SET RESEARCH LABORATORIES IN THE STATE OF INSPECTION READINESS

March 23, 2022

H-3/23, Deepa Kundadka

24th California Unified Program Annual Training Conference

March 22, 23, 24, 29, 30, 31 - 2022

Thank you to all our 2022 SPONSORS and EXHIBITORS!

HEALTHSPACE

DTSC Department of Toxic Substances Control

ULTA BEAUTY

HCL

CalEPA California Environmental Protection Agency

Accela

CleanEarth

ENVIRONMENTAL HEALTH CDEH PREVENT · PROMOTE · PROTECT

CAL FIRE

THE HOME DEPOT

VALLEY PACIFIC

Cal OES GOVERNOR'S OFFICE OF EMERGENCY SERVICES

Tanknology

SOUTHERN CALIFORNIA EDISON Energy for What's Ahead

Environmental Protection CUPA Trust Fund

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ACV ENVIRO

A Republic Services Compar

esri THE SCIENCE OF WHERE

NES www.nesglobal.net

TRINCHERO Family Estates

CITADEL EHS assess · resolve · strengthen

TAIT SINCE 1964

CDPH California Department Of PublicHealth

Yorke ENGINEERING, LLC www.YorkeEngr.com

CALIFORNIA WATER BOARDS State Water Resources Control Board

California Compliance School

TEMARRY A Triumvirate Environmental Co.

Introduction to DKK Safety and Environmental

- Started DKK Safety and Environmental in 2017.
- A Certified Industrial Hygienist (CIH) by profession.
- Masters in Safety Sciences from Indiana University of Pennsylvania.
- I am passionate about comprehensive management of Environmental Health and Safety (EHS) program for the clients. My expertise includes risk management, industrial hygiene, laboratory safety, biosafety and sustainability, among others. I have over 14 years of experience in the industry. I have passed several local and state regulatory inspections and helped organizations in excelling in their EH&S programs.

- Please visit www.dkksafety.com
- Email: deepa@dkksafety.com

Deepa Kundadka
CEO & Founder
DKK Safety and Environmental

Agenda

- **Introduction to Research Laboratories**
- **Lab and Site Layout**
- **Laboratory Hazards**
- **Elements of Laboratory Safety Inspection Readiness**
- **Tips and tricks to Lab Management**

Introduction to Research Laboratories

- **Research & Development Laboratories:**
  - **Bioanalytical Laboratories**
    - **Analyzing biomarkers**
    - **Developing Assays**
  - **Therapeutic research and development work for treating:**
    - **Cancer**
    - **Metabolic disorders**
    - **Immune disease**
    - **Respiratory disorder**

Lab Layout

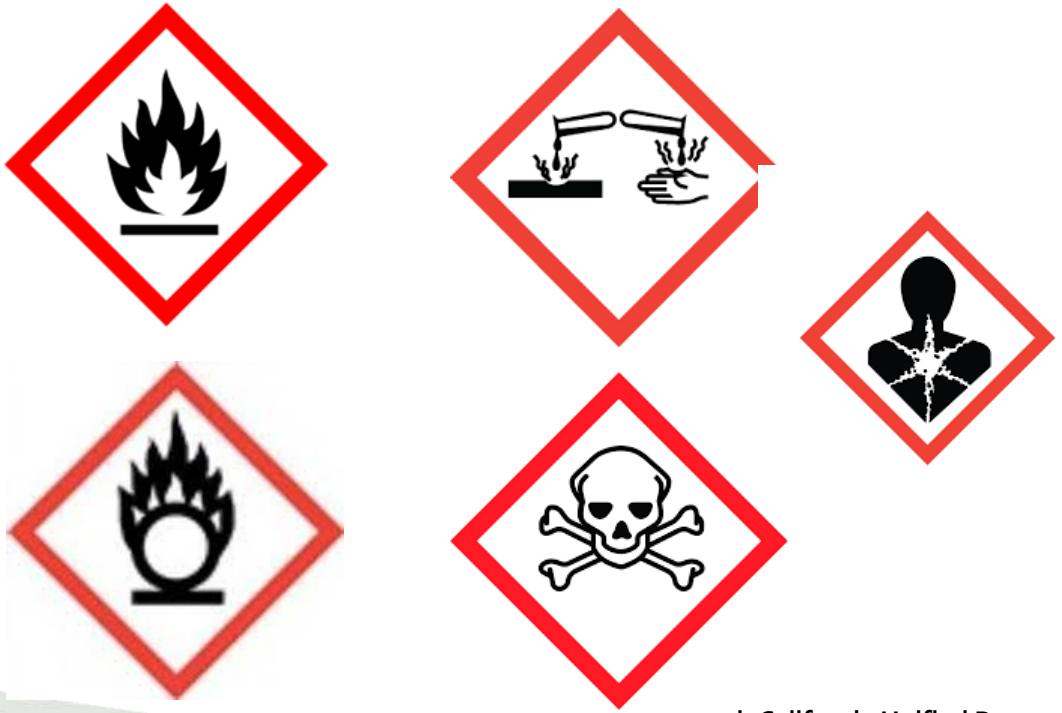
- Open Lab and Individual Labs
  - Analytical Laboratory Instruments (LCMS,HPLC, Plate reader, centrifuge, Flow Cytometry instruments)
  - Fume Hoods
  - Biosafety Cabinets
  - Glove Box
  - Isolators
  - Hazardous Waste containers
  - Biowaste containers
  - Flammable cabinet

