Marijuana Plan Review MBC / MMC 2015

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Ino-Tek
SAFETY CONSULTING & SOLUTIONS

Purpose

- The purpose of this class is to offer registered code official continuing education credits of 3 hours plan review credits for skilled trades act 407.
- Code information that will be covered
  - MICHIGAN MECHANICAL CODE 2015
  - MICHIGAN BUILDING CODE 2015

Kendall Nightlinger

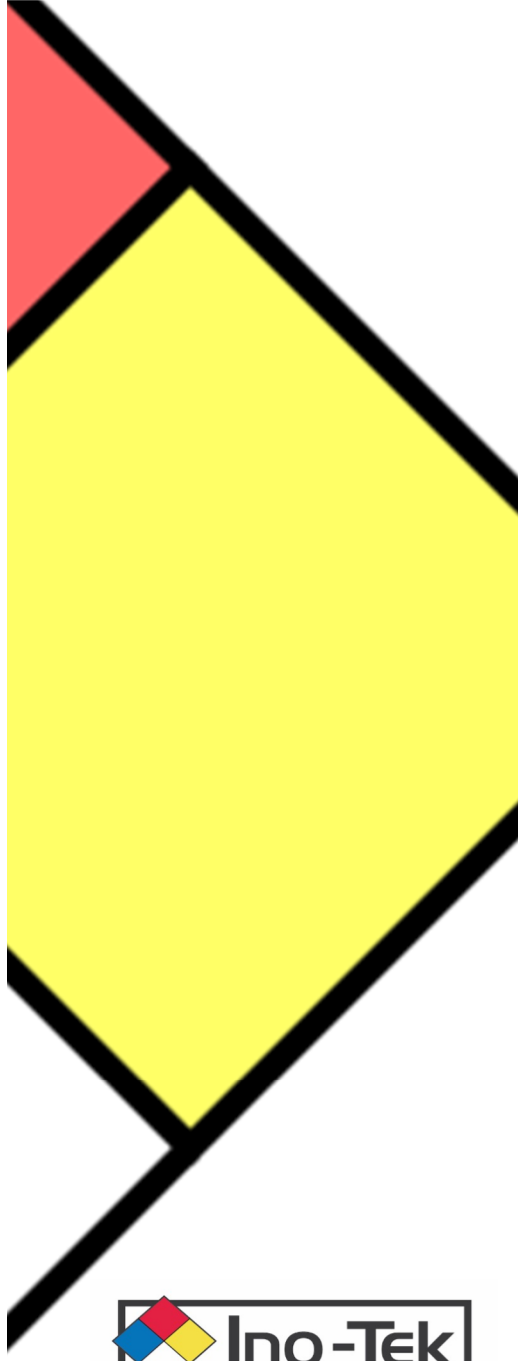
Fire Protection / Mechanical Inspector

- Lifetime State of Michigan Code Instructor #1952
  - Code Instructor since 1994
- Over 40 years of Mechanical Trade experience
- Fire Protection, Mechanical Plans Examiner / Inspector since 1992
- President of Society of Fire Protection Engineers (SFPE) Michigan Chapter
- President of Metropolitan Mechanical Inspectors Association (MMIA)
- Joined Ino-Tek in 2018 as a Senior Code Consultant for Hazardous Materials

Ino-Tek
SAFETY CONSULTING & SOLUTIONS

- Leading supplier of Code-Compliant Life Safety / Hazardous Material Emergency Alarm Systems
  - Gas and Liquid Leak Detection
- Code Officials utilize Ino-Tek for consulting services regarding hazardous materials including design and installation approval / opinions.
  - Permit Expediting
- Ino-Tek Approach: Code-Compliance from beginning to end – saving owners time and money through swift code approvals by providing them enough submittal information to say YES.

Introduction / General



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If it were not for hazardous materials used and stored within the facility

it would not be any different than a typical S or F occupancy now, would it?

- So let us develop an awareness how to deal with the hazardous materials within the occupancy for the purpose of correct occupancy classification.
- If we are not aware of the processes within the building, how will we know what Occupancy it is?
- Additionally, how would we determine if it's an S1 or S2 occupancy?
- Additionally, how would we determine if it's an F1 or F2 occupancy?

