

CNG and LNG Vehicles in Convenience Transportation's Shop

# **NVG Shop Safety**

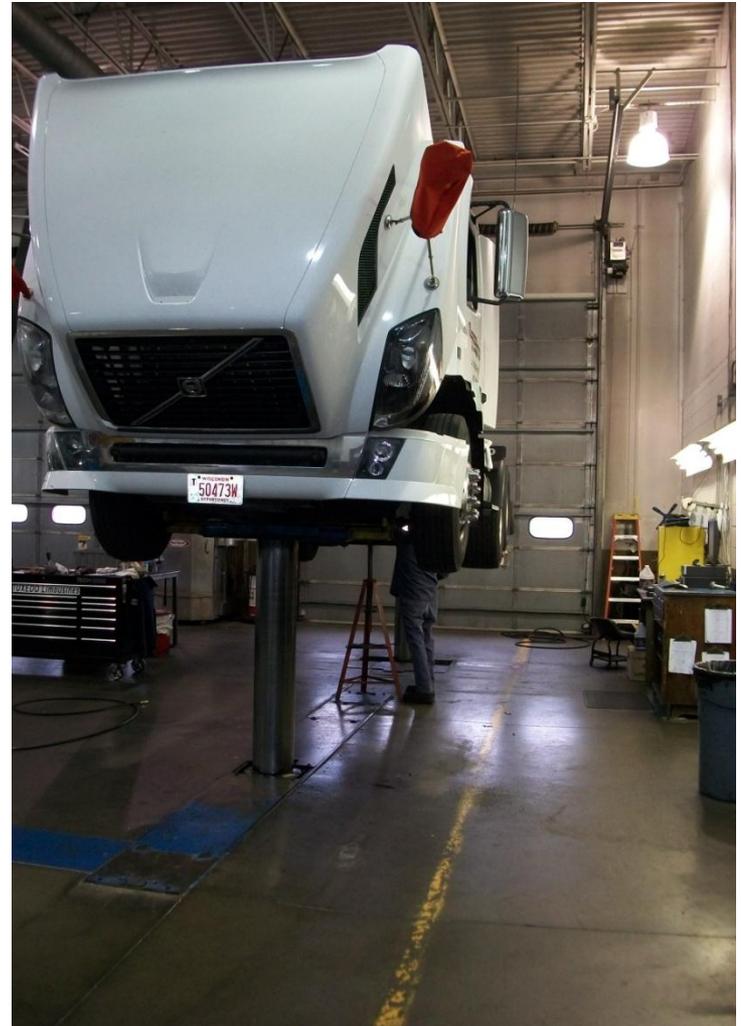
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# Scope of Work – Pre NGVs

- Automotive and Light Truck Maintenance and Repair
- Medium Duty Diesel Maintenance and Repair
- Heavy Duty Diesel Maintenance and Repair
- Heavy Duty Equipment Maintenance and Repair
- Mobile Refrigeration Maintenance and Repair
- Insulated Trailer Maintenance and Repair
- Trailer Mounted Propane Racks
- Bulk CO<sub>2</sub> Vessels
- 9700 Gallon Petroleum Transport Trailers

# Operational Overview

- Hours of Operation
  - Staffed 24/7/365
  - 40 co-workers
- Registered Inspection Facility with DOT for MC306 and MC406 Cargo Tanks
  - 15 Registered Inspectors
- Perform all levels of work internally with the exception of Painting



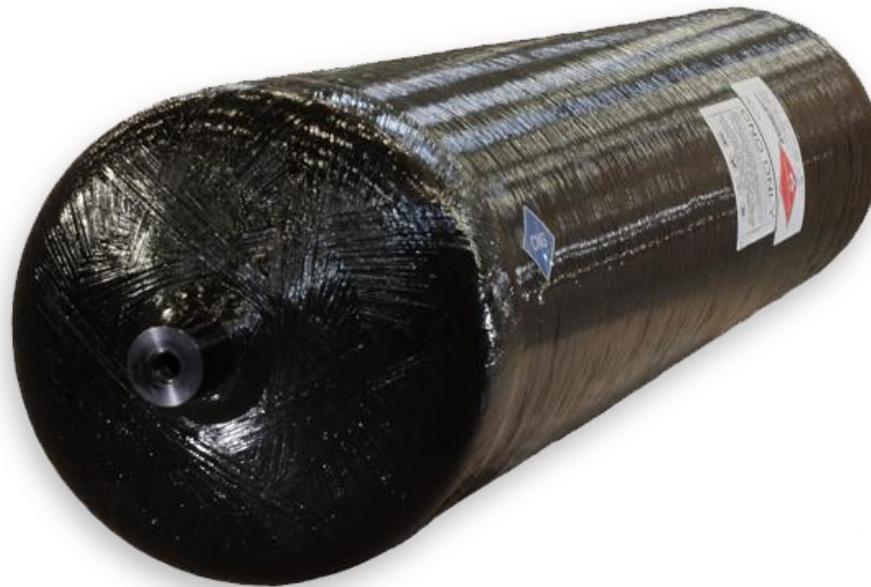
## Natural Gas: Home, Work and Vehicles

In our shop we have 14 pieces of  
equipment that operate on natural gas.

