How Do I know If My Laboratories are Safe? Untangling the OSHA Regulations for Workplace Labs

June 27, 2017

NAEM WEBINAR SERIES: HOW DO I KNOW IF MY LABORATORIES ARE SAFE?

UNTANGLING THE OSHA REGULATIONS FOR WORKPLACE LABS

Ashland™ always solving

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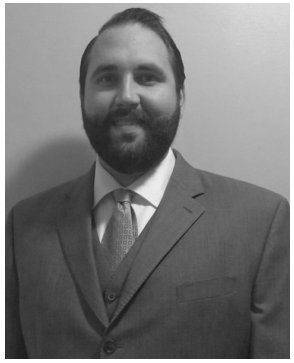
FEATURING



Jonathan Scheibe
CSP, CMSE
Global Life Safety
and Laboratory Safety Programs Manager
Ashland Inc.

Keith Green
Client Manager
EHS Support LLC

Monica Meyer
H&S Service Line Leader
EHS Support LLC

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PRESENTATION OVERVIEW

- OSHA overview
- What does OSHA say about Lab Safety?
- What are the different types of labs that are regulated for H&S?
- What regulations apply to your labs? (Regulatory overview)
- What OSHA/H&S programs do your labs need to follow?
- Lab design, what else do you need to know?

OSHA's General Industry Standard

Title 29 of the Code of Federal Regulations Part 1910

WHO IS OSHA?

- In 1970, an estimated 38 workers were killed EVERY DAY in the United States
- OSHA Established by the Occupational Safety & Health Act of 1970 (OSH Act)
- The OSH Act is in Title 29 of the United States Code Chapter 15
- This Act established, for the first time, a nationwide, federal program to protect almost the entire work force from job-related death, injury and illness

WHO IS COVERED?

- The OSH Act covers most private sector employers and their workers, in addition to some public sector employers and workers in the 50 states and certain territories and jurisdictions under federal authority (e.g., Washington, DC).

THE “GENERAL DUTY” CLAUSE

OSHA
Occupational Safety and Health Administration

NO MATTER THE SIZE OF YOUR OPERATION, YOU MUST:

- Furnish each employee and their place of employment a workplace which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- Comply with occupational safety and health standards promulgated under this Act

EMPLOYEES HAVE RESPONSIBILITIES TOO!

- Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act, which are applicable to his/her own actions and conduct.

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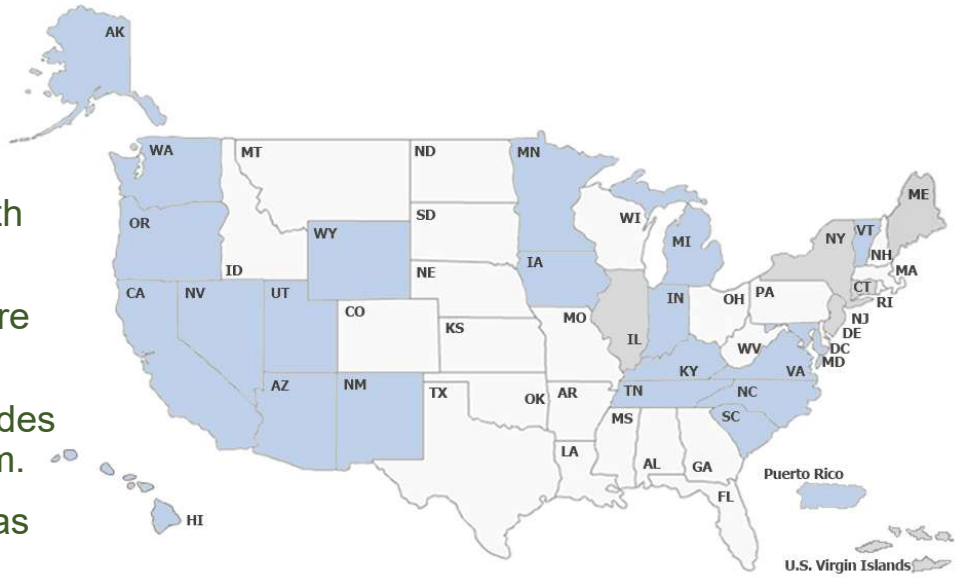
STATE PLANS

- Under Section 18 of the federal OSH Act, states are encouraged to develop their own H&S programs for both public and private sector employees
- State plans enforce their own set of standards, which are legally binding to employers
- OSHA approves and monitors all State Plans and provides as much as fifty percent of the funding for each program.
- State-run safety and health programs must be at least as effective (ALAE) as the federal OSHA program
- State Plans have the option to promulgate standards covering hazards not addressed by OSHA standards
- State Plans can impose higher fines than OSHA and have their own penalty reduction policies and procedures that may differ from OSHA's but must be deemed at least as effective



*Blue shading represents OSHA-Approved State Plans

*Gray shading represents OSHA-approved State Plans that cover state and local government public sector workers **only**

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STATE PLANS

THE FOLLOWING 22 STATES OR TERRITORIES HAVE OSHA-APPROVED STATE PLANS THAT COVER BOTH PRIVATE AND PUBLIC SECTOR WORKERS:

- Alaska
- Arizona
- California
- Hawaii
- Indiana
- Iowa
- Kentucky
- Maryland
- Michigan
- Oregon
- Nevada
- Puerto Rico
- New Mexico
- Minnesota
- North Carolina
- South Carolina
- Tennessee
- Utah
- Vermont
- Virginia
- Washington
- Wyoming