Outdated Codes, Emerging Technologies and New Processes In Buildings. **Intent.**

- Everyone knows prescriptive language.
- It’s a dangerous trap to fall into is to look for the: blinking neon light that gives you the “exact recipe” prescription.
- Few are comfortable with using performance language
- We are mandated to deal with all hazards to meet the intent MBC 101.2 of the codes.
- When the codes are not prescriptive, we need to find a non-arbitrary approach to deal with the hazards. MMC-102.9, IFC 102.9.
- By using MMC 101.2, 104.1 and
- MBC 101.3

Definitions And Administration Sections Are Important Tools

IBC 101.2 Scope

The provisions of this code shall apply to the construction, alteration, relocation, enlargement, replacement, repair, equipment, **use** and **occupancy**

Use and **Occupancy**…
another example of change

What we see…

Use and **Occupancy**…
another example of change

And what we don't…

Use and **Occupancy**… another example of change

And what we don't…

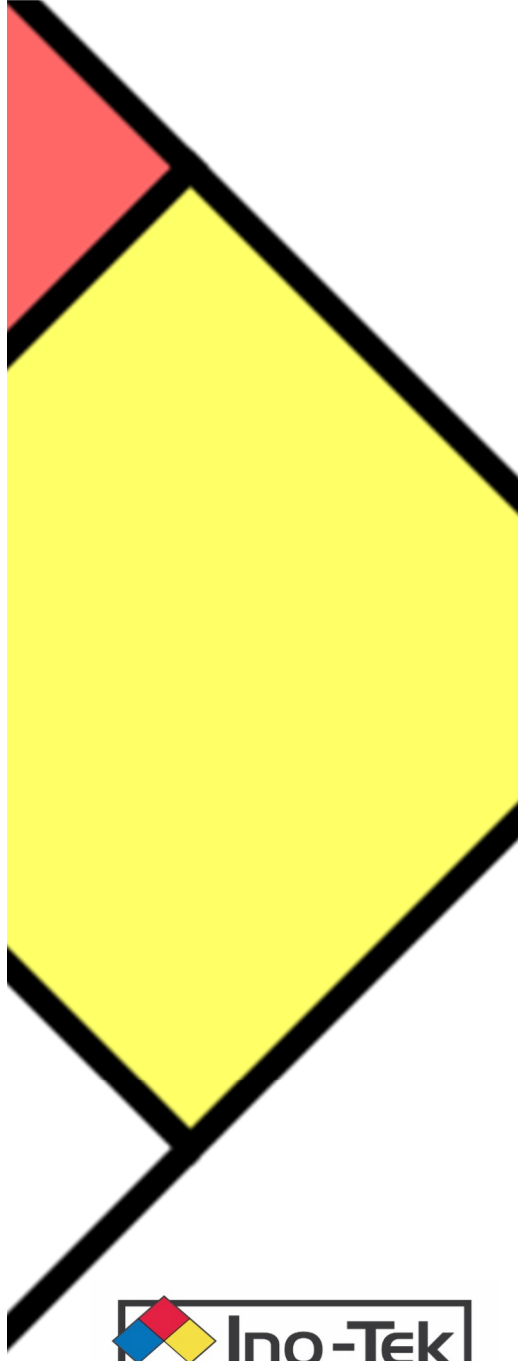
What is a Marihuana Grow Operation / House / Indoor Cultivation?

Many are **smaller spaces** with many even **smaller compartments** to eliminate risk from widespread crop failure. This can create exiting and, interior finish compliance issues.

What Drives H Occupancies?

An over MAQ Condition

What is MAQ?



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If one don’t know how to classify hazardous materials, then how would one know if they were over MAQ?

If one does NOT know if the building or area was over MAQ, then how would one know if it was an H occupancy?

How do we get to the fire code? See IBC Section below

- Many Building, Mechanical code official say:

  I don't go into the IFC, it's the Fire Code Officials Job.

- Well, the MBC (307) and MMC (Chapter 5 and 17) refer us directly and indirectly to the IFC.
- Do we NEVER go to referenced codes and standards?
- Do we pass off enforcement of the other codes and standards to someone else?

