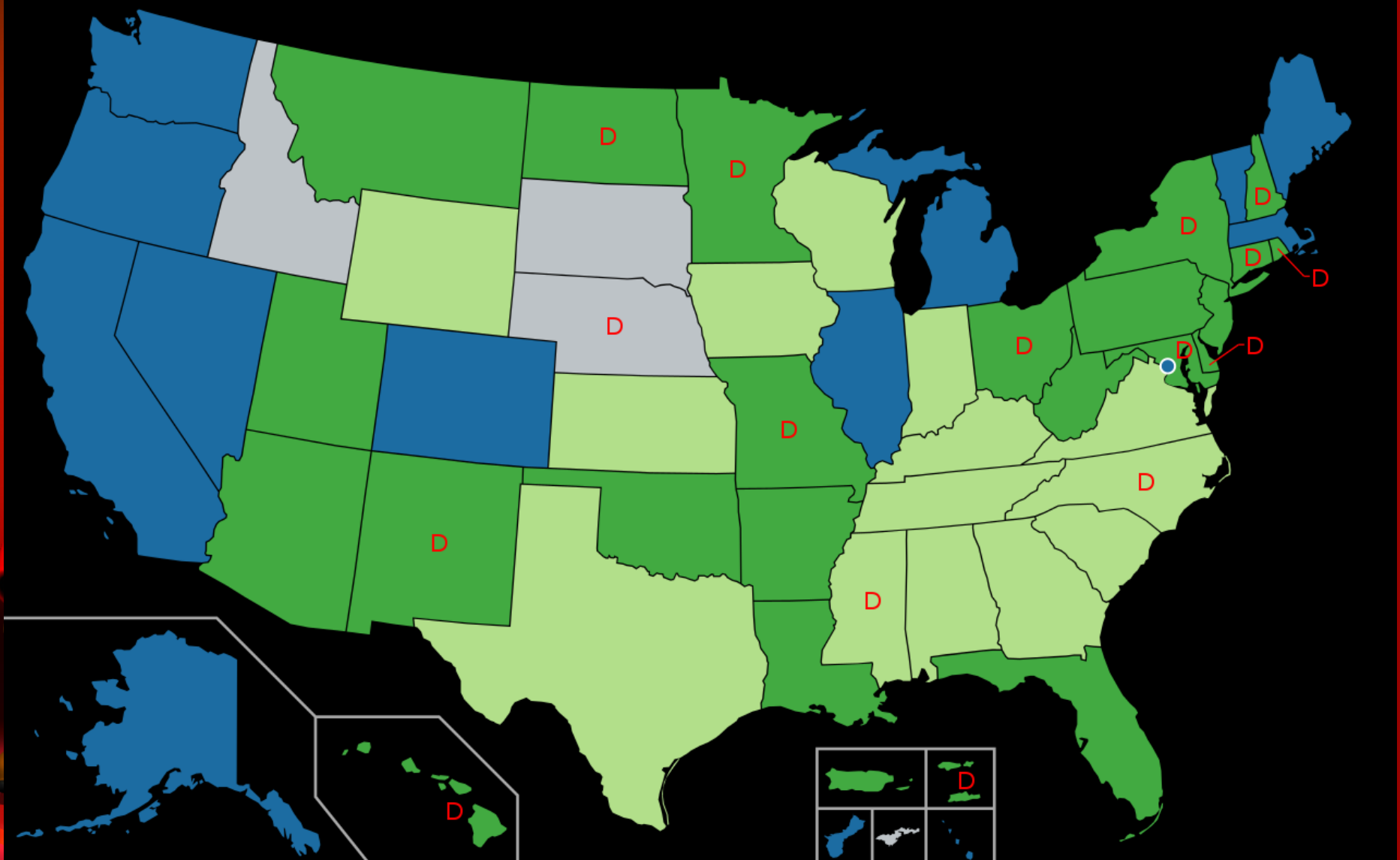


Marijuana Growing, Processing, and Extraction Facilities

The Who, What, When, Where and Why's



Legal ■ Legal medical ■ Legal medical w/limited THC ■
 Prohibited for any use ■ Decriminalized D



Medical Marijuana in Utah



Marijuana Studies and Articles:

Flower Power: Study Finds Smoking Marijuana Best for Relieving Pain
Chocolate Ingredients Throw Off Cannabis Potency Tests, Researchers Say
Your Doctor May Not Know Much About Marijuana. Here's Why.

Youth Marijuana Use Doesn't Rise When it's Legal. Federal Data Prove It.

Cannabinoids Have Potential to Reduce Tumor Growth, Researchers Find.

Cannabinoids Could Help Treat OCD, Researchers Suggest

Legal Marijuana Leads to Fewer Opioid Deaths, Studies Conclude

Researchers Unlock What Gives Cannabis its Anti-Inflammatory Qualities

Study: Drought Conditions Could Induce Plants to Make More Cannabinoids

Cannabis and Crohn's Disease

Researchers Find Endocannabinoids in Gut Might Regulate Obesity

What Can Cannabis Do for Patients with ALS?

Study: Where Weed is Legal, Interest in Alcohol Down, but Up for Tobacco

How Medical Cannabis Eases HIV Symptoms, Reduces Disease Progression

Your Transdermal Cannabis Patch Can Make For Effective Medicine

Study: Drug Rehab Experts Find Medical Marijuana Helpful, but with Risks

Endocannabinoid System Plays Key Role in Reducing Fear, Yale Study Finds

What Can Cannabis Do for Patients with ADHD?

Reference to articles:

<https://news.weedmaps.com/science-medicine/page/3/>





What is Cannabis?

- 🔥 Cannabis is a flowering plant.
- 🔥 Uses carbon dioxide (CO₂), light, and water to grow.
- 🔥 Used for industrial, medical and in some states recreational purposes.
- 🔥 Used in raw form or refined through extraction processes to create cannabis oil.



Definitions:

 **According to 21 USCS § 802;** [Title 21. Food and Drugs; Chapter 13. Drug Abuse Prevention and Control, Control and Enforcement, Introductory Provisions],

Marijuana means: “All parts of the plant Cannabis Sativa L., whether growing or not, the seeds thereof, the resin extracted from any part of such plant and every compound, manufacture, salt, derivative, mixture, or preparations of such plant, its seeds or resin.”



What about Industrial Hemp?

(Cannabis L.)

🚒 Utah Administrative Code: Rule R68-24-2(4):

🚒 “Industrial Hemp” means any part of a cannabis plant, whether growing or not, with a concentration of less than 0.3% tetrahydrocannabinol by weight.

🚒 TetraHydroCannabinol = THC



Simple Comparison

Cannabis Sativa

Hemp

Higher CBD
Traces of THC < 0.3%
Medicinal uses
Various industrial uses
Food

Marijuana

Higher THC (5-25%)
Recreational uses
Medicinal uses



non-psychoactive (no high)

CBD

psychoactive (gets you high)

THC

How is THC legally defined by Utah's Department of Agriculture?

🚒 “THC” means total composite tetrahydrocannabinol including delta-9-tetrahydrocannabinol and tetrahydrocannabinolic acid.