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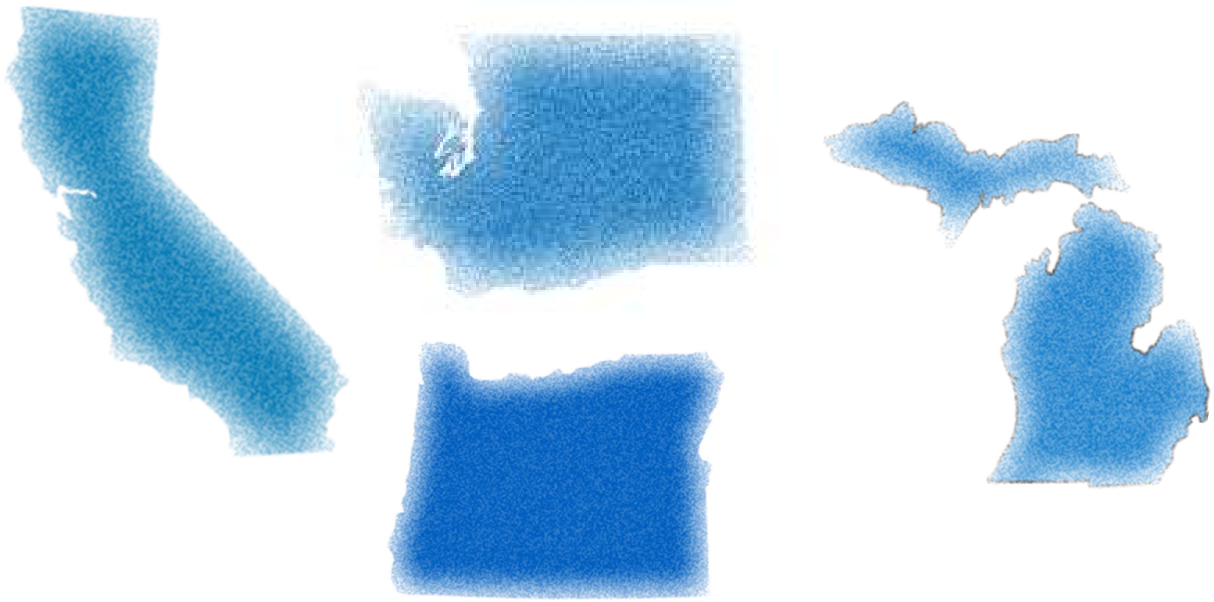
STATE PLANS

STATES WITH MORE STRINGENT PLANS THAN OSHA

- California
- Michigan
- Oregon
- Washington



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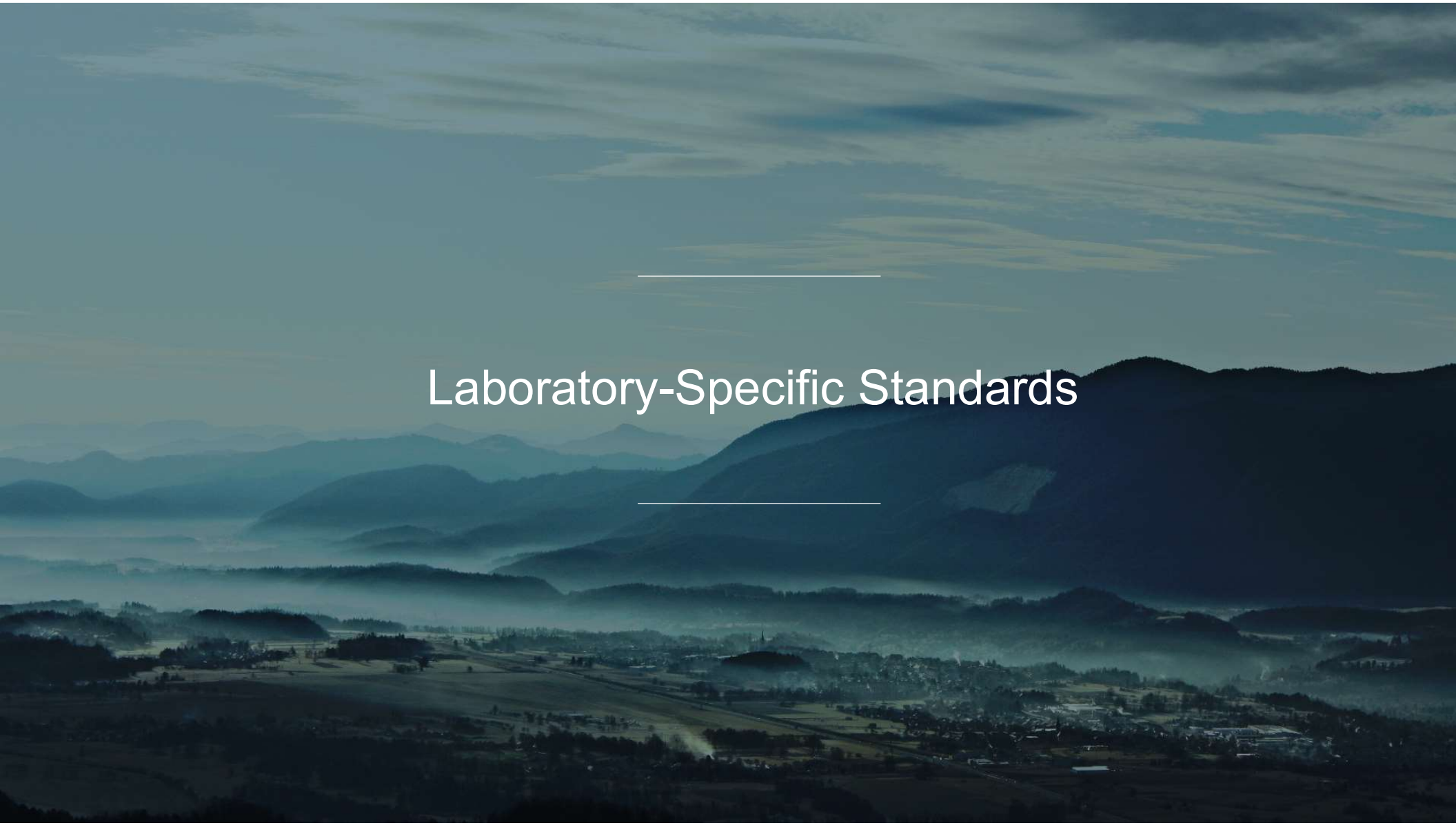