IBC / MBC 307.1.2 Hazardous Materials

KEY take away:

this section REQUIRES us all to turn to the IFC for hazardous materials.

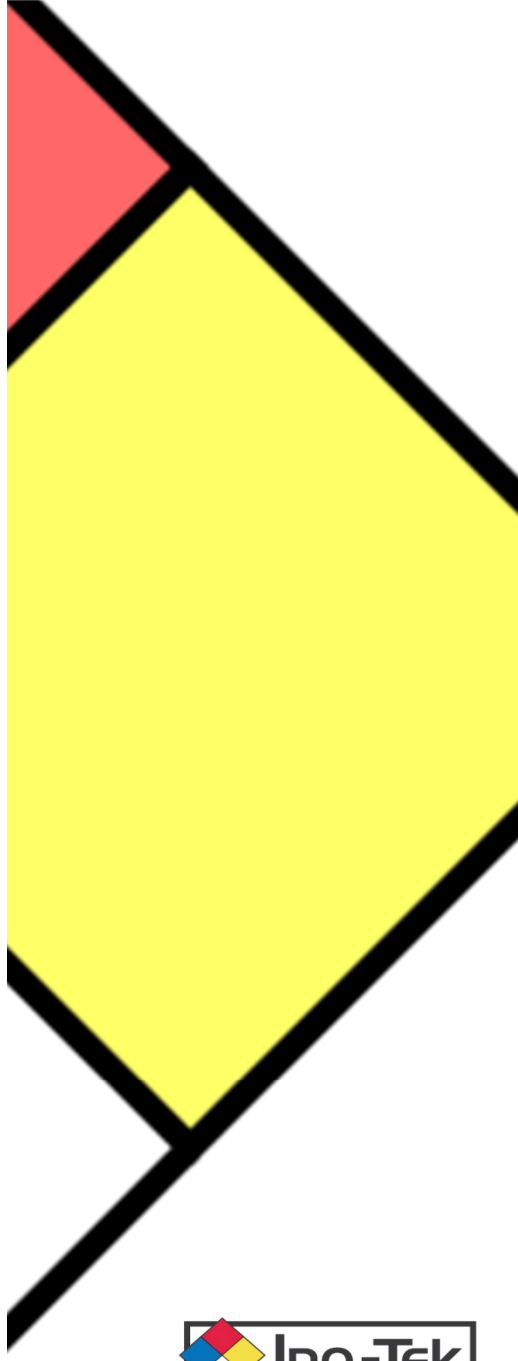
The IFC has from chapter **50** to **67** for hazardous materials and chapters **20** to **37** are also based on hazardous materials.

That's **34** of the **48** chapters of the IFC.

307.1.2 Hazardous materials in any quantity shall conform to the requirements of this code, including Section 414, and the International Fire Code.

Understanding The Processes

Does the Code Official Need to Understand?



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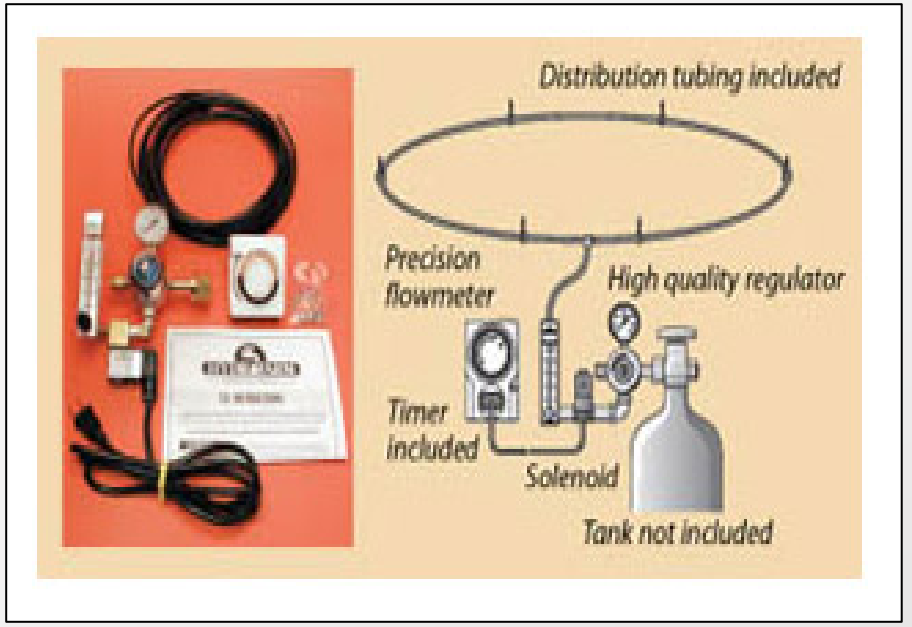
Do you know what a CO_2 generator is?

