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Challenges and Opportunities for OEHS Professionals in the Emerging Cannabis Industry

A Festivus for the Rest of Us?

Right People. **Right** Perspective. **Right** Now.



Agenda

- The Challenges
- The Basics and the Differences
- The Approaches being Taken by FACS / Cascadia / FALI
- The Choice and Opportunities for OEHS Professionals

The Challenges

Current Landscape and Challenges

- A market that has never been regulated
 - Enforcement / staffing/compliance

- State driven, rather than Fed driven regulations
 - Various Target Levels, Different Emphasis on the supply chains

- Burdens on growers, distributors, labs and retailers are different in different states
 - Registrations / Tax Structure Local and State

Current Landscape and Challenges

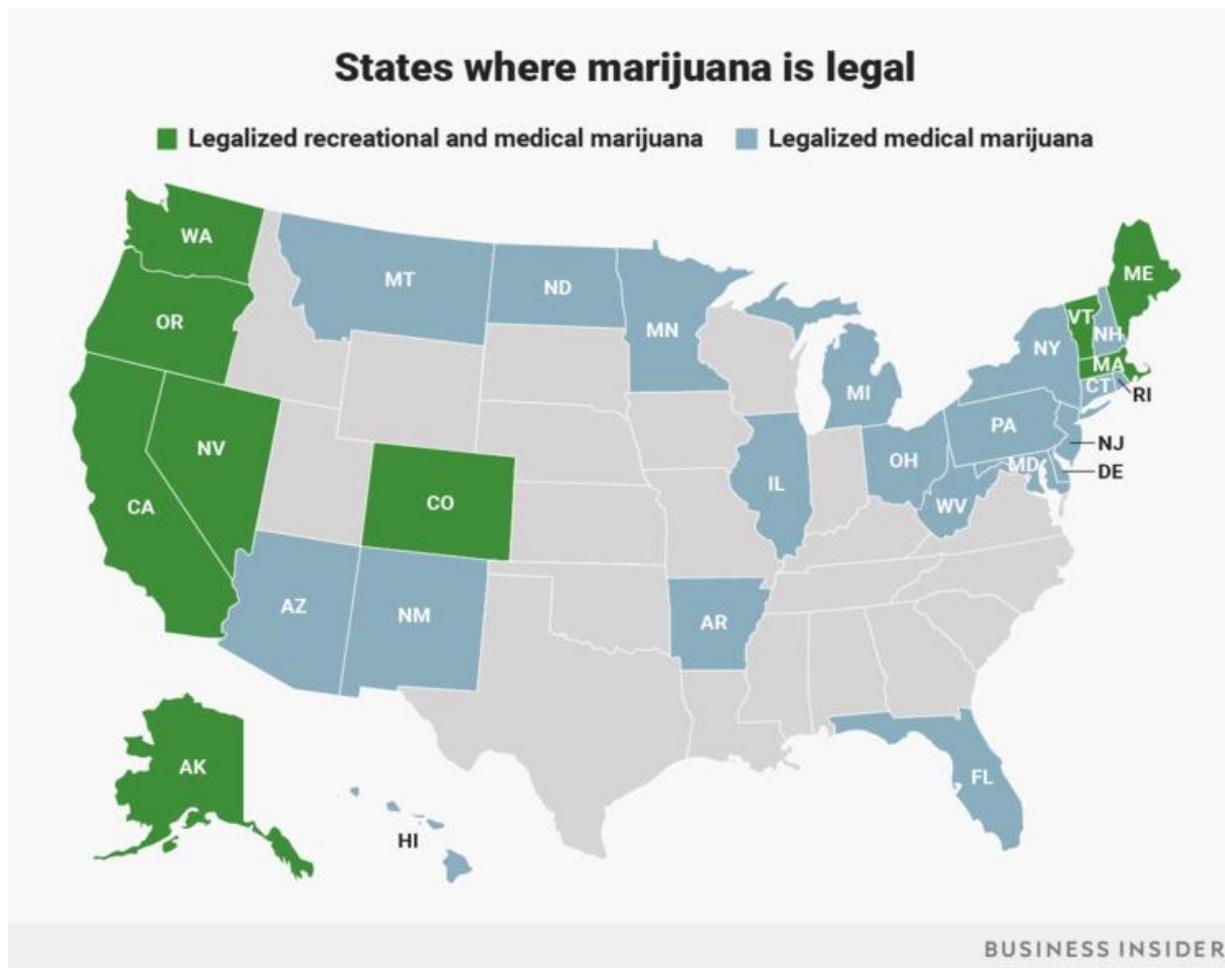
- Laboratory variability and structure in it's infancy, but for established food or environmental labs
 - Proficiency Testing / Accreditations

- Interstate Prohibitions Everywhere

- Banking

- If I participate, am I breaking the law?