Laboratory-Specific Standards

HAZARD COMMUNICATION STANDARD

- 29 CFR 1910.1200
- The HCS updated to meet requirements of the United Nations (UN) adopted the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)
- Includes requirements for Training, Labeling, and Safety Data Sheets (SDSs) for hazardous chemicals
- Requires preparation of written program
- Requires preparation of written inventory of hazardous chemicals
- The HCS covers some laboratories:
  - Those whose function is to produce commercial quantities of materials
  - Laboratories connected with production processes
  - Includes quality control/quality assurance laboratories

OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES

29 CFR 1910.1450

We will call this the "Lab HCS" for this webinar

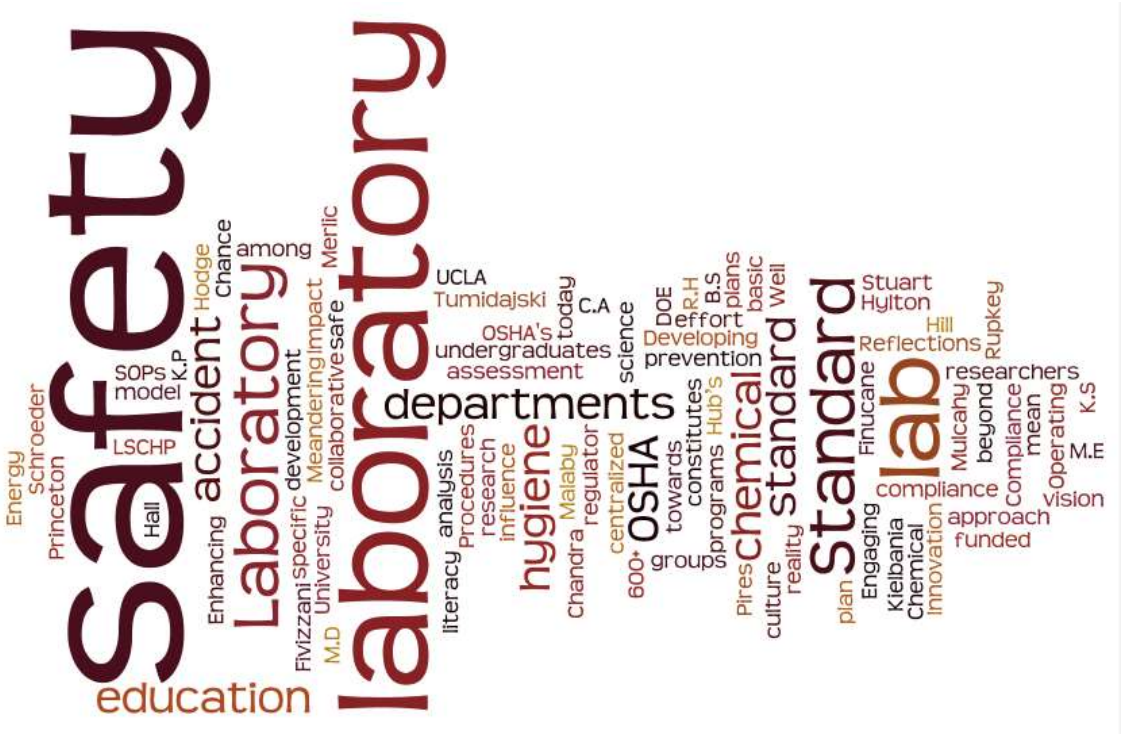
Covers laboratories meeting the criteria of "laboratory use" and "laboratory scale" but excludes procedures that are part of a production process

Includes requirements for Training, Labeling, and Safety Data Sheets (SDSs) for us of hazardous chemicals in laboratories

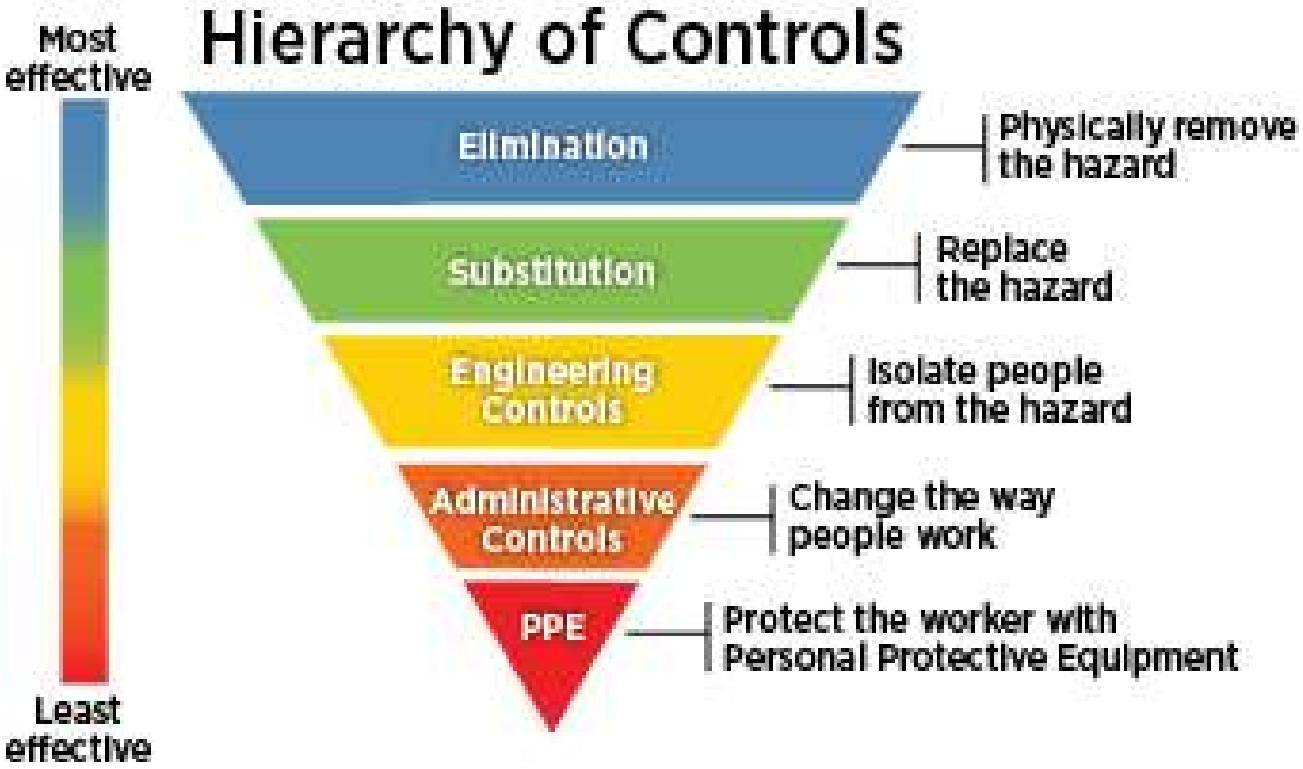
Requires preparation of written program – The Chemical Hygiene Plan (CHP)