Site Layout

- **Centralized Storage for**
  - **Hazardous Material (Key raw ingredients and chemicals/solvents/reagents are stored)**
  - **Hazardous Waste**
  - **Compressed Gas Cylinders**
  - **Nitrogen Tank (if Applicable)**

Laboratory Hazards

- Flammables
- Corrosives
- Oxidizers
- Toxics
- Carcinogens



Primary Label: Hazcom

- Chemical Name
- Pictograms
- Vendor Information
- Signal Word
- Precautionary Statements
- Hazard Statements

Secondary Label

- If you transfer chemical from its original or primary container to another container, the container needs to be labeled with at least:
  - Chemical Name
  - Hazard Warnings

Poll Question# 1

Acids and Bases shall be stored together:

a. True

b. False

Chemical Segregation

- Properly segregate chemicals:
  - Acids from bases
  - Oxidizers from Organic Acids
  - Flammables from toxics

Safe Methods for Handling and Storage of Hazardous Materials

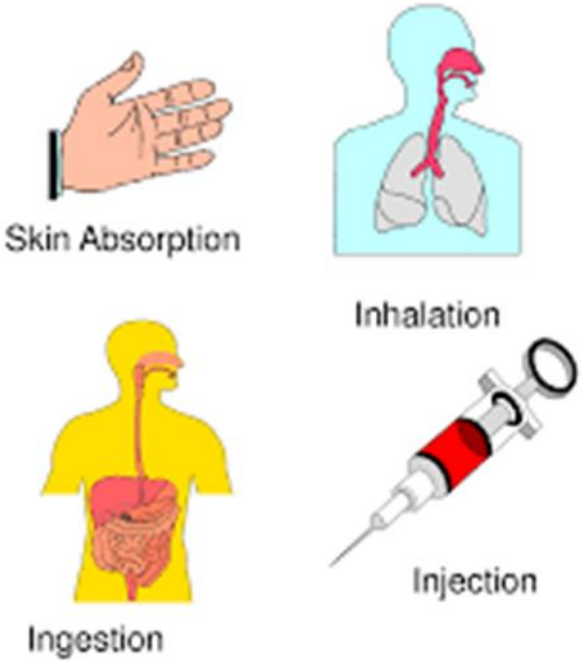
- Store Flammables in flammable cabinet
- Maintain separate dedicated cabinet for Acids and Bases
- Have a chemical storage location with keycard access to store routinely used chemicals and reagents

