

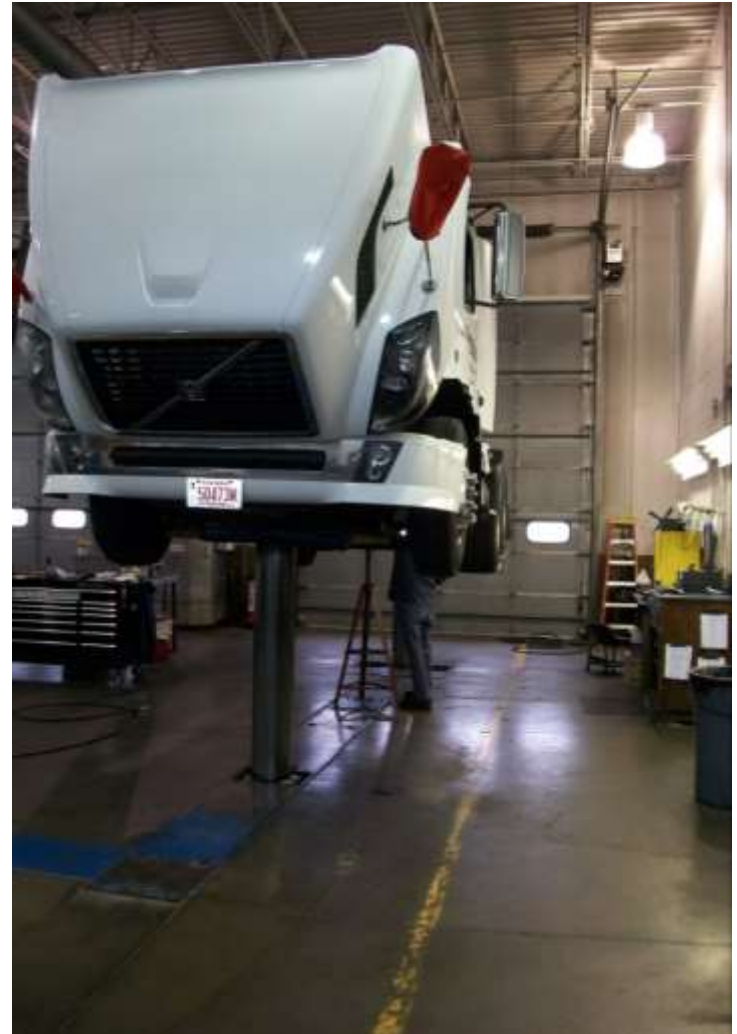
The transition to CNG and LNG vehicles in  
Convenience Transportation's Shop

# **NVG Shop Safety**

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# Operational Overview

- Hours of Operation
  - Staffed 24/7/365
  - 41 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



## Scope of Work – Pre NGVs

Everyone of these areas of work has safety and/or regulatory concerns that must be considered and addressed.