- 29 CFR 1910.1450 App A – NON MANDATORY (but helpful) summary of the National Research Council recommendations for a CHP

CHEMICAL HYGIENE PLAN



MINIMIZE OR ELIMINATE EXPOSURE



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REQUIREMENTS OF A CHEMICAL HYGIENE PLAN

- The CHP MUST include (29 CFR 1910.1450(e)(1))
  - Standard Operating Procedures (SOPs)
  - Criteria that the employer will use to determine and implement control measures for exposure to hazardous chemicals
  - A requirement that fume hoods and other protective equipment are functioning properly
  - Specific measures that fume hoods are operating properly and adequately
  - Employee training content and requirements
  - Provisions for medical consultation and medical examinations
  - Designation of personnel responsible for implementation of the Chemical Hygiene Plan including the assignment of a Chemical Hygiene Officer
  - If appropriate, establishment of a Chemical Hygiene Committee
  - Proper use of containment devices such as fume hoods or glove boxes
  - Procedures for safe removal of contaminated waste
  - Decontamination procedures
  - Annual review requirement

STANDARD OPERATING PROCEDURES

- Prepare SOPs for all assigned tasks where hazardous chemicals are used
- SOPs should include:
  - Step-by-step instructions of the tasks assigned that include the use of hazardous chemicals
  - The hazardous chemicals used in the procedure
  - The proper means of protection from the hazards:
    - Engineering controls - Hoods
    - Administrative controls
    - PPE
  - Recordkeeping/logging
- Can also use SOP format for other CHP requirements:
  - Hood/enclosure testing and operation
  - Chemical labeling
  - Chemical storage and management

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Utilize a Job Safety Analysis (JSA) to find hazards throughout every department / task/ job function

Develop program addressing:

- Hazards present
- Selection of PPE
- Maintenance
- Use of PPE
- Training of employees
- Monitoring of the program to ensure ongoing effectiveness

Cover the cost of non-specialized PPE (no cost to the worker)

- If employees supplies own PPE, employer must ensure adequacy

Train employees on:

- Proper use/ care, maintenance, useful life, and disposal
- When to use
- What kind to use
- Limitations

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LABORATORY PPE

Eye Protection

Respiratory Protection

Chemical Resistant Clothing

Face Protection

Hand Protection

29 CFR 1910.132 still applies, even in a lab

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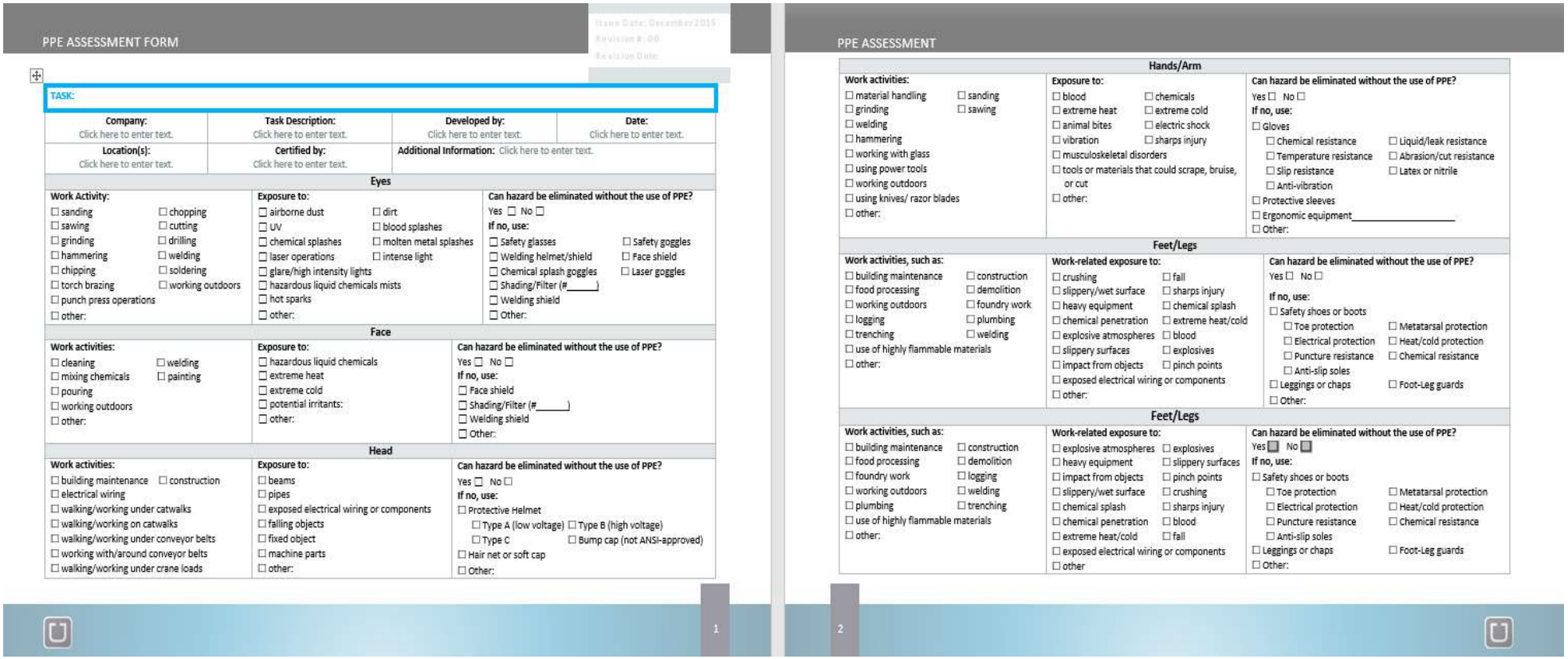
DETERMINE HAZARDS – SOP or JSA



