

because **clean air**
and **energy independence**
matter...

National Alternative Fuels Training Consortium

Gaseous Fuel Vehicle Repair and
Maintenance Facility Design

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**National Alternative Fuels
Training Consortium**

A Program of

 **West Virginia University**



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Alternative Fuels

- Natural Gas – CNG and LNG
- Propane Autogas
- Hydrogen
- Ethanol
- Biodiesel
- Electric



This Presentation **IS NOT** Designed To:

- Give code interpretation and engineering concepts
- Instruct on building code verses building architecture
- Show how to calculate or measure air flow or other engineering concepts as it relates to a maintenance or repair facility
- Teach engineering concepts in regards to CNG or Propane dispensing



This Presentation **IS** Designed To:

- Give an overview of concerns when evaluating the type of facility needed
 - Minor repair facility
 - Major repair facility
- Outline specific codes and standards of concern
- List possible hazards associated with gaseous repair facilities
- List possible concerns associated with gaseous repair facilities



Determine Type of Alt Fuel



Picture by Transportation Research Center, Inc. Courtesy of NREL.



TheFleet.com



Photo by Texas Utilities. Courtesy of NREL.



Major/Minor Repair Facility

- Determine your needs and which type of facility will meet them
- Standards, requirements and costs are much greater for a Major Repair Facility



Definition of a Major Repair Facility

- A building or portion of a building where major repairs, such as engine overhauls, painting, body and fender work, and repair that requires draining of the motor vehicle fuel tank are performed.
- As defined by NFPA 30A 3.3.12.1



Definition of a Minor Repair Facility

- A building or portion of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups replacement of parts, fluid changes, etc.
- As defined by NFPA 30A 3.3.12.2



Codes Governing Facility Structure

- International Fire Code (IFC 2012)
- International Mechanical Code (IMC 2012)
- International Building Code (IBC 2012)
- NFPA 30A (2012) Code for Motor Fuel Dispensing Facilities and Repair Garages
- NFPA 52 (2010) Vehicular Gaseous Fuel Systems Code
- NFPA 88A (2007) Standards for Parking Structures
- *Local Authorities Having Jurisdiction (AHJ)*



Basic Facility Hazards

- Primary concern is the unintended release of gaseous fuels in an enclosed space (major or minor repair facility) and possible sources of ignition
- Separation of sections of facility
- Mitigating situation
- Identification of hazards for first responders



Facility Issues of Concern

- Ceiling Height
- Facility Climate Control
- Ventilation
- Electrical
- Facility Floor Plan Design
- Roof Construction
- Other



Possible Facility Concerns

- Gas detectors
- Specific electrical requirements
- Active and passive ventilation
- Egress routes from facility
- Ignitions sources
 - Welding
 - Heating/cooling equipment



Repair Task Concerns

- Defueling of vehicles
- Fueling of vehicles
- Procedures for indoor parking/fueling for AFVs
- Decommissioning of vehicle fuel tanks
- Operation of gaseous fuel vehicles in a confined space (facility)



Compressed Natural Gas Facility

- Air Handling
- Heating
- Lights
- Type of roof
- Other concerns for ignition sources
- Purging of fuel systems
- Gas detection systems
- Identification for first responders



Liquefied Natural Gas Facility

- Same as CNG Facility
- Containment of cryogenic fuel spill
- Transfer of fuel from vehicle tank
- Identification for first responders



Propane Autogas Facility

- Containment of fuel in maintenance area
- Floor pits
- Low mounted electrical issues, power receptacles, welding, extension cords, etc.
- Gas detection systems
- Overhead ignition systems
- Identification for first responders



Ethanol Facility

- Much the same as gasoline facility
- Fuel containment
- Fire suppression
- Identification for first responders



Biodiesel Facility

- Much the same as diesel facility
- Identification for first responders



Electric Vehicle Facility

- Electrical requirements for charging
- Lockout/tagout system
- Safety items
- Identification for first responders



A Good Start!

- Determine your needs: Major repair facility, minor repair facility, or both
- Type(s) of fuels to be addressed
- Have a good working knowledge of applicable codes and standards
 - Evaluate the possible need for outside assistance
- Get your AHJs involved from the very beginning!



A Good Start!

- If your AHJ's have experience with gaseous fuel facilities, utilize their expertise
- If your AHJ's do not have gaseous fuel facilities experience, supply them with the codes and standards that apply
- **TRAIN YOUR STAFF!**



Using an Expert

- Number of companies that have expertise in designing and converting facilities for alternative fuels



Further Information

You can get additional information on these topics by:

- Contacting the NAFTC. Information on the last slide of this presentation.
- Talking with your Clean Cities Coordinator
- NGVAmerica (<http://www.ngvamerica.org/>)
- PERC (<http://www.propanecouncil.org/>)



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