Are you aware of the hazards from such piece of equipment?



CONTAINS THC

Emission of **Nitrogen Oxides - *NOx*** - when burning different types of fuels:

Fuel	Emission of NO_x [1] *(10^{-3} kg_{NOx} / kg_{fuel})*
Oil	3.0
Kerosene	3.0
Coal	4.5
Propane	**2.3**
Gasoline	27 [3]
Hydrogen	0 [2]
Natural Gas	**1.0**
Butane	2.3
Wood, Birch 20% moisture content	0.7

Either propane or natural gas fired

IMPORTANT TOOLS… Continued

- **101.3 Intent:**
  - The purpose of this code is to establish the minimum requirements to provide a reasonable level of **safety**, public **health** and **general welfare** through structural strength, means of egress facilities, stability, sanitation, adequate **light** and **ventilation**, energy conservation, and safety to life and property from fire and **other hazards**

Were you aware it is up to you to provide for: safety of first responders AND fire fighters?

IMPORTANT TOOLS… Continued

and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations. CO2 and other hazards.

What are the “processes?”

- All Material / Chemical Identities and Quantities
- Material Storage, Transport, Dispensing, Mixing, and any additional processes
  - Begin with Raw Material Receipt, Storage and end at Finished Product Storage, Packaging, and Shipping
  - Include Waste Products
  - Process Flow Diagram

What can happen if the “Processes” within the Building are not Understood?