PPE ASSESSMENT FORM

Issue Date: December 2015
Revision #: 00
Revision Date:

TASK:

Company:	Task Description:	Developed by:	Date:
Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Location(s): Click here to enter text.	**Certified by:** Click here to enter text.	**Additional Information:** Click here to enter text.	

Eyes

Work Activity:
☐ sanding ☐ chopping
☐ sawing ☐ cutting
☐ grinding ☐ drilling
☐ hammering ☐ welding
☐ chipping ☐ soldering
☐ torch brazing ☐ working outdoors
☐ punch press operations
☐ other:

Exposure to:
☐ airborne dust ☐ dirt
☐ UV ☐ blood splashes
☐ chemical splashes ☐ molten metal splashes
☐ laser operations ☐ intense light
☐ glare/high intensity lights
☐ hazardous liquid chemicals mists
☐ hot sparks
☐ other:

Can hazard be eliminated without the use of PPE?
Yes ☐ No ☐
If no, use:
☐ Safety glasses ☐ Safety goggles
☐ Welding helmet/shield ☐ Face shield
☐ Chemical splash goggles ☐ Laser goggles
☐ Shading/Filter (#_____)
☐ Welding shield
☐ Other:

Face

Work activities:
☐ cleaning ☐ welding
☐ mixing chemicals ☐ painting
☐ pouring
☐ working outdoors
☐ other:

Exposure to:
☐ hazardous liquid chemicals
☐ extreme heat
☐ extreme cold
☐ potential irritants:
☐ other:

Can hazard be eliminated without the use of PPE?
Yes ☐ No ☐
If no, use:
☐ Face shield
☐ Shading/Filter (#_____)
☐ Welding shield
☐ Other:

Head

Work activities:
☐ building maintenance ☐ construction
☐ electrical wiring
☐ walking/working under catwalks
☐ walking/working on catwalks
☐ walking/working under conveyor belts
☐ working with/around conveyor belts
☐ walking/working under crane loads

Exposure to:
☐ beams
☐ pipes
☐ exposed electrical wiring or components
☐ falling objects
☐ fixed object
☐ machine parts
☐ other:

Can hazard be eliminated without the use of PPE?
Yes ☐ No ☐
If no, use:
☐ Protective Helmet
☐ Type A (low voltage) ☐ Type B (high voltage)
☐ Type C ☐ Bump cap (not ANSI-approved)
☐ Hair net or soft cap
☐ Other:

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PPE ASSESSMENT

Hands/Arm

Work activities:
☐ material handling ☐ sanding
☐ grinding ☐ sawing
☐ welding
☐ hammering
☐ working with glass
☐ using power tools
☐ working outdoors
☐ using knives/ razor blades
☐ other:

Exposure to:
☐ blood ☐ chemicals
☐ extreme heat ☐ extreme cold
☐ animal bites ☐ electric shock
☐ vibration ☐ sharps injury
☐ musculoskeletal disorders
☐ tools or materials that could scrape, bruise, or cut
☐ other:

Can hazard be eliminated without the use of PPE?
Yes ☐ No ☐
If no, use:
☐ Gloves
☐ Chemical resistance ☐ Liquid/leak resistance
☐ Temperature resistance ☐ Abrasion/cut resistance
☐ Slip resistance ☐ Latex or nitrile
☐ Anti-vibration
☐ Protective sleeves
☐ Ergonomic equipment_____
☐ Other:

Feet/Legs

Work activities, such as:
☐ building maintenance ☐ construction
☐ food processing ☐ demolition
☐ working outdoors ☐ foundry work
☐ logging ☐ plumbing
☐ trenching ☐ welding
☐ use of highly flammable materials
☐ other:

Work-related exposure to:
☐ crushing ☐ fall
☐ slippery/wet surface ☐ sharps injury
☐ heavy equipment ☐ chemical splash
☐ chemical penetration ☐ extreme heat/cold
☐ explosive atmospheres ☐ blood
☐ slippery surfaces ☐ explosives
☐ impact from objects ☐ pinch points
☐ exposed electrical wiring or components
☐ other:

Can hazard be eliminated without the use of PPE?
Yes ☐ No ☐
If no, use:
☐ Safety shoes or boots
☐ Toe protection ☐ Metatarsal protection
☐ Electrical protection ☐ Heat/cold protection
☐ Puncture resistance ☐ Chemical resistance
☐ Anti-slip soles
☐ Leggings or chaps ☐ Foot-Leg guards
☐ Other:

Feet/Legs

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☐ food processing ☐ demolition
☐ foundry work ☐ logging
☐ working outdoors ☐ welding
☐ plumbing ☐ trenching
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☐ other:

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☐ Puncture resistance ☐ Chemical resistance
☐ Anti-slip soles
☐ Leggings or chaps ☐ Foot-Leg guards
☐ Other:

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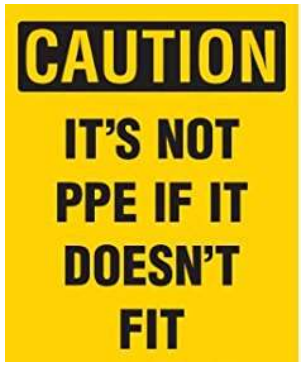
DETERMINE APPROPRIATE PPE

Discuss the selections with the employees required to use the PPE and provide them with the appropriate PPE that

- Is durable?
- Does it fit snugly and assure maximum protection?
- Does it interfere with the employee's movements?