Refrigerated Flammable Liquid Storage

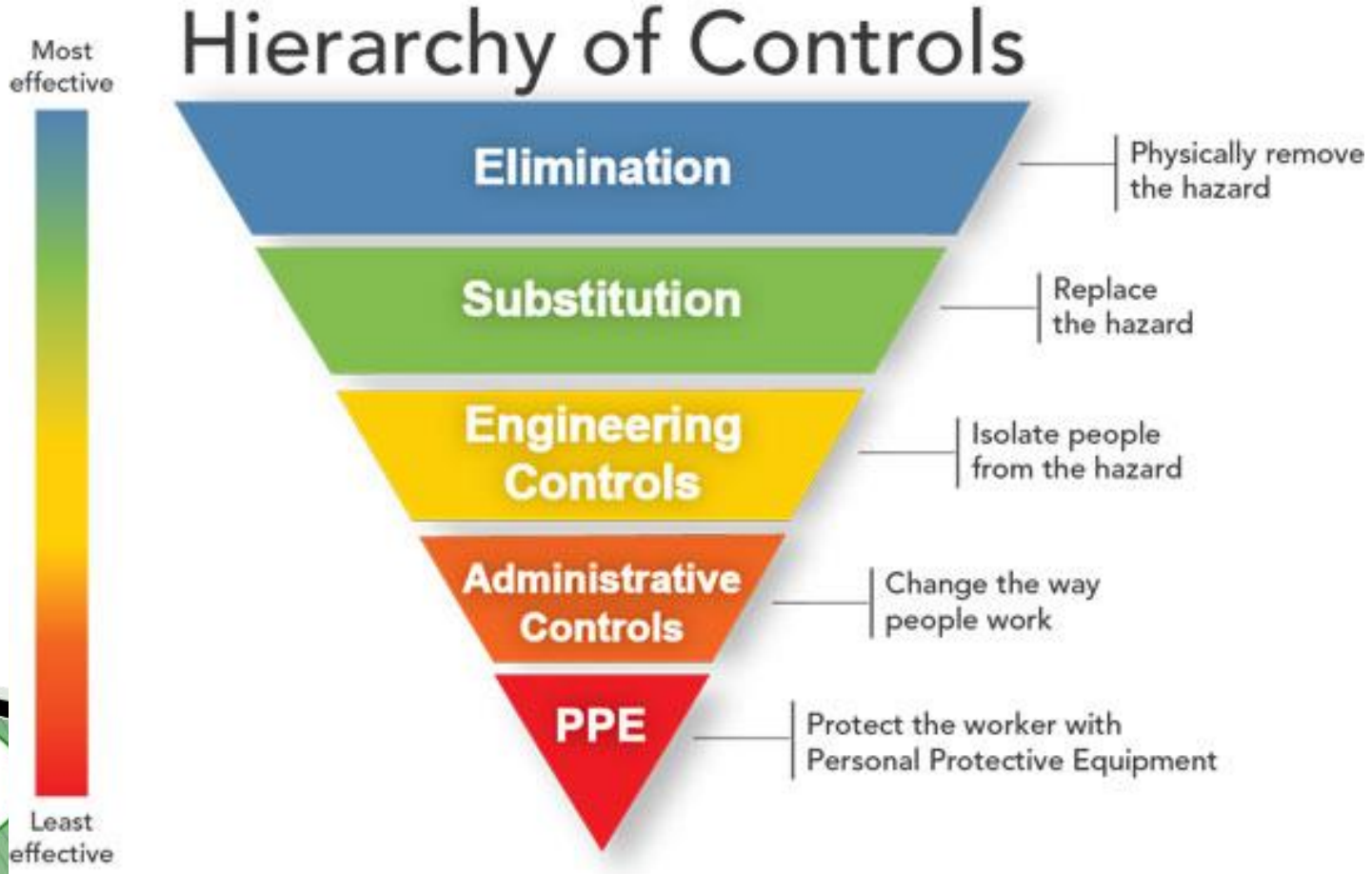
- Certain flammables need to be refrigerated
  - Please store them in the dedicated flammable storage refrigerator and not just regular refrigerator

Chemical Hazard: Route of Exposure

- Inhalation
  - Vapors
  - Fumes
  - Dust
- Absorption
  - Contact
  - Splash on skin
- Injection
  - Needle Sticks
  - Sharps
- Ingestion
  - Food and drink in the lab
  - Splash to face



Hazard Control Strategy in Research Labs



CALIFORNIA CUPA FORUM

Poll Question# 2

What form of control strategy does Fume Hood fall into:

a. Substitution
b. Elimination
c. Engineering Control
d. Administrative Control

Engineering Controls

- Make use of Engineering Controls such as Fume Hood to reduce exposure to harmful vapors
  - Example: While working with solvents such as Methanol, Acetonitrile, Isopropyl Alcohol

Engineering Controls Cont'd

- Check the fume hood certification date
- Work 10cm/ 4 inch inside for better protection

- Exception: Solvent squeeze bottles which are routinely used shall be stored inside the fume hood
  - Examples include: Acetone,70% Isopropyl Alcohol

Engineering Controls Cont'd

- Biosafety Cabinets
  - A biological safety cabinet (BSC) is a **primary engineering control used to protect personnel against biohazardous or infectious agents** and to help maintain quality control of the material being worked with as it filters both the inflow and exhaust air.