And it's Changed since the Mid-Term Elections



The Basics

The Scope of Exposure

■ Employees affected

- Cultivators
- Trimmers
- Extractors
- Edible Producers
- Budtenders
- Laboratory Technicians



■ Types of hazards

- Biological
- Chemical
- Physical



Physical Hazards



- **Occupational Injuries**

burns, cuts, bruises, slips, trips, falls, and strains and other ergonomic issues are possible in many areas of the cannabis industry

- **Electrical and Mechanical Hazards**

Electrical: temporary wiring, electricity in highly humid or watering areas, UV radiation issues in indoor grows. Mechanical: forklifts, trimming machines, wood chippers, grinders

- **Fire Hazards (flammable and explosive)**

Explosion and fire hazards extracting oils from the plants, working with compressed gasses and flammable/combustible liquids

- **Dangerous Work Environments**

Working at heights, in confined spaces, with UV lighting, excessive noise, workplace violence

Biological Hazards



■ Mold

- Increased levels of humidity (up to 90%) as well as poor ventilation promotes mould growth (up to 100 times higher than outdoor air)
- Affects employees involved with cultivation, trimming, and removal of plants
- Can cause nasal congestion, throat, eye, or skin irritation, wheezing

■ Sensitizers/Allergens

- Any employee who comes into direct contact with the cannabis plants can be affected
- Can cause allergic reactions (itchiness, sneezing, coughing, congested or runny nose), hypersensitivity, anaphylaxis

Chemical Hazards

- Carbon Dioxide
 - Carbon Dioxide is used to increase plant growth, produce concentrates, extraction, and enrichment
 - Can act as a asphyxiant
 -
- Carbon Monoxide
 - Employees in the cultivation facility, as well as in areas using indoor generators may be affected
 - Can lead to CO Poisoning
- Indoor Air Quality
 - Nitrogen oxides, volatile organic compounds, and ozone can affect all employees in indoor environments
 - Can lead to eye and skin irritation, headaches, decreased lung function

Chemical Hazards

- Pesticides/Fertilizers
 - Employees in the cultivation facilities may be in close contact with these chemicals (such as isopropyl alcohol, ethanol, malathion)
 - Can cause skin or eye irritation, burns, effects on nervous system, Inhalation can lead to lung damage and respiratory issues



Your Typical Exposure Control Matrix

- Elimination and substitution
 - Eliminating hazards or substituting a less hazardous option.
 -
- Engineering controls
 - Remove hazard at the source before it comes into contact with a worker
- Work practice controls
 - Measures to reduce employee exposure by changing how they work
- PPE
 - Personal protective equipment for when hazards cannot be controlled by other means

Typical Personal Protective Equipment

- Respirator
- Eye protection
- Hand/skin protection
- Hearing protection



What is the *Same* about Cannabis Labs

- Laboratory Safety Chemical Hygiene Plan
 - [OSHAfactsheet-laboratory-safety-chemical-hygiene-plan.pdf](#)

- Injury and Illness Prevention Plan

- Accreditation
 - ISO 17025
 - Total Quality System
 - TNI
 - State Specific
 - Some Form of Proficiency Testing
 - Round Robins
 - AIHA LAC Someday

- Facility Management
 - Calibrations of Hoods
 - Engineering Controls

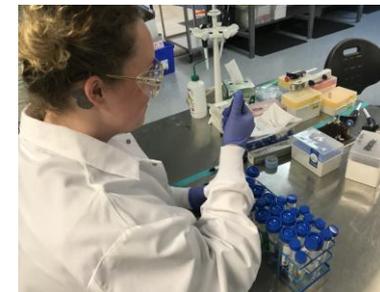


What is the *Same* about Cannabis Labs

- Instrumentation
 - GC's
 - ICP's

- Data generation

- Staff Scientists Appropriately Protected



What is the *Same* about Cannabis Labs

- Flammable Cabinets
 - Reagents
- Safety showers
- Proper NFPA Safety Signage



What is *Different* about Cannabis Labs

- Prescribed Testing Methods by State
- [Bureau of Cannabis Control - Required Testing Chart.pdf](#)



BUREAU OF CANNABIS CONTROL CALIFORNIA

ALL CANNABIS HARVESTED ON OR AFTER 1/1/2018 AND ALL CANNABIS PRODUCTS MANUFACTURED ON OR AFTER 1/1/2018, SHALL BE TESTED ACCORDING TO TITLE 16 OF THE CALIFORNIA CODE OF REGULATIONS, SECTION 5715, AND THE REGULATIONS THAT FOLLOW.