PPE items/devices are not one -size fits all. PPE that fits poorly will not properly protect the wearer and may make it more difficult to work. For example, loose-fitting protective clothing can get caught in moving machine parts; poorly fitting gloves will increase the effort required to do a job. Also, an employee is less likely to use PPE that causes discomfort.



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TRAINING

- The employer shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:
- When PPE is necessary
- What PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- Limitations of PPE
- Each affected employee shall demonstrate an understanding of the training, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

Retraining:

- Changes in the workplace
- Changes in the types of PPE
- Inadequacies in affected employee's knowledge or use of assigned PPE

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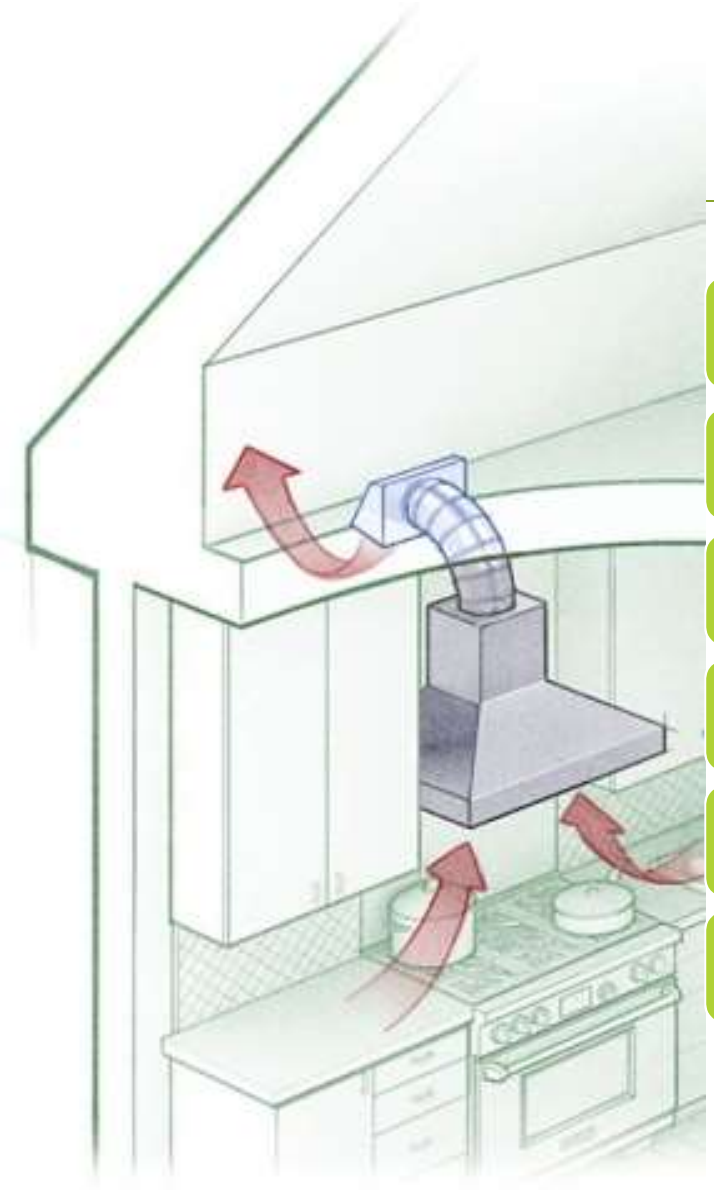


LABORATORY VENTILATION

- General ventilation
- Chemical "fume" hoods
- Glove boxes
- Slot hoods
- Downdraft tables
- Goose neck/elephant trunk

ASPECTS OF GENERAL VENTILATION

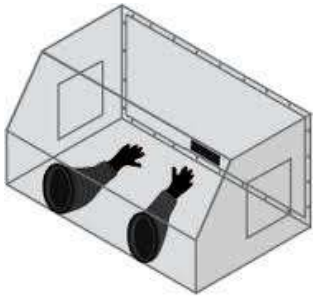
- Building heating, ventilation, and air conditioning (HVAC)
- Room changes
- Negative/positive pressure
- Return and make up air