🚒 R68-24-2(6)

🚒 What does that mean in layman's terms?



The first step to understanding THC is to understand cannabinoids.

- 👉 Cannabinoids are chemical compounds found in the cannabis plant that interact with receptors in the brain and body to create various effects.
- 👉 There exist dozens, and potentially more than 100, cannabinoids in the cannabis plant, but THC is most widely known among these due to its abundance and euphoric attributes.



What are Terpenes?

- 🔥 Terpenes are chemicals that determine how things smell.
 - 🔥 Orange Citrus, Pine Tree, Fruity, Skunky, Floral
- 🔥 There are over 100 different terpenes found in cannabis. They serve as a defense mechanism against bacteria, fungi, insects and other pests.



Trichomes
(Tiny resin filled glands that contain majority of THC)

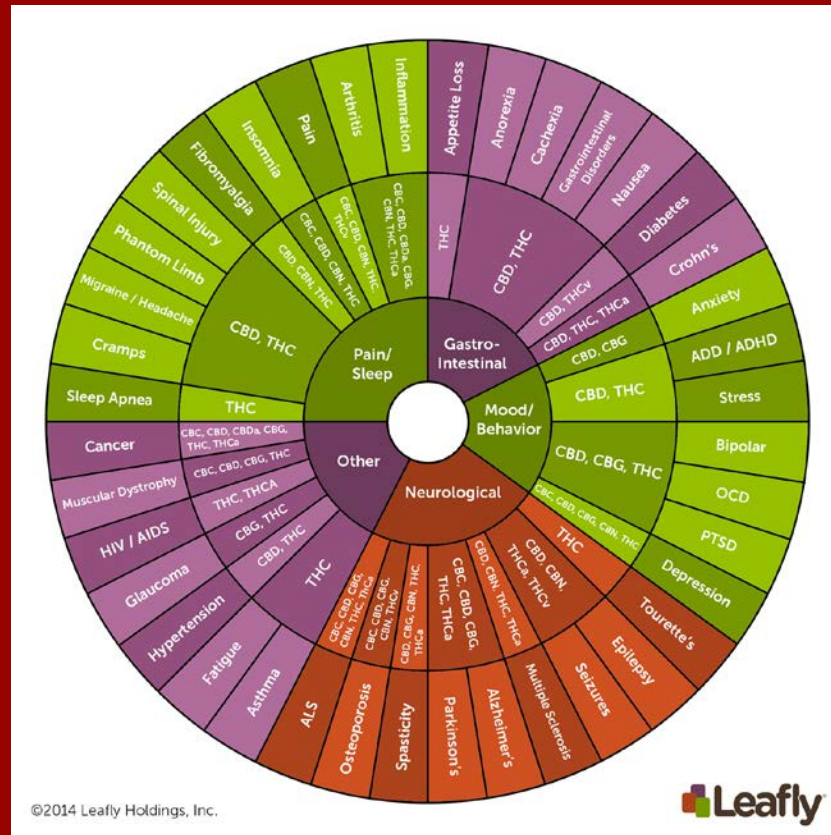


👉 Cannabinoids and Terpenes work together in what is called the 'Entourage Effect'.

👉 Terpenes can intensify or down-play the effects of the cannabinoids.



Cannabinoid Wheel



Estimated Domestic Market Value

Hemp

\$452 million

Marijuana

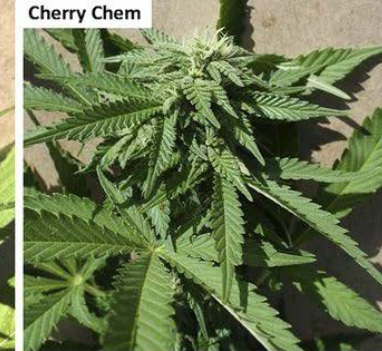
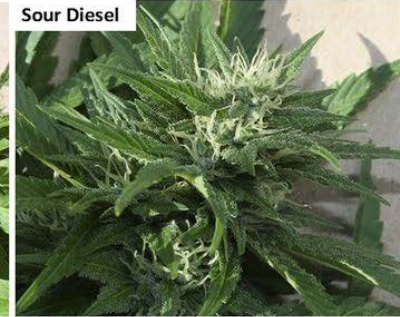
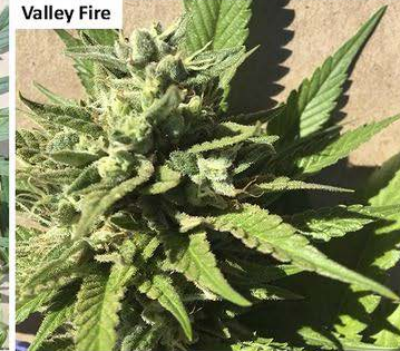
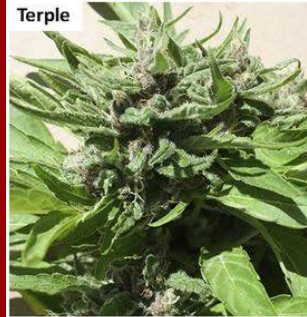
\$10 billion to \$120 billion