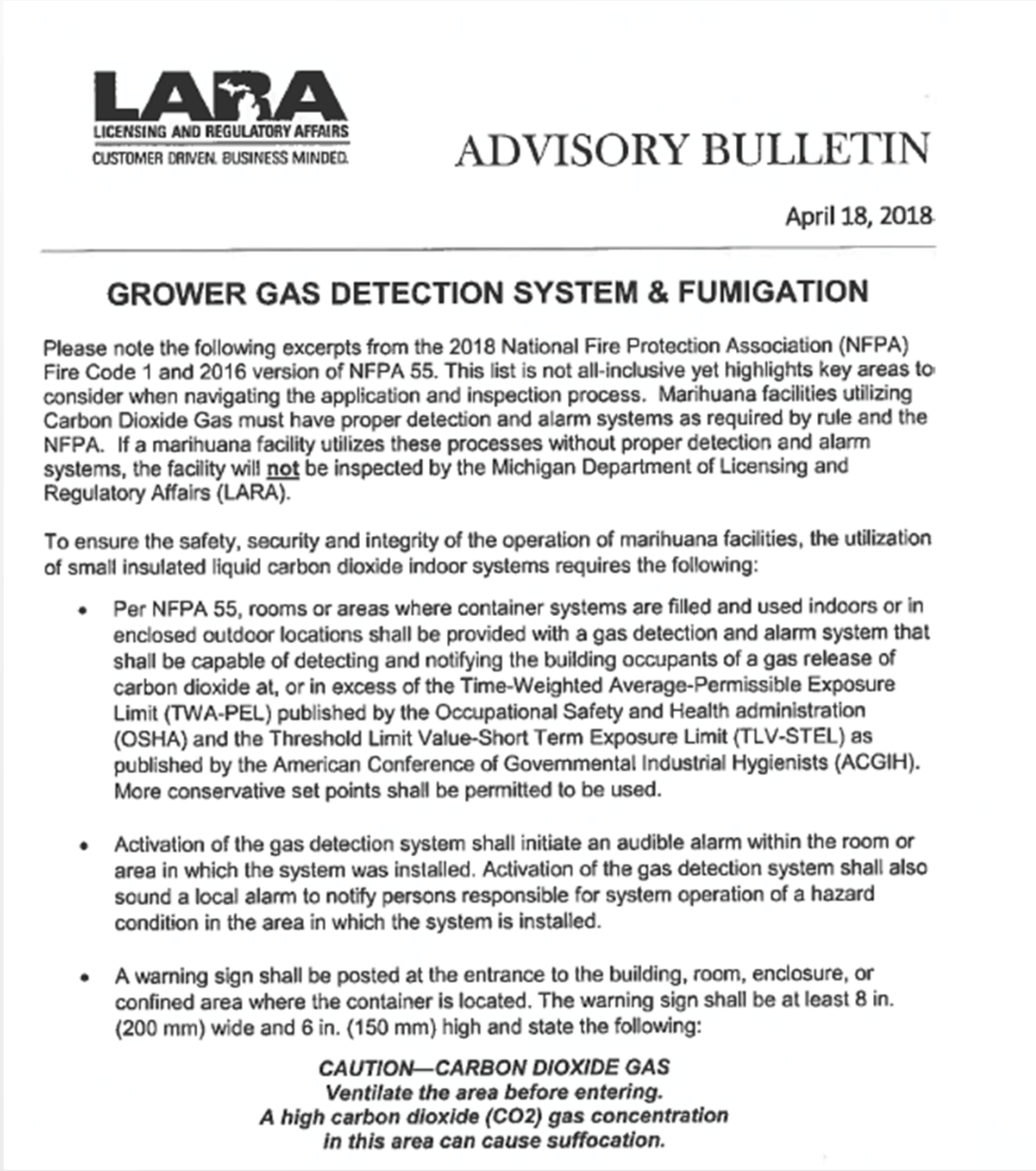
- H Occupancies are frequently missed. 60 + %
- Unsafe neighborhoods
- Unsafe buildings
- Unsafe work environment
- Permitting and Approval delays

Common Hazardous Materials associated with Marijuana Cultivation

- Carbon Dioxide (CO_2)
- Carbon Monoxide (CO)
- Nitrogen Dioxide – NOX (NO_2)
- Ozone (O_3)

Other Hazardous Materials associated with Marijuana Cultivation

- Pesticides, fungicides, etc.
- Chemical used in treating the crops
- Department Approved Chemical Pesticide List
- Dry Fertilizers (Ammonium Nitrate)
- Cleaning Products
- Powdered Sulphur (Combustible Dust)



LARA
LICENSING AND REGULATORY AFFAIRS
CUSTOMER DRIVEN. BUSINESS MINDED.

ADVISORY BULLETIN

April 18, 2018

GROWER GAS DETECTION SYSTEM & FUMIGATION

Please note the following excerpts from the 2018 National Fire Protection Association (NFPA) Fire Code 1 and 2016 version of NFPA 55. This list is not all-inclusive yet highlights key areas to consider when navigating the application and inspection process. Marihuana facilities utilizing Carbon Dioxide Gas must have proper detection and alarm systems as required by rule and the NFPA. If a marihuana facility utilizes these processes without proper detection and alarm systems, the facility will **not** be inspected by the Michigan Department of Licensing and Regulatory Affairs (LARA).

To ensure the safety, security and integrity of the operation of marihuana facilities, the utilization of small insulated liquid carbon dioxide indoor systems requires the following:

- Per NFPA 55, rooms or areas where container systems are filled and used indoors or in enclosed outdoor locations shall be provided with a gas detection and alarm system that shall be capable of detecting and notifying the building occupants of a gas release of carbon dioxide at, or in excess of the Time-Weighted Average-Permissible Exposure Limit (TWA-PEL) published by the Occupational Safety and Health administration (OSHA) and the Threshold Limit Value-Short Term Exposure Limit (TLV-STEL) as published by the American Conference of Governmental Industrial Hygienists (ACGIH). More conservative set points shall be permitted to be used.

