CNG Maintenance
vs.
Facility Modifications

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Facilities

Maintenance Facilities 3rd priority

- Behind Vehicles and Refueling Stations

Pocket Book

- How much is this going to cost me?
- Depends on facility
- May not be as bad as you think

Early Modifications

Fire & Building Official: robust requirements

- No consistency
- Mercy of local authority's wishes
- Cautious due to Propane Vehicle mishaps
  - Faulty pressure relief devices
- Some mandated "ENTIRE" buildings Class I, Division II compliant

New National Standards/Codes developed

- Allowed for practical approach

Codes

National Fire Protection Association (NFPA) 52 (2010)
(Vehicular Gaseous Fuel Systems Code)

National Fire Protection Association (NFPA) 70
(National Electrical Code)

National Fire Protection Association (NFPA) 30A (2012)
Code for Motor Fuel Dispensing Facilities and Repair Garages

International Building Code (IBC 2012)

International Mechanical Code (IMC 2012)

International Fire Code (IFC 2012)

NFPA 88A (2007) Standards for Parking Structures

Types of Facilities

Minor CNG & LNG Repair Facilities

- A minor repair facility is defined as one where work is **NOT** performed on the fuel system and is limited to exchange of parts and other maintenance requiring no open flame or welding
    - By NFPA 30A code definition, minor repair facilities perform services including:
        - Chassis Lubrication
        - Inspections
        - Engine Tune-ups
        - Parts Replacement
        - Fluid Changes
        - Tire Rotation
        - Brake systems
        - Similar Routine Maintenance
- Mitigation efforts NOT needed
    - But must comply with minimum Ventilation for Class I and Class II liquid fuel repair garages
- Vehicle Storage Facilities fall into this category

Types of Facilities

Major CNG & LNG Repair Facilities

- A major repair facility is one where work is performed on the fuel system, body work and/or repairs requiring open flames or welding
  - Fuel injectors
  - Fuel filters
  - Tanks
  - Fuel Lines
  - Body work
  - Painting
  - Engine Overhauls
  - Note: Some AJH consider spark plug replacement as opening the "sealed" fuel system
- Mitigation efforts ARE needed

CNG Facility Basics

Hazard is on ceiling

- Gas Rises and Concentrates

Classified Space is 18" down from ceiling

- Items affected:
  - lights, electrical, mechanical, heating, ventilation, roof top unit, conduit penetrations, etc.
- Items in space need to be fully Class I, Division II compliant
  - Or remove these items from the Classified Space
  - Or combination of both
- Heating systems: 750 degree max skin temperature
  - No open flame heaters

Major Repair Options

Work on Vehicles outside

Exhaust fans "continually" operating

- Provides for positive ventilation
- Does not work well during Colorado winter

Modify Facility:

- "Classified Space" compliant with Class 1, Div. 2
- Control System
  - Monitor for gas leaks (Methane detection)
  - Interlock exhaust fans and fresh air intake
    - Turns ON upon detection of methane
  - Shutdown heating systems
  - Audible & Visual Alarms

CNG Cost Savings

Separation

- Some (but not all) facilities can be separated into major or minor repair areas (2-hour fire rating)
- Primary vehicle access from exterior

Classified Space

- Relocate items (electrical, heat, ventilation, roof top units, lights, etc.)
- May be cheaper than Class 1, Division 2 changes?

Approval

- Methods must be pre-approved by the Authority Having Jurisdiction (Fire Dept. and/or Building Inspections)
- May have other alternatives

LNG Facility Basics

LNG is a cryogenic "liquid"

- As natural thermal change, it will flashover to a gas (CNG)
- Once flashed over, it rises
- Hazard is Floor AND Ceiling

Major Facilities

- Must be compliant with CNG Facility modifications
- Must have a gas detection system

In addition, must mitigate risks in:

- 18" Classified Space from floor up
- Includes: lights, electrical, mechanical, heating, ventilation, conduit penetrations, floor drains, maintenance pits, etc.
- Floor drains will need a valve to keep liquid from entering sewer system
- Maintenance pits will need monitoring and ventilation

LNG Cost Savings

Separation

- Some (but not all) facilities can be separated to provide a major LNG repair area
- Accomplished using fire walls, partitions and other methods

Classified Space

- Remove items (electrical, heat, ventilation, lights, etc.)
- Tie control wiring to remove power to items that remain instead of making them Class 1, Div. 2 compliant
  - Shunt trip circuit breakers

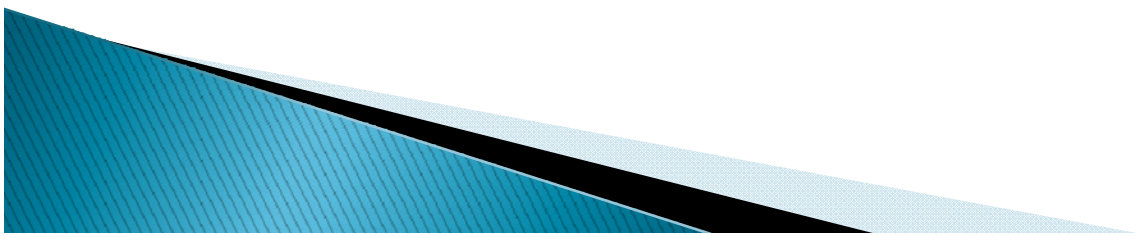
Manual Valves

- Instead of monitored valves in drain lines, manual valve at floor drains could be used
  - Requires policy & procedures to close prior to brining LNG vehicle indoors
  - Saves removing concrete

Approval

- Methods must be pre-approved by the Authority Having Jurisdiction (Fire Dept. and/or Building Inspections)
- May have other possibilities

Questions



Components

Relay Controller: $5,500 Each

Components

Uninterruptable Power Supply: $150

Components

Transmitter: $700

Components

Gas Detector: $1,200 Each

Components

Each point: $2,000

Components

Warning Lights: $200 Each

0-25 LFL

25-50 LFL

> 50 LFL

Components

Warning Horns: $1,300 Each