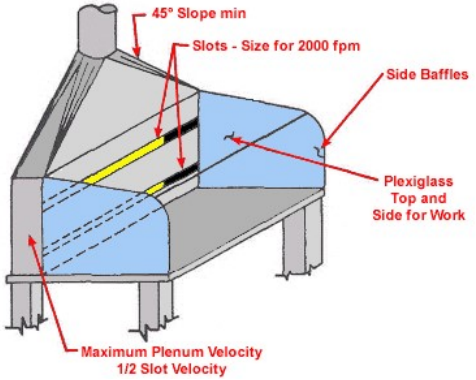
CHEMICAL HOODS

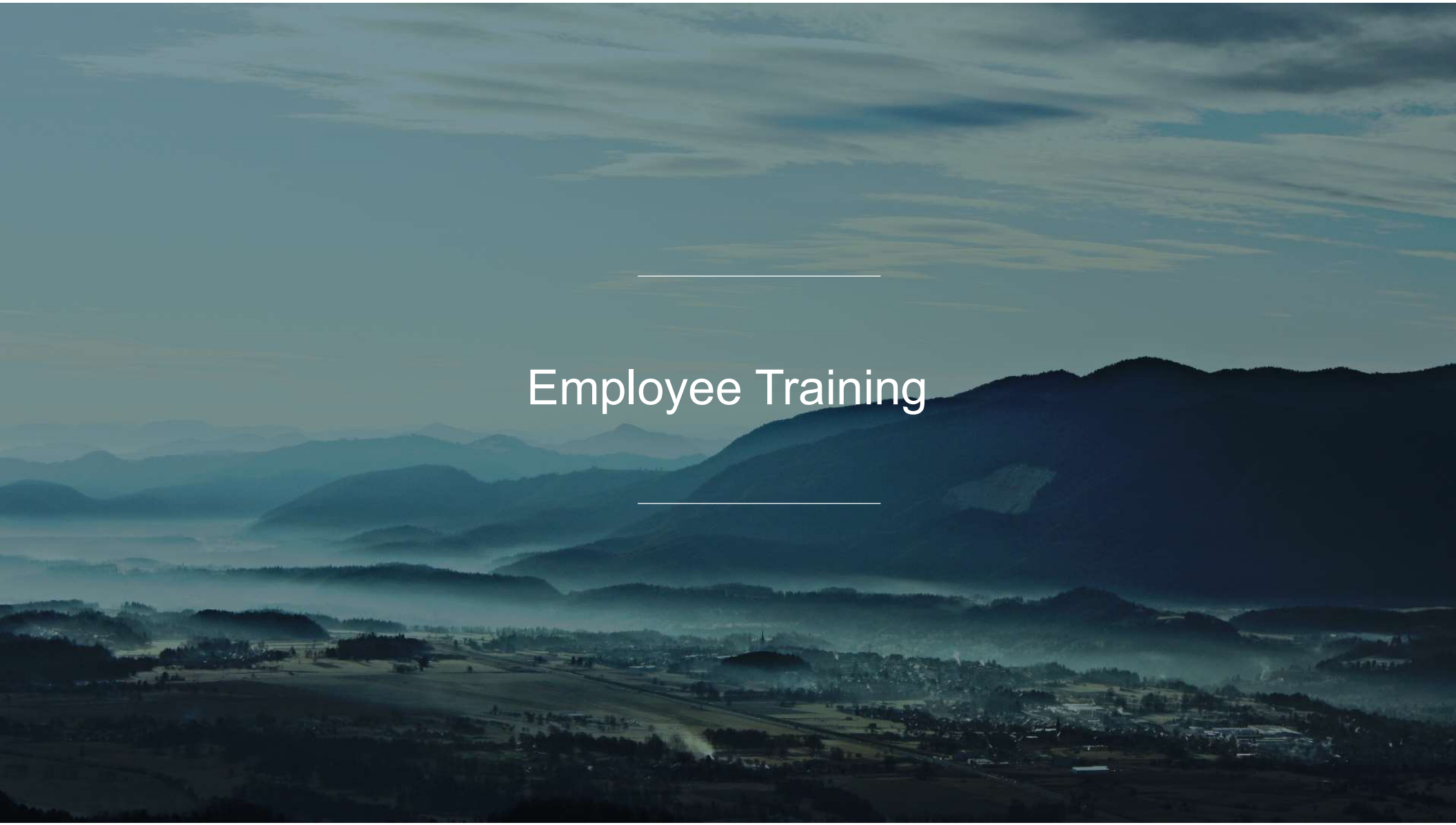
- Proper operation required by CHP
- Will change air balance in room
  - Make up air
- Face velocity vs capture velocity
- Sash positions
- Measuring/monitoring
- Resources for information

OTHER TYPES OF VENTILATION

- Glove boxes
- Slot hoods
- Downdraft tables
- Goose neck/elephant trunk






Employee Training

LAB HCS REQUIRED TRAINING

- Methods used to detect the presence or release of a hazardous chemicals
  - monitoring conducted by the employer
  - continuous monitoring devices
  - visual appearance or odor of hazardous chemicals when being released, etc.);
- The physical and health hazards of chemicals in the work area
- The measures employees can take to protect themselves from these hazards
  - specific procedures implemented by the employer
  - appropriate work practices
  - emergency procedures
  - personal protective equipment
- New/re-training prior to assignments involving new exposure situations
- The employee shall be trained on the employer's written Chemical Hygiene Plan

TRAINING CONTINUED (BECAUSE IT SHOULD NEVER STOP!)

- Refresher training
  - Lab HSC does not have specific refresher training requirements
  - Lab HSC states "The frequency of refresher information and training shall be determined by the employer"
  - This implies that refresher training is required, the specifics are simply not spelled out
- Continuous training models
  - Rather than one long training, provide periodic training sessions
  - Keep topics rotating
  - Ask employees for training topics