- Activation of the gas detection system shall initiate an audible alarm within the room or area in which the system was installed. Activation of the gas detection system shall also sound a local alarm to notify persons responsible for system operation of a hazard condition in the area in which the system is installed.

- A warning sign shall be posted at the entrance to the building, room, enclosure, or confined area where the container is located. The warning sign shall be at least 8 in. (200 mm) wide and 6 in. (150 mm) high and state the following:

CAUTION—CARBON DIOXIDE GAS
Ventilate the area before entering.
A high carbon dioxide (CO_2) gas concentration
in this area can cause suffocation.

Hazards

Non-H Hazards	H Hazards (if over the MAQ)
Carbon Dioxide (CO_2)	Hydrogen Peroxide (H_2O_2)
Carbon Dioxide (CO_2) Generators	Ammonium Nitrates
CO	Combustible Dust
NO_2	Combustible Fiber
	Flammable Liquids

One of the most common hazards in Grow operations

About CO_2

- Odorless gas
- Tasteless
- Invisible
- Acidic
- Relative density is 1.6
- Expansion ratio is **553:1**
- Means it takes very little liquid to fill a building with a gas concentrated enough to KILL

CO_2 Properties continued

- Even in the presence of normal concentrations of oxygen, death will occur at exposures of 7% CO_2 in only 5 minutes
- Concentrations of 30% CO_2, even with 70% oxygen, leads to **unconsciousness in 30 seconds**

CO_2 gas carries a 704, health ranking of 3 All Liquified gases have the same ranking

- This means the use of CO_2 gas in buildings has been regulated for many years, due the pressure being over 15 psi per **IFC 5003.2.2 Piping, tubing, valves and fittings.**

CO… another Grow-house hazard

- PEL is between 9 and 35 PPM depending on who you are listening to.
- IDLH is 1,500 PPM
- Michigan codes are requiring alarms at 25 PPM
- Density is 0.9667
- Known as the silent killer

NOx… another Grow-house hazard

- Comes from the combustion of fuels
- Several types of NOx
- PEL **1 to 5** PPM
- IDLH 35 to 50 PPM
- Density Varies from **1.0** to **1.6** to **2.62**
- Most common types will lay at the floor and concentrate there.

Ozone… another Grow house hazard

- PEL limit is **0.1 PPM!**
- IDLH is **5 PPM**
- Density is **1.660**

IDLH is "an atmosphere that poses **an immediate threat to life**, would cause **irreversible adverse** health effects, or would impair an individual's **ability to escape** from a dangerous atmosphere

Methods of Protection for all Occupancy Classifications

- Flame Spread.
- Smoke Developed Index.
- Alternative Automatic Fire-extinguishing Systems. MBC 904
- Automatic Fire Sprinkler Systems. MBC 903, 903.2
- General Requirements. IFC 5003
- Aerosols. IFC Chapter 515 pages.
- Compressed Gases. IFC Chapter 53
- First Responder Radio Coverage. MBC 916 and others.

- Control areas
- Fire protection systems and
- Group H occupancies

Security. IFC 5303.5

Physical Damage Protection. MMC chapter 17, chapter 303.4, IFC 5303.5.2

1. Do the grow applications you've seen, shut off the CO_2 compressed gas supply?
2. If not, they are required to
3. Who tests this equipment?
4. Who inspects it?
5. What type of permit shall it be?
6. Who is licensed to install detection and alarm equipment?
7. Do you think this equipment should be unregulated?
8. HMM, is it time for policies and procedures within your department?

…now in Marihuana Grow Operations, due to the refrigerant concentration limits (RCL) from the large cooling BTU demand
MMC Chapter 11

908.7 Carbon Monoxide (CO) Alarms

- Where required by the Building Code
- Due to **CO being introduced into the atmosphere, Marijuana Grow operations. (CO_2 Generators)**
- When the designer chooses to use the intermittent option for parking garage and other **motor vehicle areas** (LP-GAS and Gasoline / Diesel forklifts, Zambonis, floor cleaners).