Numerous varieties and hybrids



A

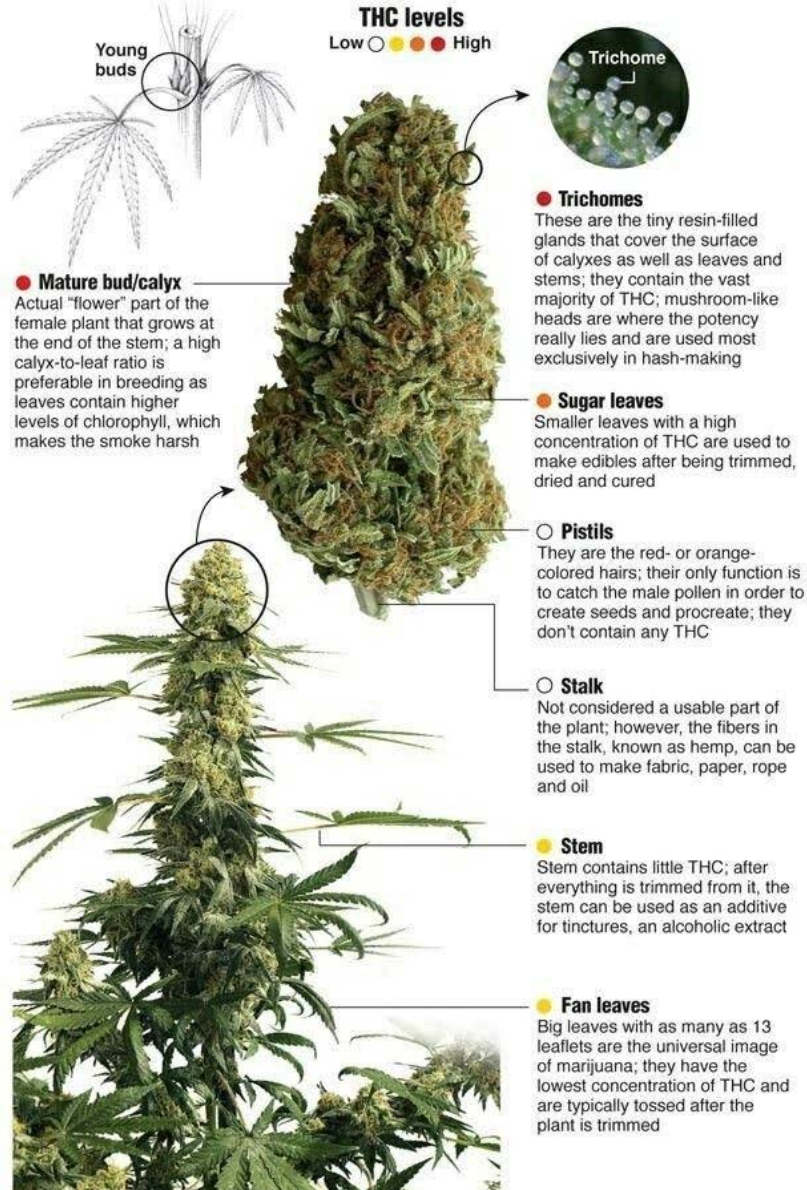


B

Strain	Origin	Aromatic Description	Lineage
Blackberry Kush'	Indica Dominant Hybrid	Hashy, jet fuel aroma with a sweet berry taste	Afghani x Blackberry
Black Lime'	Sativa Dominant Hybrid	Pine, lemon, and black pepper	Northern Lights x Purple Kush
Canna Tsu'	Sativa Dominant Hybrid	Sweet, earthy, citrus	Cannatonic x Sour Tsunami
Mama Thai'	Sativa	Fruity, citrus	Likely a landrace
Valley Fire'	Sativa Dominant Hybrid	Earthy, pine, citrus, flowery	The White x Fire OG
Cherry Chem'	Indica Dominant Hybrid	Sweet cherry, grassy, spicy	Cherry Pie x Chemdawg
Terple'	Unclear	Earthy, woody, tobacco, spicy, slightly fruity	Unknown
Sour Diesel'	Sativa Dominant Hybrid	Pungent diesel like aroma, earthy	Chemdawg 91 x Super Skunk
White Cookies'	Sativa Dominant Hybrid	Sweet, earthy	White Widow x Girl Scout Cookies

'Cannabiology'

Tetrahydrocannabinol (THC), is the main compound found in the cannabis plant, also known as marijuana. When ingested or inhaled, it binds to cannabinoid receptors in the brain. In low doses, the compound can reduce pain and aggression. Here's a look at the various parts of the marijuana plant and how they are processed:



THC levels

Low ○ ● ● High

Young buds

Trichome

● Mature bud/calyx

Actual "flower" part of the female plant that grows at the end of the stem; a high calyx-to-leaf ratio is preferable in breeding as leaves contain higher levels of chlorophyll, which makes the smoke harsh

● Trichomes

These are the tiny resin-filled glands that cover the surface of calyxes as well as leaves and stems; they contain the vast majority of THC; mushroom-like heads are where the potency really lies and are used most exclusively in hash-making

● Sugar leaves

Smaller leaves with a high concentration of THC are used to make edibles after being trimmed, dried and cured

○ Pistils

They are the red- or orange-colored hairs; their only function is to catch the male pollen in order to create seeds and procreate; they don't contain any THC

○ Stalk

Not considered a usable part of the plant; however, the fibers in the stalk, known as hemp, can be used to make fabric, paper, rope and oil

● Stem

Stem contains little THC; after everything is trimmed from it, the stem can be used as an additive for tinctures, an alcoholic extract

● Fan leaves

Big leaves with as many as 13 leaflets are the universal image of marijuana; they have the lowest concentration of THC and are typically tossed after the plant is trimmed



Grow facilities won't always look the same











It takes approximately 150 days for the plant to produce flowers.
Only the Female Flowers are used.



The male plants produce seeds.



But the end product should look like this...



CO₂ Enrichment for Indoor Cultivation Operations



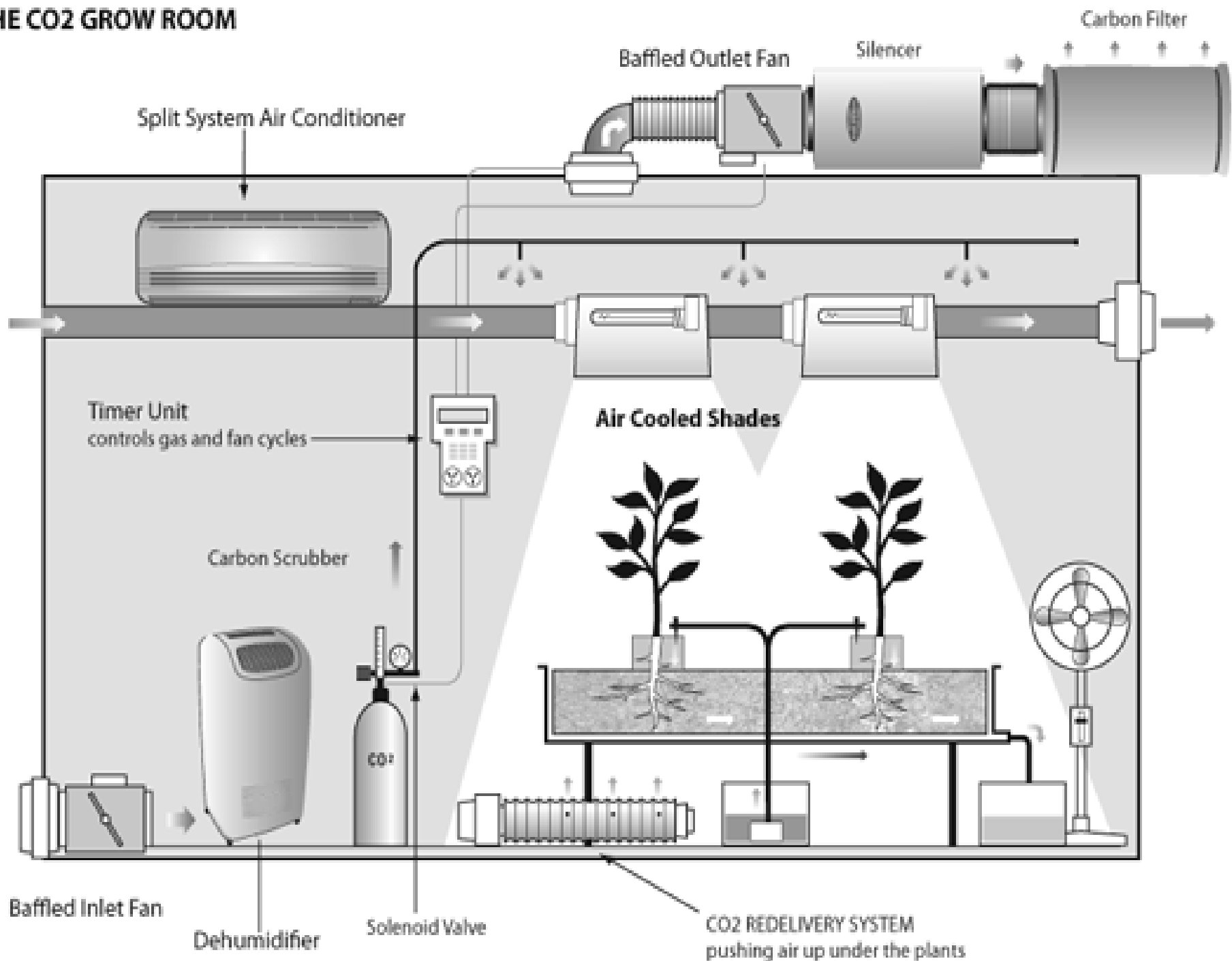


CO₂ Enrichment

- 👉 Growers may use a generator or compressed CO₂ to elevate CO₂ levels to make plants grow faster
- 👉 Typical set range is 1,500 ppm or less of CO₂ in grow rooms
- 👉 OSHA Permissible Exposure Limit (PEL) in an 8 hour Time Weighted Average (TWA) for human occupancy is 5,000 ppm