PHASE-IN OF REQUIRED LABORATORY TESTING	INHALABLE CANNABIS	INHALABLE CANNABIS PRODUCTS	OTHER CANNABIS & CANNABIS PRODUCTS
JANUARY 1, 2018			
Cannabinoids Testing	✓	✓	✓
Moisture Content Testing	✓		
Category II Residual Solvents and Processing Chemicals Testing		✓	✓
Category I Residual Pesticides Testing	✓	✓	✓
Microbial Impurities Testing (A. fumigatus, A. flavus, A. niger, A. terreus)	✓	✓	
Microbial Impurities Testing (Escherichia coli and Salmonella spp.)	✓	✓	✓
Homogeneity Testing of Edible Cannabis Products			✓
JULY 1, 2018			
Category I Residual Solvents and Processing Chemicals Testing		✓	✓
Category II Residual Pesticides Testing	✓	✓	✓
Foreign Material Testing	✓	✓	✓
DECEMBER 31, 2018			
Terpenoids Testing	✓	✓	✓
Mycotoxins Testing	✓	✓	✓
Heavy Metals Testing	✓	✓	✓
Water Activity Testing of Solid or Semi-Solid Edibles	✓		✓

STATE OF CALIFORNIA
dca
DEPARTMENT OF CONSUMER AFFAIRS

 **Bureau of Cannabis Control**
1625 North Market Boulevard, Suite 202-S
Sacramento, CA 95834
(800) 952-5210

For the latest updates, follow the Bureau on social media

PDE_17-261

What is *Different* about Cannabis Labs

- Labs Must be Completely Separate Entity from any other cannabis enterprise
- Sampling Must be performed by individuals with Lab Certification and Plan developed prior to collection
- Different Approaches by States
 - At grow site
 - At distribution site
- This places Staff at both Outdoor and Indoor grow sites that need to be safe as well



CASCADIA LABS Sampling Report

Sampling Plan ID# SPC003977		
Primary Sample ID	Increment Number	Sample Weight (grams)
SPC003977-1	1	5.72
SPC003977-2	2	5.21
SPC003977-3	3	5.21
SPC003977-4	4	5.55
SPC003977-5	5	5.51
SPC003977-6	6	5.20
SPC003977-7	7	5.55
SPC003977-8	8	5.40
SPC003977-9	9	5.20
SPC003977-10	10	5.15
Total Composite Sample		52.13

Client Signature / Date: [Signature] 7/1/2018
 LIMS Input By / Date: [Signature] 7/1/2018

CASCADIA LABS Sampling Plan

Document Number: SPC003977 Revision: 1

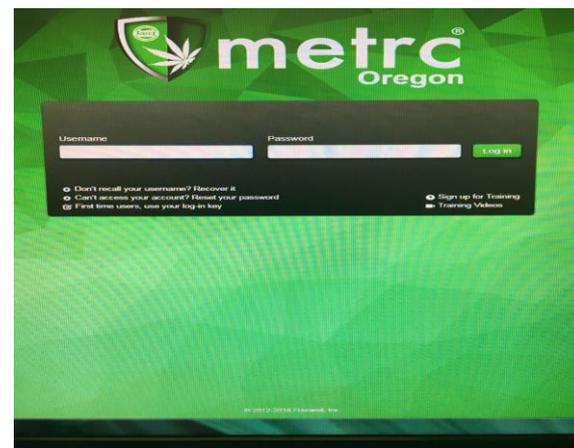
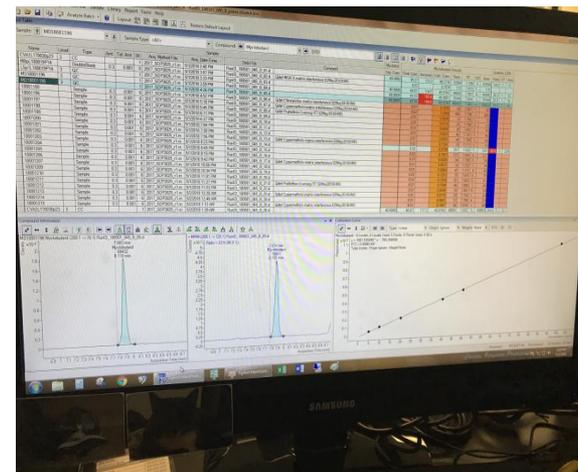
Sampling Plan ID	SPC003977
Unique Batch ID	LAB010000 [Redacted]
Total Mass of Batch (g)	6434
Total Number of Containers	4
Number of Increments	10
Minimum Mass per Sample (g)	5.40 5.21 5.21 5.55