Contaminated Waste

PROPER MANAGEMENT OF CONTAMINATED WASTE

Waste generation → Waste handling → Waste storage → Waste disposal

CONTAMINATED WASTE MANAGEMENT

OSHA H&S requirements

EPA waste regulations

- Hazardous waste
- Training
- Haz waste storage
- Labeling
- Disposal

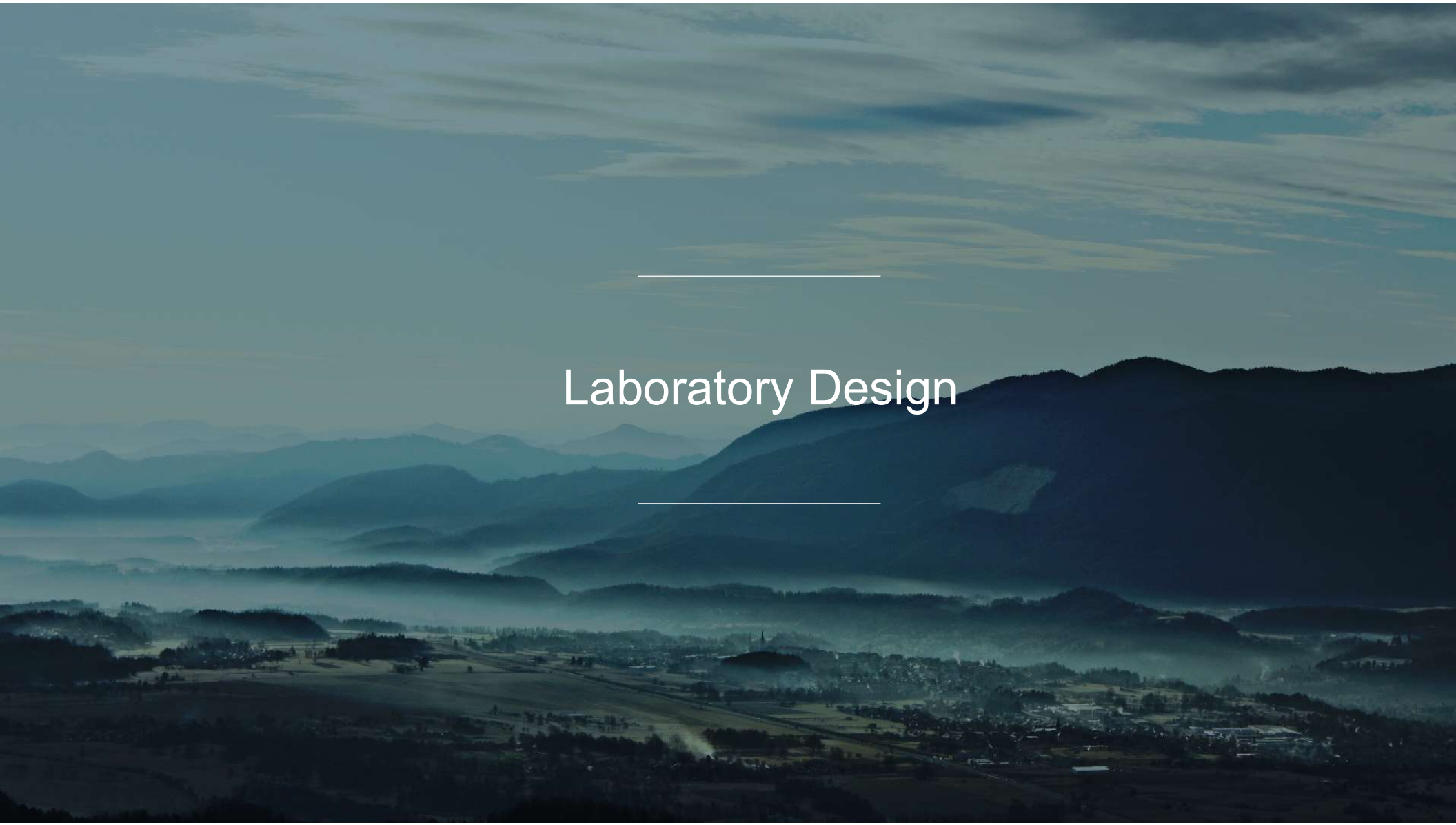
US DOT shipping regulations

- Labeling
- Shipping documentation
- Training

Annual Review of CHP

REVIEW OF THE CHP

- The Lab HCS requires that the CHP is reviewed at least annually
- Remember that if the review is not documented, it did not happen!
- The CHP should be "updated as necessary"
- What should the review look like
  - Accident and injury review
  - Upset scenarios
  - Equipment failures
  - Review of new/changed chemicals
  - Employee interviews



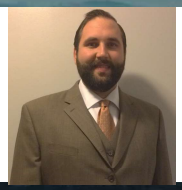
Laboratory Design

ASPECTS OF LAB SAFETY DESIGN

- It may seem obvious, but what are you doing in the lab?
  - Chemicals
  - Biologicals
  - Radioactive
- Ventilation
  - Must work with and not against base building systems
  - Hoods
  - Enclosures
  - Clean rooms
- Emergency action plans
- Fire protection

QUESTIONS

THANK YOU!



Jon Scheibe, CSP, CMSE
Ashland, LLC
Global Life Safety and Lab
Safety Programs Manager

Keith E. Green
EHS Support
Client Manager
keith.green@ehs-support.com

Monica Meyer
EHS Support
H&S Service Line Leader
monica.meyer@ehs-support.com

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  - 2017 Corporate Sustainability Management Conference
    - > August 1-2, Chicago, IL (Lombard)
- Upcoming Webinars
  - July 25 - Building a Successful Renewable Energy Strategy to Meet Aggressive Sustainability Goals
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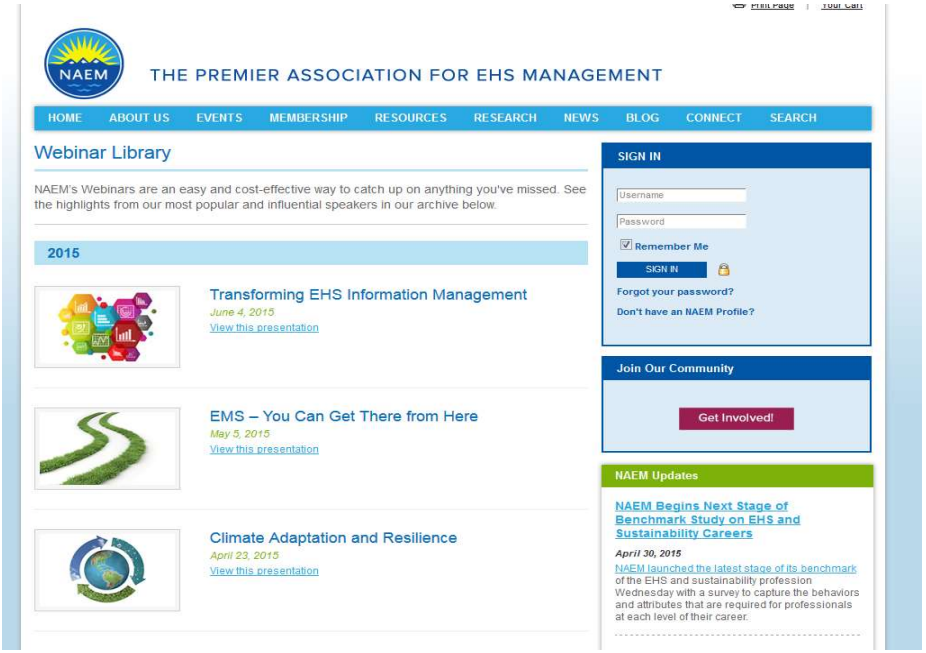

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