THE CO2 GROW ROOM



CO₂ Enrichment

- 🚒 40,000 ppm of CO₂ is the Immediately Dangerous to Life and Health concentration (IDLH) by the National Institute for Occupational Safety and Health (NIOSH)
- 🚒 CO₂ alarms are required and should be set to alarm at 5,000 ppm (NFPA 1: 38.6.4.3)



Is CO2 Plant Food?

Here is what happens with more CO2



385 ppm



535 ppm



685 ppm



835 ppm

Initial Processing

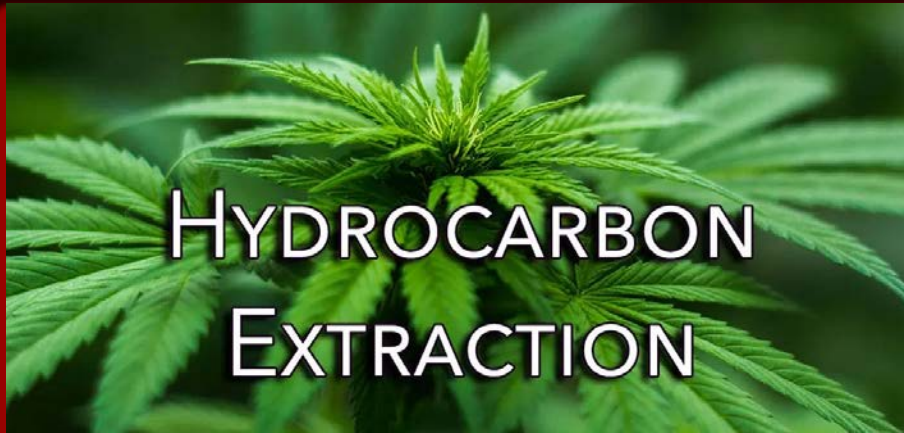
Harvesting
Drying
Storage
Analysis



Extraction Methods:

- 🔥 Dry-sieved then pressed
- 🔥 Water extracted, dried, pressed
- 🔥 Rosin, heat & pressure applied
- 🔥 Liquid Nitrogen
- 🔥 CO₂ (Carbon Dioxide)
- 🔥 Ethanol Alcohol
- 🔥 Distillation
- 🔥 Hydrocarbon
 - 🔥 (Butane, IsoButane, Propane, Propylene, Hexane)





HYDROCARBON EXTRACTION

- 🚒 Hydrocarbon compounds are highly flammable: but they are efficient cannabinoid extractors. In practice; only propane and butane are used.
- 🚒 Why these? They work efficiently, and evaporate very quickly, making recovery of the dissolved cannabinoids easy. They also leave the colored pigments and chlorophyll behind.



The properties of hydrocarbons that are ideal for cannabis extraction (high volatility, low viscosity) make them extremely dangerous. All hydrocarbons can form explosive mixtures.

Explosive Potential

Butane: LEL is 1.8% and UEL is 8.4% in air
Propane: LEL is 2.1% and UEL is 9.5% in air



There is no way to make these hazardous compounds safe, thus extensive engineering controls MUST be employed to avoid disaster.

Even then, operator error, or inadequate SOPs can lead to hazardous conditions.



Extraction Process

Process produces the crude cannabis oils (often called “Hash Oil”)



🏠 Biomass Cooling

🏠 Conveying

🏠 Milling/Grinding

🏠 Extraction

🏠 Degumming & Winterization

🏠 Filtration

🏠 Desolventization

🏠 Biomass Waste & Analysis

🏠 Azeotropic Solvent Distillation

🏠 Clean Solvent

Post Processing

Distillation

Decarboxylation and
Analysis

Crystallization

Sonification

Water Soluble

Cannabinoids

Isolate and Analysis



The Guide to Marijuana Facilities Design

“AIA Trust: Where smart architects manage risk.”

<https://www.theaiatrust.com/marijuana-facilities-design-common-risk-problems/>

- 🚒 Threat of Explosion and Fire
- 🚒 Worker Safety
- 🚒 Damage to Real Property
- 🚒 Electrical Risks
- 🚒 Miscellaneous Risks
- 🚒 Inadequate Design
- 🚒 Nuisance



Facility Inspection





A visitor must show identification and get a visitor's badge, then don a white coat and shoe covers before entering the secure facility.



Everyone who enters the agricultural part of the facility must go through an enclosed space where they are sprayed with air to 'wash off' any potential contaminants, like pollen.

Considerable Lighting, HVAC, Humidity control, & Aisles (?)





Plants are tagged and tracked from seed or seedling to final production.
When growers identify a healthy mother plant, they take cuttings for multiple new baby plants.