Poll Question# 3

What type of Biosafety levels are found commonly in research and development laboratories:

a. Biosafety Level 1 and Level 2
b. Biosafety Level 3
c. Biosafety Level 4
d. Biosafety Level 3 and Level 4

Engineering Controls Cont'd

- To safeguard employees from asphyxiation hazard
  - Oxygen Monitors (For Example: In areas where liquid nitrogen or gaseous nitrogen are used)
  - Carbon Dioxide Monitor (For example: incubators are fed with carbon dioxide gas)

Administrative Controls

- Warning Signs
- Lab Door Signs
- Standard Operating Procedures
- Training

Spill Containment

- Keep Spill Kits well stocked:
- Absorbent pads, socks and waste disposal bag
  - Place them in chemistry and biology labs for emergency preparedness

Personal Protective Equipment

- Protect yourself as you work:
  - Lab coat,
  - Safety glasses
  - Gloves
  - Closed Toed Shoes

Safe Methods for Handling and Storage of Hazardous Materials

- Ensure flammables are stored back in the flammable cabinet after use
    - Example: Methanol, Acetonitrile, Isopropyl Alcohol

Safe Methods for Handling and Storage of Hazardous Materials

- Use secondary containment such as rubber baskets while transporting flammables like Methanol, Acetonitrile and Isopropyl Alcohol Bottles

- If you are storing non-flammables on counter tops, store them inside secondary containment

Evacuation Procedures

- Whenever there is an imminent or actual emergency situation such as an explosion, fire, or release, the Emergency Coordinator shall:
  - Activate internal facility alarms or communications systems to notify facility personnel.

Assembly Area

- Define your assembly area during the evacuation
- Run the evacuation drill at least annually and document the paperwork for recordkeeping purposes

Emergency Equipment

- Perform monthly inspections for:
  - Portable fire extinguishers
  - Emergency Safety Shower and Eyewash Stations
- Maintain well stocked First Aid Stations
- Chemical Protective Clothing: Tyvek suits, Lab coat, safety glasses and gloves
- Fixed fire systems/sprinklers/fire hoses

Safety Equipment Location

- Have a site map with emergency safety equipment marked on it
- Also indicate on site map, the locations of hazardous material and hazardous waste above the threshold of:
  - 55 Gallons for liquid
  - 500 lbs. for solids
  - 200 cubic feet for gases (at normal temperature and pressure)

Poll Question# 4

How often should we inspect the Emergency Showers and Eyewash station as per California OSHA regulations:

a. Weekly
b. Quarterly
c. Periodically
d. Monthly

Chemical Inventory/Library

- Maintain current chemical inventory of all the chemicals stored and actively used on site
- Safety Datasheet database must be maintained either electronically or in the hard copy format
- According to California OSHA's Hazcom standard SDSs must now follow a standardized 16-section format in conveying information about a hazardous chemicals health effects and physical and chemical characteristics

Chemical Inventory/Library Example

- Chemical Inventory database managed electronically may include:
  - CAS No.
  - Chemical Name
  - Permanent Storage Location
  - Vendor
  - Product Number
  - Amount
  - SDS Link

Safety Data Sheets

- Provide comprehensive information of a substance/mixture for use in the workplace
- Information provided enables the employer:
  - To develop worker protection measures specific to the exposures and workplace environment
  - To consider measures to protect the environment

Exit and Egress

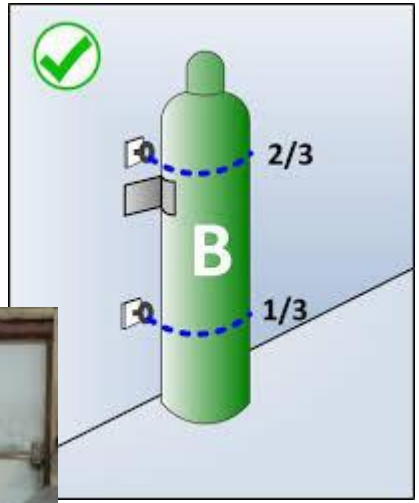
- Keep hallways and egress path always clear

Electrical Safety

- 3 ft clearance in front of the electrical panel

Compressed Gas Cylinder Safety

- Compressed Gas Cylinders to be secured at 1/3 and 2/3 height
- Use cylinder dolly for transportation