Natural Gas is all around us. At an early age we are all taught to recognize the rotten egg smell associated with natural gas.

If you smell natural gas at home or at work you take appropriate action.

CNG and LCNG are odorized with the same chemical, mercaptan.



**There could have been many rational responses to the proposal of bringing NGVs into this shop?**

“I’m not sure that I want natural gas vehicles in the shop” was not one of them.

# Initial Focus

- Understanding the Fuel and its Storage Conditions.
  - High Pressure
  - Cryogenic
- Train Our Co-workers
- Integrate NGVs into the Shop Environment

# Our Transition Route



Reviewing Applicable Codes

Defined Our Preferred Work Process

Evaluate the Facility

Develop the Work Plan & Define the Plan for Facility Conditioning

Meet with the AHJ

- Once the decision was made to transition to Natural Gas Vehicles we began to train a core group: 1 supervisor and 3 technicians.
- Throughout the process we have continued to work with co-workers. Training them on NG, NGV Storage Systems and Shop Guidelines.

# Preferred Scope of Work and Operational Basics

- Scope of NGV Work
  - Odorized CNG/LCNG minor repair
  - Odorized CNG/LCNG major repair
  - LNG minor repair
  - LNG major repair
- Vehicle Attendance
  - Shop is 24/7/365
    - In the event of an unscheduled closing of the facility
      - vehicles will be defueled and rendered inert with nitrogen or simply removed from the shop.

# Work Area - General Shop

## Odorized CNG/LCNG Minor Repair

- 1
  - Prior to Shop Entry Close the Manual Valves on the Storage Tanks
- 2
  - Drive Vehicle into Work Bay and Allow it to Run Out of Fuel.
- 3
  - Tag Out Vehicle Fuel Tanks
  - Identify the Area as a No Hot Work Zone
- 4
  - Complete Repairs
  - Open Storage Tanks / Remove Signage
- 5
  - Remove Vehicle from Shop and Return to Service.

Shop  
Modifications

NONE

# General Shop

## Major Repair – CNG/LCNG or LNG

- 1
  - Prior to Shop Entry – Defuel the Vehicle and Render it Inert
- 2
  - Issue a Shop Entry Permit
  - Identify the Vehicle as Inert
- 3
  - Complete Repairs
  - Remove Unit from Shop
- 4
  - Fuel and Return to Service

Shop  
Modifications

NONE

# Defueling

## LNG

- Able to hold approximately 100 liquid gallons of LNG for temporary storage.
- Has a pressure builder to facilitate return of the LNG to a vehicle.