Inspector scanning RFID tags



Using a flashlight to inspect plants

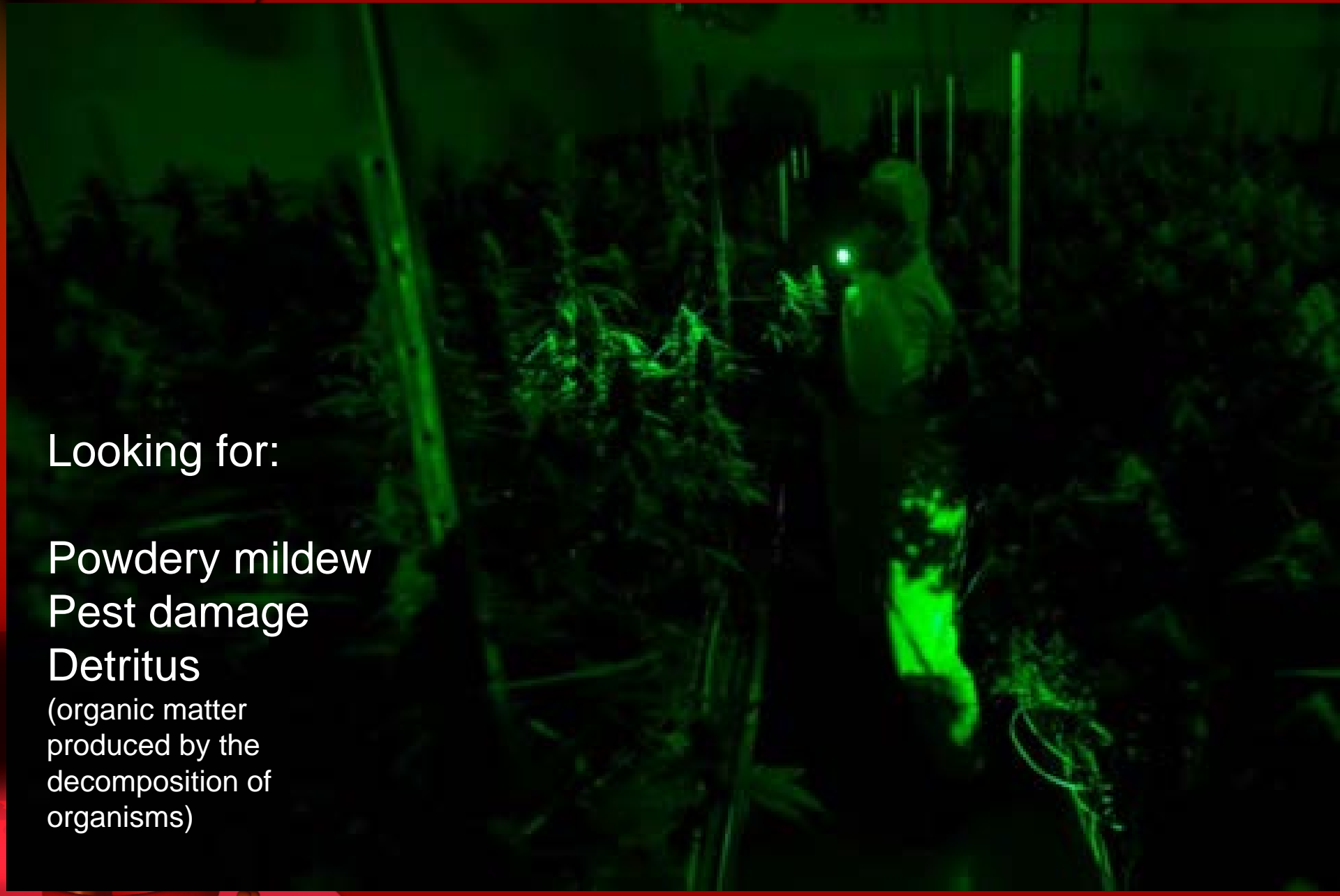
Looking for:

Powdery mildew

Pest damage

Detritus

(organic matter
produced by the
decomposition of
organisms)



Inspecting Chemical Storage and Flammable Liquids Cabinets



Lab tests find mold on medical marijuana sold in Phoenix

Dec. 7, 2017



Crew Orientation Hazards Tour

<https://www.firehouse.com/home/article/12318245/indoor-marijuana-grows-hazards-recognition-response-considerations>



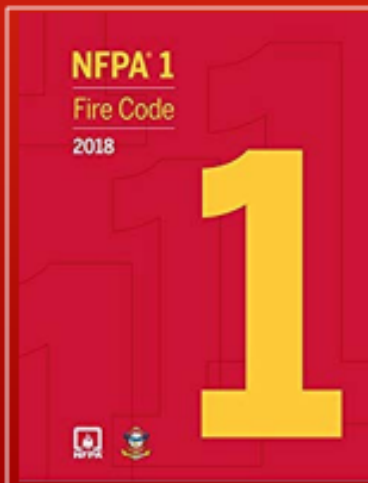
Utah's Adopted Codes dealing with Marijuana



IFC Chapter 39:
*Processing and
Extraction Facilities*

COMPLICATED
PROCESSES:

Require the best sources
of code in dealing with
the actual operations
and processes within a
facility.



NFPA 1, Chapter 38:
*Marijuana Growing,
Processing, or
Extraction Facilities*



Code References Spreadsheet

Includes: 2018 IFC, NFPA 1 Chapter 38 & some minor 2018 IBC

Marijuana Facilities - 2018 IFC Code References			
REQUIREMENT	CULTIVATION/GROW	EXTRACTION	DISPENSARY/PHARMACY
ADMINISTRATION & DEFINITION	MIP*/MMIP*		See Note at bottom...
Definitions	Chapter 2	Chapter 2	Chapter 2
Change of Use or Occupancy	102.3, 102.4	102.3, 102.4	102.3, 102.4
Approved Materials & Equipment; Technical Assistance; Alternative Method or Material; Research Report and Tests	104.7.2, 104.9, 104.9.1	104.7.2, 104.9, 104.9.1	N/A
Occupancy Classification Building Code	202	202	202
F Occupancy	202; Tables 5003.1.1(1) - 5003.1.1(4)	202; Tables 5003.1.1(1) - 5003.1.1(4)	N/A
H Occupancy	202; Tables 5003.1.1(1) - 5003.1.1(4)	202; Tables 5003.1.1(1) - 5003.1.1(4)	N/A
Operational Permits: Various Hazardous Materials, Carbon Dioxide Systems; Combustible Fibers, LP-Gas; Fumigation & Insecticidal Fogging	105.6.4; 105.6.8, 105.6.9, 105.6.11, 105.6.16, 105.6.19, 105.6.20, 105.6.21, 105.6.27, 105.6.38, 105.7	105.6.4; 105.6.8, 105.6.9, 105.6.11, 105.6.16, 105.6.19, 105.6.20, 105.6.21, 105.6.27, 105.6.38, 105.7	N/A
Construction Permits: Various Hazardous Materials; Flammable & Combustible Liquids; LP-Gas; Compressed Gas	105.7, 105.7.9, 105.7.11, 105.7.13, 105.7.16, 105.7.18	105.7, 105.7.9, 105.7.11, 105.7.13, 105.7.16, 105.7.18	N/A
GENERAL SAFETY PROVISIONS			
Emergency Preparedness	403.6, 403.7, 404.1, 406	403.6, 403.7, 404.1, 406	403.9
Hazard Communication	407	407	407
BUILDING AND EQUIPMENT DESIGN FEATURES			
Fire Protection	903.2.4, 903.2.5, 903.2.11	903.2.4, 903.2.5, 903.2.11	903.2.7
Interior Finishes	Chapter 8	Chapter 8	Chapter 8
Exits and exit signage; Egress	1006, 1007, 1008	1006, 1007, 1008	1006, 1007, 1008
Locks	1010.1.9	1010.1.9	1010.1.9
Key Box (Knox)	506.1, 503.6	506.1, 503.6	506.1, 503.6
Aisles	1031.3, 1031.5, 3206.10.1, 5003.11.3.9	1031.3, 1031.5, 3206.10.1, 5003.11.3.9	1018.3, 1018.4, 1018.5
Control Areas	202, 5003.8.3	202, 5003.8.3	N/A



Hazards of the Trade - Jesse Roman, NFPA

Cultivation/Growing Hazards Include:

- 🚒 Access and Egress
- 🚒 High Electrical Loads and Lights
- 🚒 Plastic dividers/combustible interior finishes
- 🚒 Loads on trusses: Humidifiers, carbon filters, lights
- 🚒 Fumigation – including pesticides
- 🚒 Illegal locks/barriers
- 🚒 CO₂ enrichment and/or extraction
- 🚒 Butane / Propane – other Hazardous Materials
- 🚒 Extraction Equipment