CO and NOx Technical Requirements

- Both NOX and CO detection, alarm, and ventilation
- activation required

SAFE BUILDING STRATEGY

- **Identify** the hazard, done by the report
- **Quantify** the hazard, done by the report
- **Identify** acceptable mitigation strategies
- **Implement** the above strategies

Additional Resources

- In all cases AHJ,s **need the report**
- They are required to ask for **the report**
- IFC **Appendix E**
- Especially **IFC E-103** provides the methodology
- Incorporate the **”Methods of protection”** into the Design of the building

Other States

- Oregon, Colorado and California have been the in the Grow business for a while.
- Lets learn from them
- There are other occupancies that will come in the future after the grow operations become more common

Additional Methods of Protection for H Occupancies

- Exit Access Travel Distance.
- Exit Common Path of Egress Travel.
- Height, Area, Frontage. (Building Area Analysis)
- Ventilation 1 CFM ft^2 . IFC 5005.2.2.1, 5005.2.1.1 MMC 502.8
- Emergency Alarm System. (EAS) MBC 414.7.1 - 414.4.2, 908
- Backup Power.
- Specialized Fire Protection Measures.
- Automatic Fire Sprinkler Systems. MBC 902.3.5
- Storage. IFC 5004
- Use dispensing and Handling. IFC 5005

Additional Methods of Protection for H Occupancies from E-107 of IFC

- 11. How can protection be accomplished? Consider:
- 11.1. Proper
  - containers and
  - equipment.
- 11.2. Separation by
  - distance or
  - construction.
- 11.3. Enclosure in
  - cabinets or
  - rooms.

Additional Methods of Protection for H Occupancies from E-107 of IFC

- 11.4. Spill control,
  - drainage and
  - containment.
- 11.5. Control systems-
  - ventilation,
  - special electrical,
  - detection and
  - alarm,
  - extinguishment,
  - explosion venting,
  - limit controls,
  - exhaust scrubbers and
  - excess flow control.

Additional Methods of Protection for H Occupancies from E-107 of IFC

- 11.6. Administrative (operational) controls-
  - signs,
  - ignition source control,
  - security,
  - personnel training,
  - established procedures,
  - storage plans and
  - emergency plans.

Even the Fire Code recognizes this is NOT a Simple Task

Additional Information from E-107 of IFC

- Evaluation of the hazard is a strongly subjective process;
  - therefore, the person charged with this responsibility
  - must gather as much relevant data as possible
  - so that the decision will be objective and
  - within the limits prescribed in
  - laws,
  - policies and
  - standards.

Additional Information from E-107 of IFC

- It could be necessary to cause the responsible persons in charge to
  - have tests made by qualified persons or
  - testing laboratories
  - to support contentions that a particular material or process is or is not hazardous.
  - See Section 104.7.2 of the International Fire Code.

HMOR / TAR

Hazardous Materials
Opinion and Report

Technical Assistance Report

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IBC / MBC 414.1.3 Information Required

A report shall be submitted to the building official identifying the maximum expected quantities (MEQ) of hazardous materials to be:

- stored,
- used in a closed system, and
- used in an open system, and
- subdivided to separately address hazardous material
- classification categories based on Tables
- 307.1(1) and
- 307.1(2).

NOT OPTIONAL!

IBC / MBC 414.1.3 Information Required

- The methods of protection from such hazards, including but not limited to
  - control areas,
  - fire protection systems and
  - Group H occupancies shall be indicated in the report and on the construction documents.

IBC / MBC 414.1.3 Information Required

- The opinion and report shall be prepared by a qualified person, firm or corporation approved by the code official and provided without charge to the enforcing agency

IFC 104.7.2 Technical Assistance

- To determine the acceptability of technologies, processes, products, facilities, materials and uses attending the design, operation or use of a

IFC 104.7.2 Technical Assistance

- building or premises subject to inspection by the fire code official, the fire code official is authorized to require the owner or owner’s authorized agent to provide, without charge to the jurisdiction, a technical opinion and report. The opinion and report shall be prepared by a

IFC 104.7.2 Technical Assistance

- qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official and shall analyze the fire safety properties of the design, operation or use of the

IFC 104.7.2 Technical Assistance

- building or premises and the facilities and appurtenances situated thereon, to recommend necessary changes. The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

Thank you!

Questions and Comments

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