Assigned Container ID	Primary Sample Location	Primary Sample ID
1 of 4	Bottom Lower Right	SPC003977-1
4 of 4	Top Upper Right	SPC003977-2
4 of 4	Top Upper Left	SPC003977-3
2 of 4	Bottom Lower Right	SPC003977-4
2 of 4	Middle Lower Left	SPC003977-5
1 of 4	Bottom Lower Left	SPC003977-6
3 of 4	Bottom Lower Left	SPC003977-7
3 of 4	Top Lower Left	SPC003977-8
3 of 4	Bottom Upper Right	SPC003977-9
2 of 4	Middle Lower Right	SPC003977-10

Sampling Plan Generated By / Date: [Signature] 3/26/2018 08:39 AM

What is *Different* about Cannabis Labs

- Results from Compliance Testing are reported from the initiation of the sampling plan though analysis and globally reported to the State Agency
- Panels are different / analytes are different
- No Standard Method
- Extract testing equally complicated
- Edible Testing More Complicated



What is *Different* about Cannabis Labs

- Permitting Hurdles at Local and State Level
 - Significant Fees for those permits

- Zoning Restrictions on Placement of the Lab

- Leases

- Lumped in with all of the supply chain

- Loans – not..



Flow Cannabis Institute
 Redwood Valley CA
 100s of small farmers in the
 Emerald Triangle



What is *Different* about Cannabis Labs

- Dealing with Schedule 1 Drugs and general safety is a concern – Significant Security needed
- Homogenization Procedures need to be used creating some potential exposure
- Odor Issues and Adjacent Spaces
- Employee Issues – Driving with Samples! Over-testing of Samples..



The Approaches

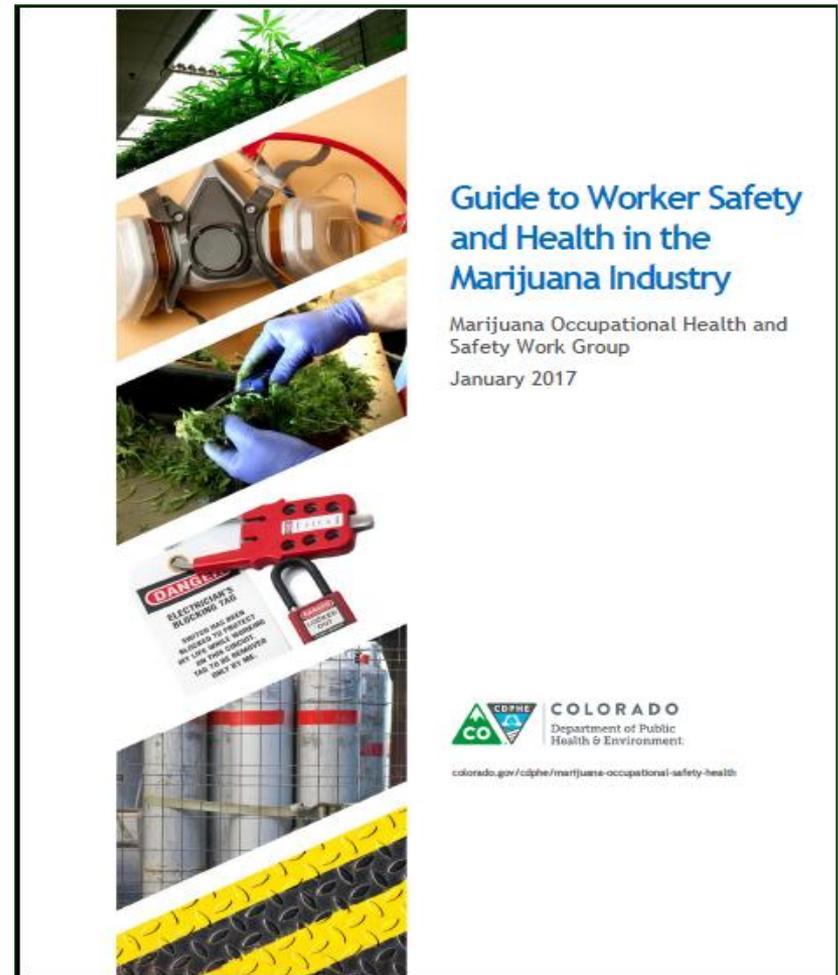
EHS Plans that will be Required

- Site Safety
- Hazard Communication
- Fire Prevention/Protection
- Emergency Action Plan



