can threaten human health and agriculture. In addition, our Medical Centers provide some of the most advanced and up-to-date care on emerging infectious diseases. Effective biosafety and biose-curity practices, as well as effective oversight, are key components of this research and medical enterprise.

Biosafety and biosecurity have recently come under increased scrutiny nationwide. This scrutiny has resulted largely from well-publicized incidents involving bio-hazardous materials, particularly two that occurred at federal laboratories in 2014. These incidents, as well as others, have led to heightened public awareness of research using biohazardous material. Congressional hearings, and directives from the White House and the National Institutes of Health (NIH). The latter include recommendations that institutions conducting federally-funded research, like UC campuses, re-examine their inventories of biohazardous material and re-assess their practices toward the goal of enhanced stewardship of biohazards and improved individual and public safety.

In partial response to these considerations, I convened a *Task Force on Biosafety and Biosecurity*. The Task Force was asked to identify UC's facilities and practices for the use of infectious agents and toxins, with an emphasis on Biosafety Level 3 (BSL-3)[1] laboratories.

High Containment Laboratory Oversight Committee

High Containment Laboratory Oversight Group

BSL3 Training Center

Occupational Health

Finance

Police / Security

Leadership / VCR

Researchers / Faculty / HCLOG Chair

EHS / High Containment Lab Director

Facilities

First Responders

UC High Containment Lab Initiatives – Accomplishments

2015 - 2020

Established and convened High Containment Laboratory Oversight Committee (Systemwide Level)

Developed and approved charge and charter for the HCLOC

Established and convened High Containment Laboratory Oversight Groups (Campus Level)

Hired and provided training to High Containment Laboratory Oversight Directors

Conducted first comprehensive survey of UC BSL-3 Laboratory Facilities

Conducted first comprehensive survey of UC Medical Center Clinical Diagnostic Facilities

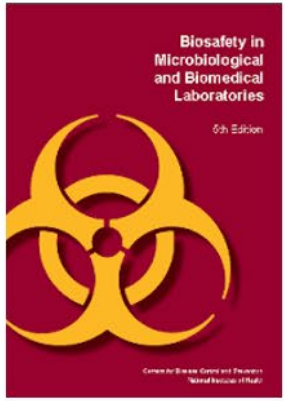
Developed and adopted UC BSL-3 Laboratory Design Standards

https://www.ucop.edu/safety-and-loss-prevention/environmental/groups/hcloc/bsl-3-laboratory-design-standards.html

BSL-3 Laboratory Design Standards - Overview

References and Resource Documents

- CDC Biosafety in Microbiological and Biomedical Laboratories (BMBL), 5th Edition, 2009
- NIH Design Requirements Manual for Biomedical Laboratories and Animal Research Facilities (DRM), 2019
- NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines), 2016
- National Institutes of Health Biosafety Level 3 Laboratory Certification Requirements, 2006
- Industry Standards and Best Practices



BSL-3 Laboratory Design Standards - Overview

Overview of Key Points

- Development of the UC BSL-3 Laboratory Design Standards
- Application to new construction and renovation projects
- Deviation requests
- On-going revisions and updates to the Standards
- Campus involvement in design projects

Systemwide Coordination

HCLOC

HCLOGs

BSL-3 Laboratory Design Standards - Overview

Application to Campus Projects

New BSL-3 facility construction

Major renovations & retrofits – alterations to:

- Fixed primary containment equipment (ducted biosafety cabinets)
- Major HVAC components (exhaust fans, AHUs)
- Floorplans or secondary containment components (walls, ceilings, etc.)
- Any other changes that could impact safety, operations, or ventilation performance

BSL-3 Laboratory Design Standards - Overview

Deviation Request Process and Flowchart

Deviation Requests

Campus must comply with these Standards

Processes developed to support deviation requests

BSL-3 Laboratory Design Standards - Overview

Revisions and Updates

- HCLOC meets quarterly via conference calls
- HCLOC has one annual in-person meeting
- Full review and revisions every two years, on even years
- As-needed revisions and updates as identified during projects
- HCLOC responsible for authorizing and approving updates, then distributed to HCLOGs (Campuses)

BSL-3 Laboratory Design Standards - Overview

Campus Involvement

- PI (researcher)/Department Chair
- EH&S Biosafety
- High Containment Laboratory Director
- Campus Design Management Group
- Capital Programs
- UC Building Officials
- Campus ADA Reviewer
- Campus Security or Campus Police Department
- Campus Emergency Response
- Campus Fire Marshal
- Campus Facilities Operations & Management Group

BSL-3 Laboratory Design Standards - Content

Table of Contents

BSL-3 Laboratory Design Standards - Content

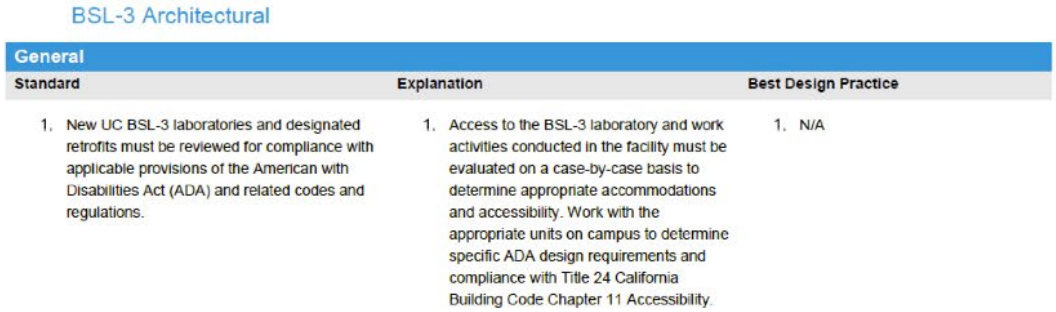
Document Layout

Each section contains:

Standard – minimum UC requirements

Explanation – details about the standard requirements and what they support

Best Design Practice – design elements and considerations that support best practices related to facility construction, operations and maintenance



BSL-3 Architectural

General

Standard	Explanation	Best Design Practice
1. New UC BSL-3 laboratories and designated retrofits must be reviewed for compliance with applicable provisions of the American with Disabilities Act (ADA) and related codes and regulations.	1. Access to the BSL-3 laboratory and work activities conducted in the facility must be evaluated on a case-by-case basis to determine appropriate accommodations and accessibility. Work with the appropriate units on campus to determine specific ADA design requirements and compliance with Title 24 California Building Code Chapter 11 Accessibility.	1. N/A

BSL-3 Laboratory Design Standards - Content

Section Highlights

Architectural

ADA requirements

Ceilings, floors, windows, doors, etc.

HVAC

Directional airflow

6 air changes per hour (ACH)

Dedicated single pass exhaust

Electrical

Penetrations

Back-up power / Emergency power

Plumbing

Showers

Sinks

Vacuum lines, traps, drains

BSL-3 Laboratory Design Standards - Content

Section Highlights

Telecom, Security & Documentation

Access doors

Warning signage

BSL-3 Laboratory Design Standards - Content

Commissioning documents

Safety and Decontamination

Emergency shower and eyewash

Sprinkler systems / extinguishers

BSL-3 Standard Equipment

Pass-through autoclaves

Biosafety cabinets

Centrifuges