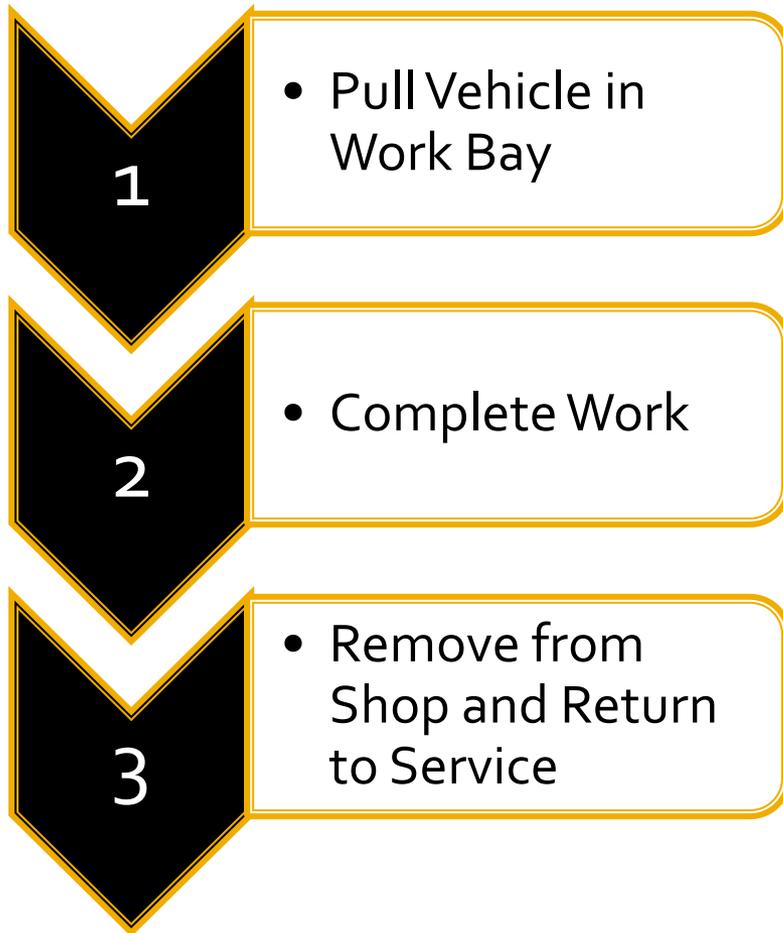
## CNG

- All vehicles are spec'd with a de-fueling port.
- Currently utilize pressure equalization transfer.



# Conditioned Bay – LNG Compliant

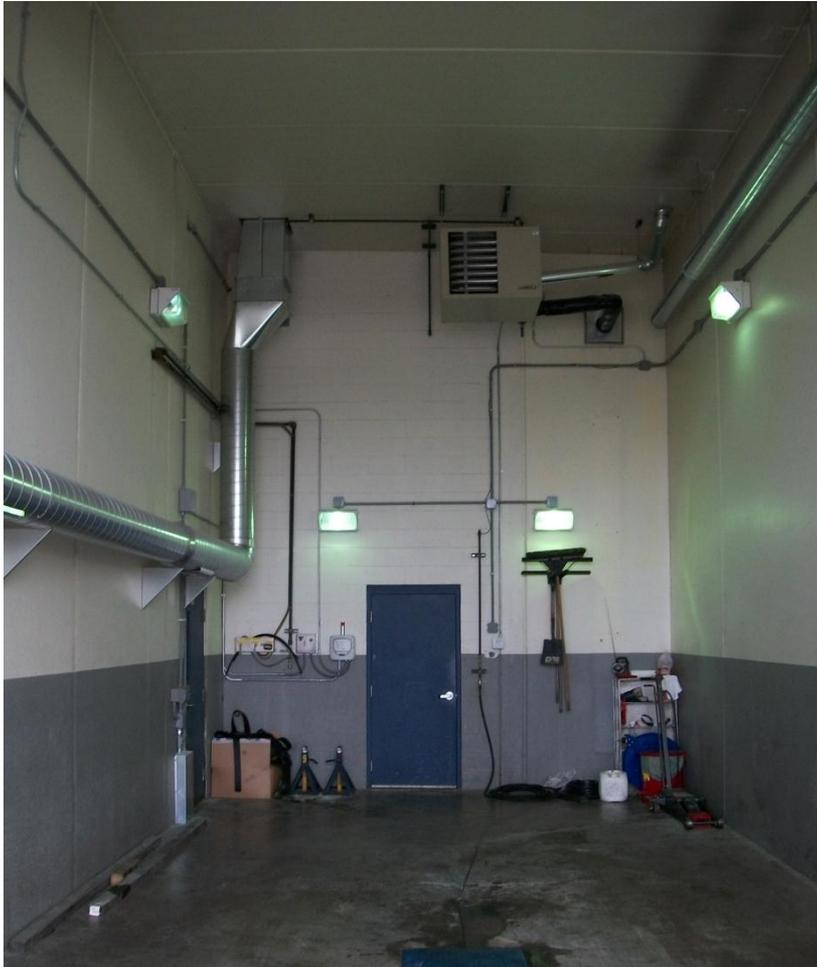
## Any Work on NVGs



## Shop Modifications

- Methane Detection
- Changed Heating Source and Ventilation System
- Both are latched to Latched to Methane Detection
- Lowered the Garage Door Opener
- Additional Lighting

# Conditioned Bay



# NGV Safety

- Our procedures for working with NGVs has been and will continue to be dynamic in nature.
- Today we believe that we have a solid platform to build on.
- Currently developing an annual training and certification program.

# Current NGV Activity

- Natural Gas Tank Installations
- EPA Certified Automotive Vehicle Conversion Installation
- Basic NGV PM Maintenance
  - Oil/Lube/Inspection
  - Spark Plug Replacement
  - Valve Adjustment
- Diagnostics
- Chassis Maintenance and Repairs