<https://www.nfpa.org/Codes-and-Standards/Resources/Standards-in-action/Marijuana-grow-and-extraction-facilities>



Incidents at Marijuana Facilities

 *Chemical-fueled explosion causes fire inside Coolidge marijuana facility*

- Casa Grande Dispatch, Aug. 14, 2018

 *Man dies in fire at marijuana facility*

- WBKB News, May 8, 2019

 *Fire Damages medical marijuana facility*

- Coast Mountain News, Aug. 23, 2019

 *Fire at marijuana growing warehouse prompts evacuation*

- The Spokesman-Review, Sept. 15, 2019



Explosion at Medical Marijuana Grow Facility

Hamilton, Michigan 03 December 2015



<https://fox17online.com/2015/12/03/crews-responding-to-explosion-in-hamilton/>

Propane explosion – Propane was being used to heat the facility



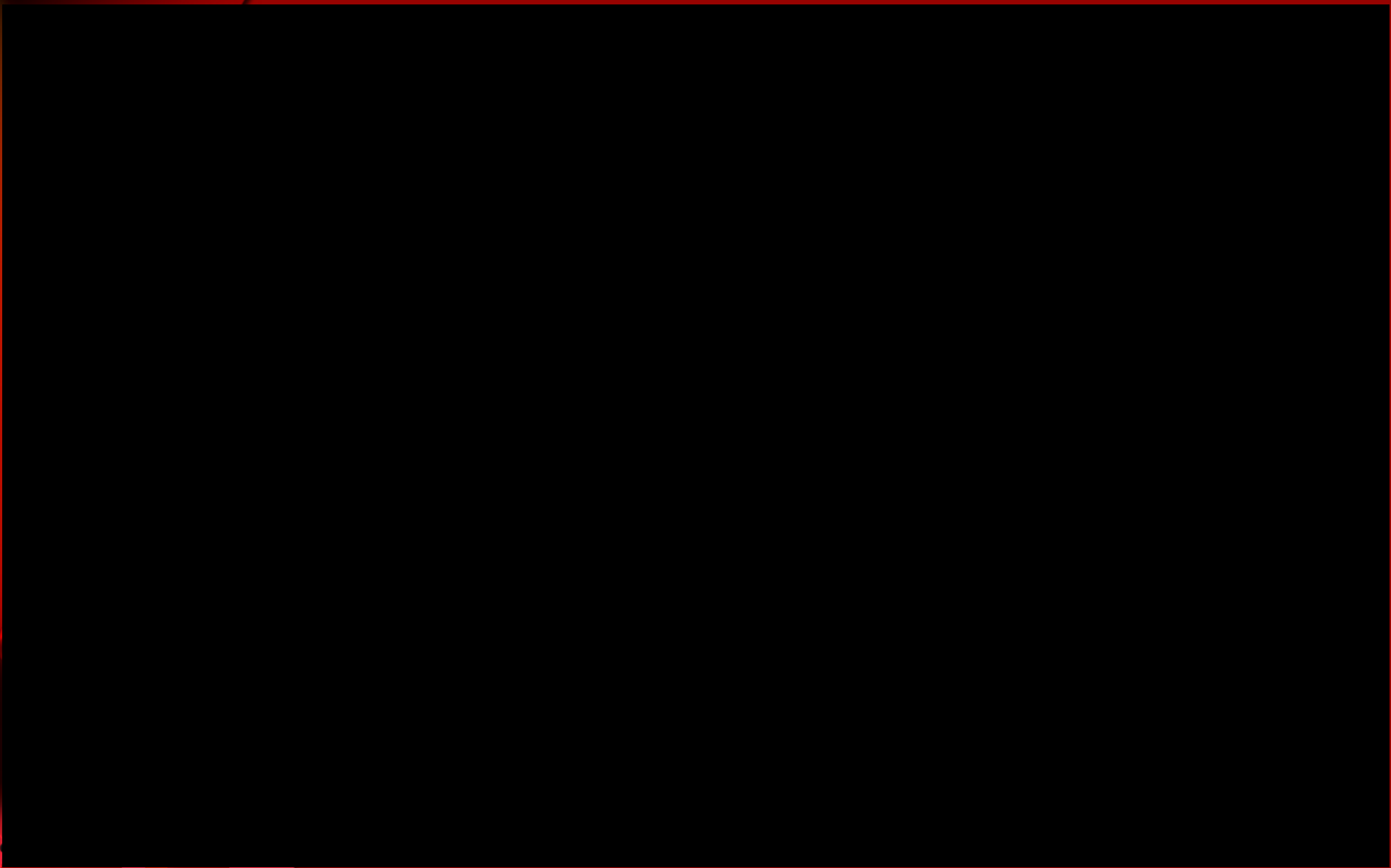
Employees



Two workers burned in Santa Fe, NM

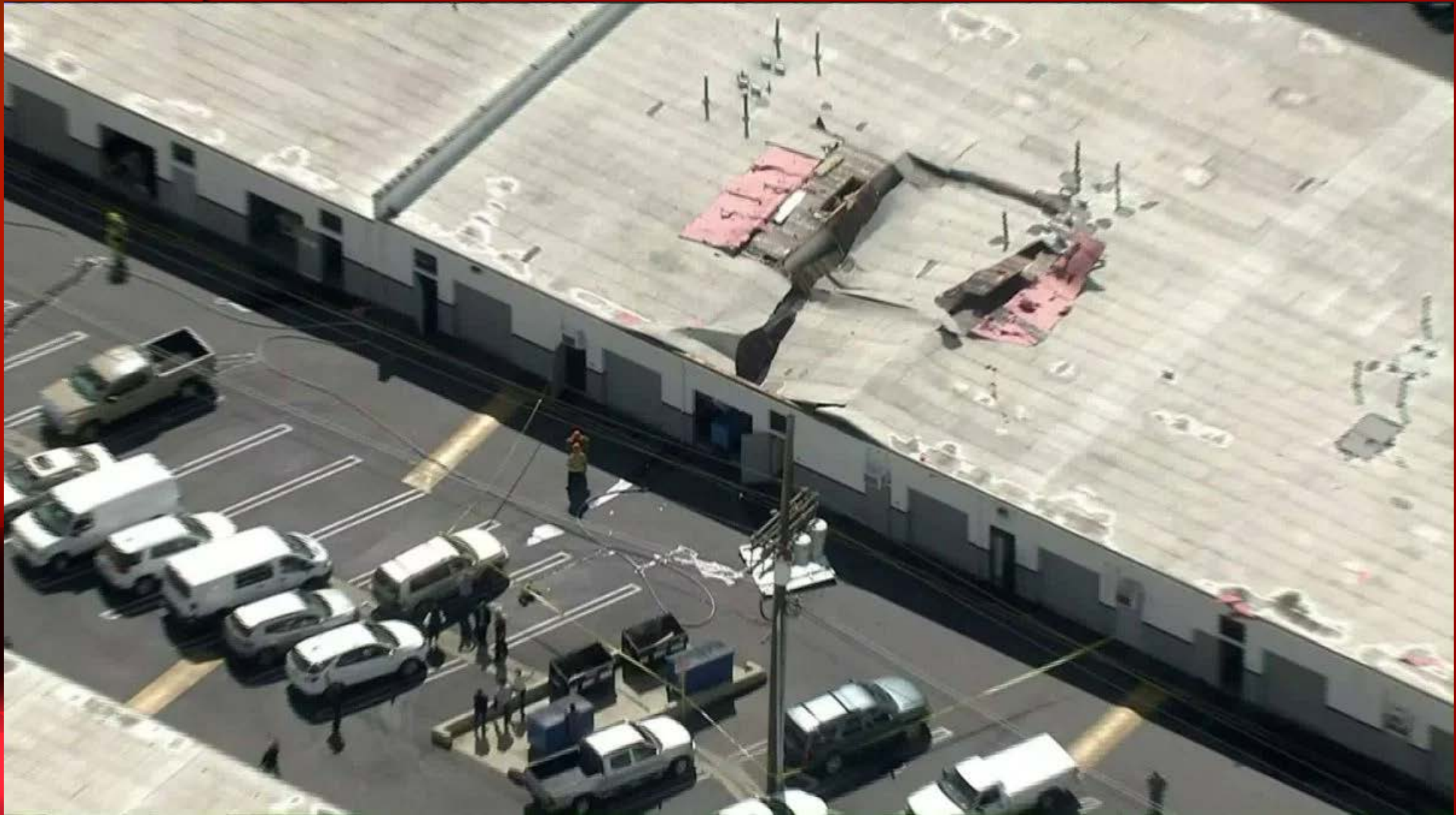


<https://www.youtube.com/watch?v=QTTG6NwJoos> (22 seconds)



Two injured in explosion while trying to extract Marijuana Oil - Los Angeles

March 20, 2019




Second hash oil extraction laboratory explosion in San Diego County within two week period

17 May 2019

<https://www.dea.gov/press-releases/2019/05/17/second-hash-oil-extraction-laboratory-explosion-san-diego-county-within>





👑 “Legalization of marijuana at the state level has resulted in at least 10 recorded instances of fires or explosions at facilities that extract hash oil.” - Politico, Feb. 18, 2019

👑 States are facing a new danger as legal marijuana spreads across the country: Explosions and fires at cannabis factories are sending workers to the hospital with severe burns, revealing the nascent industry’s lack of proper safety standards.

POLITICO - By REBECCA RAINEY 02/18/2019

<https://www.politico.com/story/2019/02/18/marijuana-factories-explosions-safety-issues-1155850>

SECURITY ISSUES



Heightened Security Measures

- ▶ Perimeter Fencing
- ▶ Vehicular Drives/Approaches
- ▶ Fire Lanes
- ▶ Parking Lot Layouts & Islands
- ▶ Parking Lot Lighting
- ▶ Loading Docks
- ▶ Site/Exterior Building Lighting
- ▶ Sidewalks - Pedestrian approaches
- ▶ Exterior Doors and Glazing
- ▶ Landscaping
- ▶ Bollards, Barriers, Level Changes, Walls
- ▶ Exterior Cameras
- ▶ Call Boxes

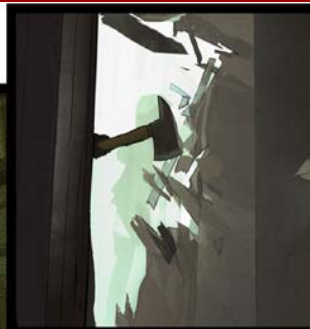
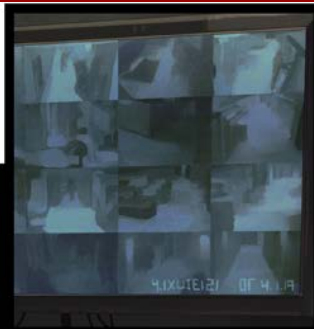
Facility Hardening



The Great Seattle “Pot Heist”

(Politico; August 23, 2019)





The growers came to suspect that the criminals had found another way of getting the information they needed. ... The government was giving it to them.