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

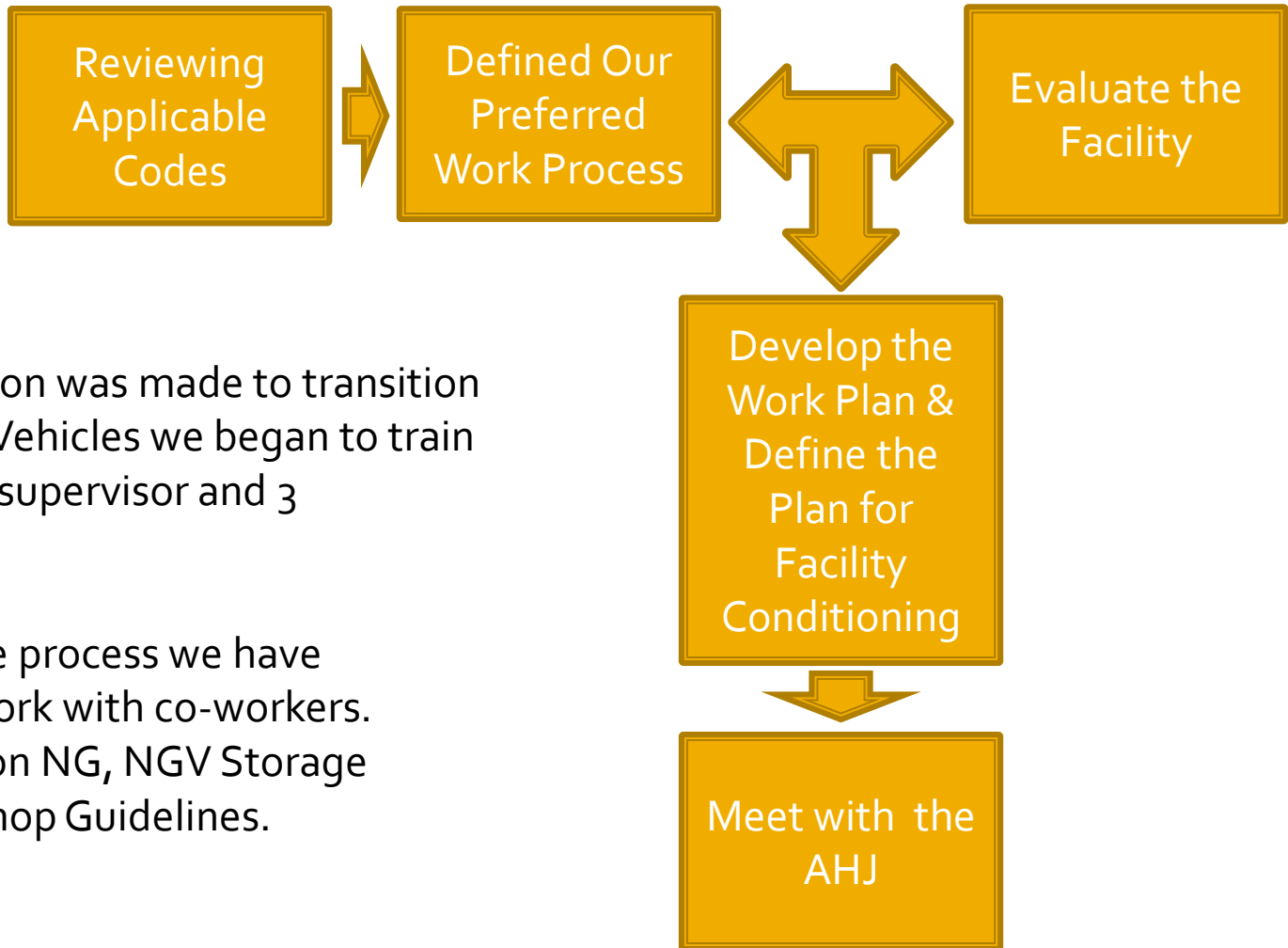
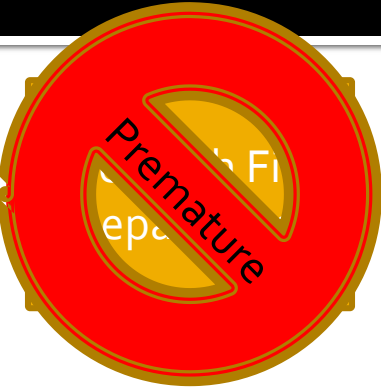
“I’m not sure that I want natural gas vehicles in the shop” was not one of them.

Natural Gas:  
Home, Work and  
Vehicles

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



# Our Transition Route



- 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.

# 2012 NFPA 30A

## **3.3.12.1 Major Repair Garage.**

A building or portions of a building where major repairs, such as engine overhauls, painting, body and fender work, and repairs that require draining of the motor vehicle fuel tank are performed on motor vehicles, including associated floor space used for offices, parking, or showrooms.

## **3.3.12.2 Minor Repair Garage.**

A building or portions of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups, replacement of parts, fluid changes (e.g., oil, antifreeze, transmission fluid, brake fluid, air conditioning refrigerants, etc.), brake system repairs, tire rotation, and similar routine maintenance work, including associated floor space used for offices, parking, or showrooms.

# Desired 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
  - Communicate the Vehicle Status (Signage)
  - No Hot Work On/Near the Vehicle
- 4
  - Complete Repairs
  - Open Storage Tanks / Remove Signage
- 5
  - Remove Vehicle from Shop and Return to Service.

Shop  
Modifications

NONE

# Conditioned Bay – LNG Compliant

## Any Work on NVGs



## Shop Modifications

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

# General Shop

## Major Repair – CNG/LCNG or LNG

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

Intended  
Modifications

NONE

This has been discussed but not finalized with the AHJ.