In the Event of Chemical Exposure

- Emergency procedures may include
  - Eyes: Flush with water for 15 minutes
  - Skin: Remove contaminated clothing and wash affected areas with soap and water
  - Inhalation: Move to fresh air
  - Swallowing: Get immediate emergency medical assistance
  - Always read the label and SDS for every chemical you work with

Hazardous Waste Management

- Keep Hazardous Waste stream list ready
- Maintain active waste profile for the current hazardous waste

Hazardous Waste Management …Cont'd

- Hazardous Waste Containers must be:

  - Closed when not being filled
  - Rigid and leak proof
  - In secondary containment
  - Labeled with Hazardous Waste Label
  - Hazardous waste storage central location must be inspected weekly and paperwork kept ready

Hazardous Waste Management …Cont'd

Hazardous Waste Label Must have:

- Generator's Name and Address
- EPA ID#
- Words "Hazardous Waste"
- Contents
- Hazardous Properties
- Physical State
- Start Date
- Fill Date

Sustainability: California Empty

- Empty containers can be recycled if they meet the regulations found in Title 22, CCR 66261.7
  - Liquid – a container is empty when there is no longer a continuous stream of material flowing from the opening when the container is held in any orientation
  - Solid: no hazardous material shall remain in the container that can be feasibly removed by physical methods such as scraping and chipping, but not rinsing
  - Once the chemical container is considered empty, the label can be defaced or removed and the container can be recycled
  - Exception: Acutely or Extremely hazardous materials
    - Example: Sodium Azide

Biowaste Container Management

- Ensure Biowaste containers are:
  - Labeled with biohazard signs on all sides
  - Have a red bag liner meeting ASTM standard
  - Closed when not in use

Employee Training

- Have Training curriculum for Lab personnel in:
  - Hazard Communication
  - Hazardous Waste Management
  - Bloodborne Pathogen Programs
  - Medical Waste Management Program
- Maintain Training recordkeeping:
  - Online Learning Management System
  - Any other form of electronic recordkeeping

Summary of Hazard Communication Program

- The Hazard Communication Standard requires a written program, material safety data sheet, proper chemical labeling and training
- Chemical can enter the body through absorption, inhalation, injection and ingestion and at excessive levels have severe toxic effects
- Hazard control strategies include elimination or substitution, engineering and administrative controls and personal protective equipment
- Safety Data Sheets must be readily accessible to all employees in their work area/work site
- Chemical labels must include the identity of the chemical, specific health hazards including target organs

Tips and Tricks for

Safe Laboratory Management

24th California Unified Program Annual Training Conference
March 22, 23, 24, 29, 30, 31 - 2022

Tips & Tricks for Safe Laboratory Management

Fume Hood Challenge

- A competition among scientists and lab personnel to maintain fume hood organized and tidy

Advantages

- Challenge helps scientists to be aware of
  - Maintaining sash at the recommended height to reduce exposure to solvents and chemicals
  - Became aware of annual certification of fume hoods
  - Putting solvents and glassware away after use to reduce clutter
  - Raising instrument to improve airflow

CALIFORNIA CUPA FORUM

Tips & Tricks for Safe Laboratory Management

International Freezer Challenge

- A competition among scientists to maintain current inventory of biological samples, reagents, virus among others in the freezers

freezer challenge

Advantages

- Keeping updated inventory of biological samples and reagents
- Purge samples that are no longer needed
- Explore options to maintain digital inventory of samples
- Keep an eye on freezer preventive maintenance elements
- Reduce frost build up and prevent injuries associated with handling ultra cold samples

CALIFORNIA CUPA FORUM

Tips & Tricks for Safe Laboratory Management…Cont'd

Biosafety Cabinet Challenge

- A competition among scientists and lab personnel to maintain biosafety cabinet organized and tidy

Advantages

- Making scientists aware of annual certification ensures
  - adequate Airflow
  - HEPA Filter Performance
- Maintain BSCs clean after use helps to reduce
  - Lab acquired infection
  - Cross contamination

CALIFORNIA CUPA FORUM

References

- Cal/OSHA Regulations
  - Section 5191, Occupational Exposure to Hazardous Chemicals in Laboratories
  - Section 5194, Hazard Communication

Any Questions?

Deepa Kundadka, CIH
DKK Safety and Environmental
Email: deepa@dkksafety.com
Phone: 814-441-2363