“We plant a seed, we report it,” the marijuana facility owner says. “You take a cutting, you report it. How long you dry it. What the final weight was. How soon did it go out the door? What did you sell, who did you sell it to, for how much? What did they mark it up to? Easily, 25% of our time is given over to tracking.” The state and state-licensed data firms then post much of this information online, where it is available to the public.

<https://www.politico.com/magazine/story/2019/08/23/marijuana-legal-seattle-robberies-heist-227628>



Marijuana Waste Stream



Nationwide Cannabis and HEMP Waste Disposal Services

Affordable Pricing and EPA Compliant

Call Now to Get a FAST Price Quote
(888) 784-5231

Get a price quote by email

Cannabis and Hemp Waste Disposal Services

PegEx Hazardous Waste Experts provides affordable nationwide (USA) cannabis, hemp, and lab pack waste disposal services.

Per the EPA, cannabis and hemp waste must be made "unusable and unrecognizable" before disposal, mixed with at least 50 percent non-cannabis (or hemp) waste (such as non-consumable solids), and stored in a "secured" waste receptacle.

Cannabis and hemp waste must be disposed of in a



“Track and Trace” compliance measures



Plant waste must be rendered unusable by grinding and incorporating it with other ground materials.

The resulting mixture must be at least 51% non-marijuana waste by volume.



Failure to meet marijuana waste disposal requirements can lead to fines or cancellation of license.

Where is Utah now with Marijuana?



Under the Utah Medical Cannabis act: Utah Code 26-61a-102(29)

🔥 SMOKING OF MARIJUANA IS PROHIBITED.

🔥 However, “...patients may purchase a medical cannabis device that warms cannabis material into a vapor without use of a flame and delivers cannabis to an individual’s respiratory system.”



Edible products (beside the gelatinous cubes) such as candies, cookies, brownies, and unprocessed flowers outside of blister packs **are not permitted.**



Allowable forms of Medical Cannabis

(Utah Rule: 26-61A-102, 502)

- 🔥 Tablet or Capsule
- 🔥 Concentrated Oil
- 🔥 Sublingual preparation
- 🔥 Liquid Suspension
- 🔥 Topical Preparation
- 🔥 Gelatinous Cube

- 🔥 Unprocessed cannabis flower in blister pack of less than 1 gram



“If the patient doesn’t respond to two of the above, then the medical provider may recommend a wax or resin dosage form.”



Department of Agriculture Grow Licenses

Dragonfly Greenhouse Lic.# 20175

Location: Moroni, Sanpete Co.

Harvest of Utah Lic. # 20180

Location: Ogden, Weber Co.

Medical Cannabis LLC Lic. # 20177

Location: Garland, Box Elder Co.

Standard Wellness of Utah Lic. # 20173

Location: Corinne, Box Elder Co.

True North of Utah LLC Lic. # 20178

Location: Brigham City, Box Elder Co.

Tryke Companies Utah LLC Lic. # 20174

Location: Tooele, Tooele Co.