# 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.

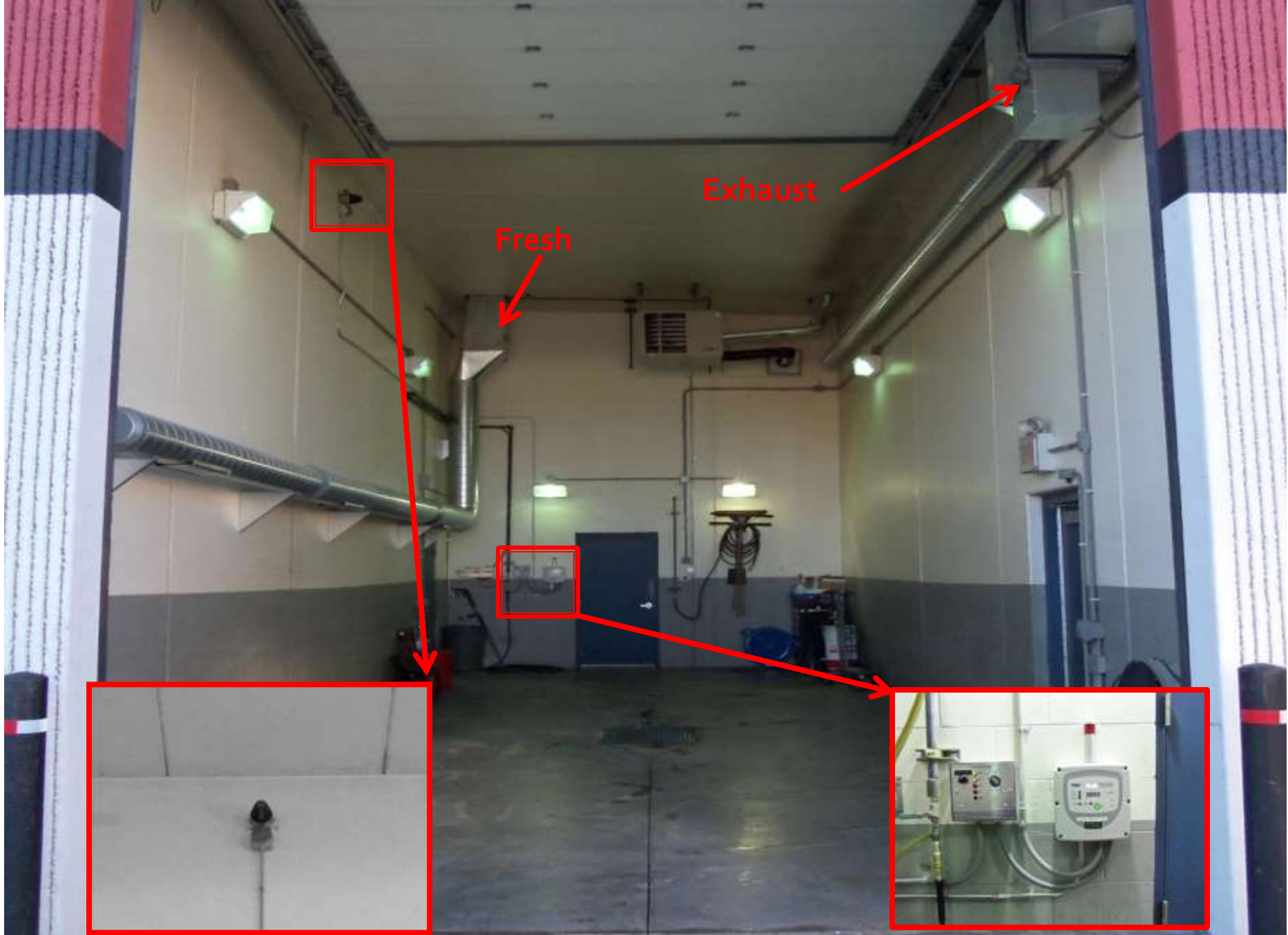
## CNG

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



# Conditioned Bay





Exhaust

Fresh



# NGV Safety Today

- Repair and Maintenance of NGVs is occurring daily in our Shop
- Natural Gas Has Become Another Fuel – We see it as posing no more of a threat than gasoline or diesel.
  - All Flammables Represent have Hazardous Characteristics and Must be Handled Appropriately.
- Natural Gas Safety is Dynamic
  - We have provided shop wide safety training and will continue so.
  - Currently developing an annual training and certification program.
- Understanding the Fuel and its Storage Conditions.
  - High Pressure
  - Cryogenic

# Current NGV Activity

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