Reliance Documents

- The Colorado Experience
 - Publications and Presentations
 - Roberta Smith and Others at DPH
- Report published in January 2017:
 - <https://www.colorado.gov/pacific/cdphe/marijuana-occupational-safety-and-health>



Published Exposure Investigations

NIOSH HHE

- Report on Workers

- Other Investigators
 - Harvesting and Processing in an Outdoor Grow
 - Other Publications out there on Indoor Grows
 - Graduate Work from Aspiring CIH on UV Illumination



One City Approach

- Certified Industrial Hygienist Plan. A detailed plan prepared by a certified industrial hygienist (CIH) to ensure that the proposed wholesale commercial cannabis business maintains appropriate health and safety procedures, including, but not limited to, procedures necessary to control hazards, procedures for use of proper protective equipment, product safety procedures, procedures for compliance with Cal OSHA limits, procedures to provide specifications for ventilation controls, and procedures to ensure environmental protections. (PMC 5.58.126(F)(3)).
- Note: Approval of the Director as to the CIH plan's compliance with these criteria is a pre-requisite to commencing and continuing operations. The Director shall establish further written requirements for the CIH plan, including but not limited to required inspections by the CIH and a hazardous materials management plan. Upon reasonable determination by the Director, the permittee shall be required to update or amend the approved plan to the satisfaction of the Director.
- [CommercialMarijuanaManufacturingPermitApplication.docx](#)

Gap Analysis Approach

- FACS is conducting Gap Analysis for Companies / Attorneys/ Investors – Distribution Facilities
- - The facilities may in fact not even be built, have personnel, but are expected to provide an EH & S plan...
- [CIHC Example of Gap Analysis.pdf](#)

Potency Frenzy

- It's Not about the THC, it's about CBD's and:
- Terpene Testing – Over 200 terpenoids in cannabis
 - Chemo-diversity - Genetic
 - Chemo-intensity – environmental
 - Key to flavor and likely pharmaceutical breakthroughs as they interact with
 - neuronal and muscle ion channels
 - cell membranes
 - Neurotransmitter receptors
 - Odorant receptors
 - Enzymes

D-Linalool



Beta-Caryophyllene



Beta-Myrcene



D-Limonene



Beyond Compliance

- Genetic typing
- Soil Nutrient Analysis
- CBD to THC quick ratios
- Field Tests
- In House Labs

The Future

Engagement: Associations Docs / Memberships

- AOAC
- US Pharmacopeia
- ACIL Cannabis Working Group
- AIHA task Force and Board and the LAC Interest
- FDA

Engagement:

Associations Docs / Memberships

- AIHA Cannabis Task Force
 - Organized in 2017
 - Rob has told you the Rest already
- California Cannabis Industry Association
- National Cannabis Industry Association
- A Host of Industry Periodicals

The Upcoming Battle : Keeping Strains Viable... *Sort of Like Fine Wine*

Cascadia Co-Located at the
FCI Site

Vs

Big Ag in the Central Valley



Cannabis Opportunities

- EHS Program Management
 - Permitting and Cal/OSHA compliance
 - EHS Gap Assessment
 - EHS Safe Work Practice Development
 - Mold assessment
 - Identification of mold growth on cannabis plants
 - Industry concern around powdery mildew and Aspergillus
 - Water management
 - Water storage and irrigation systems
 - Managing water systems to prevent contamination during cultivation operations

Cannabis Opportunities

- EHS Training:
 - California – 10 v. 30 hours of training.
 - Larger facilities have the need for an individual with training in all aspects of occupational health and safety
 - Need someone to oversee and manage to ensure things are always as safe as possible.
 - Someone with training in all aspects can ensure that everyone else has all the training that they need.
 - Having an individual with training in all aspects of occupational health and safety means employees with questions have someone at work to discuss these issues.

Cannabis Opportunities

- Intercompany Cooperation
 - EHS services
 - Analytical and product testing (COA)
 - Product design
 - Industrial Hygiene
 - Water management
 - Litigation support
 - Training

Conclusion

- Industrial Hygienists will play an essential role in risk management as we do in other industrial and agricultural settings, both large and small. *It will be a battle and include feats of strength*
- The Industry will be very turbulent, as in every frontier industry where regulation is messy and enforcement is unclear. Think Asbestos in the late 70's, but with investors. *The airing of grievances will continue*
- Only this time perhaps we both get it right, and help save lives in a different way. *Yes a Festivus for the rest of us..*



Questions & Thank You

Feel Free to Reach out at
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Or view the websites at
www.cascadia-labs.com
www.falaboratories.com
www.forensicanalytical.com



**Right
People.**

**Right
Perspective.**

**Right
Now.**