Wholesome Ag. Lic. # 20179

Location: North Salt Lake, Davis Co.

Zion Cultivars LLC Lic. # 20176

Location: Benjamin, Utah Co.



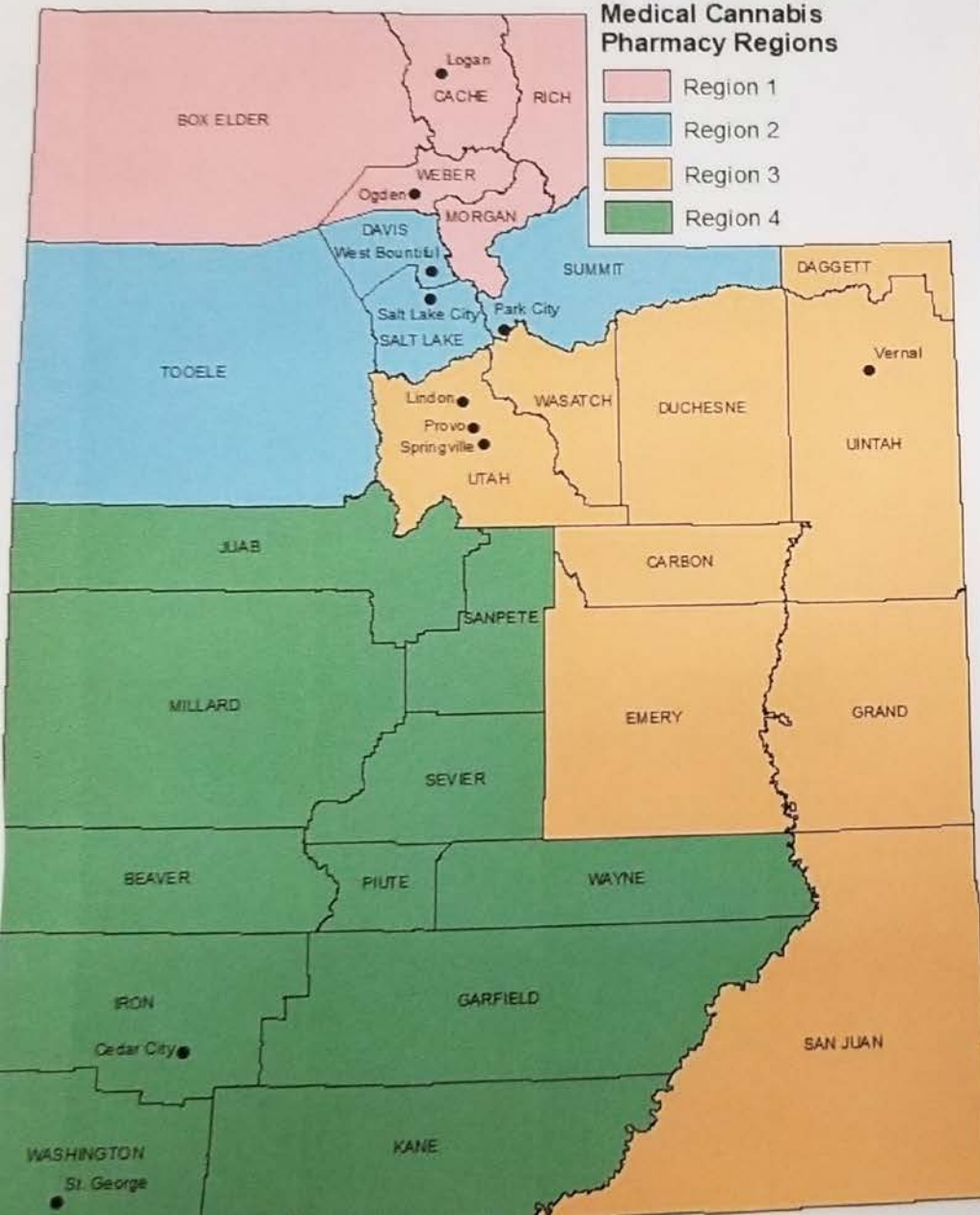
Utah Dept. of Health Pharmacy Licenses:

- 👉 Beehive's Own (2 licenses: Salt Lake City and TBD either in Box Elder, Morgan or Rich)
- 👉 Bloom Medicinals, Cedar City
- 👉 Columbia Care, Springville
- 👉 Curaleaf, Lindon
- 👉 Deseret Wellness (2 lics: Park City, Provo)
- 👉 Dragonfly Wellness, Salt Lake City
- 👉 Justice Grown Utah (2 lics: Salt Lake City, St. George)
- 👉 Pure UT, Vernal
- 👉 True North of Utah (2 lics: Logan & Ogden)
- 👉 Wholesome Therapy, West Bountiful

Announced on 03 January 2020



Utah Medical Cannabis Pharmacy License Locations



City	Name	Address
Logan	True North of Utah	2359 North Main Street, Logan
Ogden	True North of Utah	1148 Century Drive, Ogden
West Bountiful	Wholesome Therapy	724 West 500 South #100, West Bountiful
Salt Lake City	Beehive's Own	1991 South 3600 West, Salt Lake City
Salt Lake City	Justice Grown Utah	242 East Broadway, Salt Lake City
Salt Lake City	Dragonfly Wellness	711 S State Street, Salt Lake City
Park City	Deseret Wellness	4554 Forestdale Drive, Park City
Vernal	Pure UT	2075 US-40, Vernal
Lindon	Curaleaf	1172 West 700 North, Lindon
Provo	Deseret Wellness	222 North Draper Lane, Provo
Springville	Columbia Care Utah	484 South 1750 West, Springville
Cedar City	Bloom Medicinals	Old Hwy 91 West Green Lake Drive, Cedar City
St. George	Justice Grown Utah	TBD, St. George
Other		
TBD	Beehive's Own	The location will be in Box Elder, Morgan, or Rich County in a highly populated area.

Utah Medical Cannabis Program

 <https://medicalcannabis.utah.gov>

Utah Department of Health

**UTAH MEDICAL
CANNABIS PROGRAM**

[PATIENTS](#) [PROVIDERS](#) [PRODUCTION](#) [PHARMACIES](#) [CONTACT US](#)



Prior to January 2021, patients may obtain recommendations from qualified providers* to use medical cannabis. [Click here](#) for more information.



Patients



Providers



Production



Pharmacies



Resources from SFM Office:

1. Generic Inspection Form for Marijuana Facilities
2. Relevant 2018 IFC Code references spreadsheet
3. NFPA 1: Chapter 38* *Marijuana Growing, Processing, and Extraction Facilities*
4. NFPA 1: Chapter 38 Annex A
5. List of marijuana grow facilities licensed by the Utah Department of Agriculture (8 businesses)
6. List of pharmacies licensed by the Utah Department of Health (14 businesses)
7. Slide show presentation note pages

* SB 1002, 1st Substitute Medical Cannabis Amendments (lines 971-974) passed the Utah State legislature on 16 September 2019 and signed into law by the Governor on 23 September 2019.



Code Question: Is Grandma's "portable" grow facility legal?



Wheelbarrow



Questions?

Comments?

