

## PROJECT APPROACH – FACILITY MODIFICATIONS

Along with your new CNG station, you will need to be able to maintain and store your new Compressed Natural Gas-Powered Vehicles (CNG-PV) indoors. Bringing your vehicle maintenance facility up to the latest codes to allow natural gas vehicles to be serviced and/or stored indoors. Is an important to include as a comprehensive approach to CNG-PV transition.

Upon detection of a leak inside a building, we recommend following the simple Three-Step system of Detection, Dilution and Extraction. This simple philosophy allows you to ensure you are providing a safe, code compliant facility.

### DETECTION

#### Methane Detection – First Line of Defense

Following NFPA 30A - One of the most critical aspects of any facility modification is a continuously monitoring methane detection system that includes methane detectors and an associated control system. In fact, Code recommends a continuous methane detection system in any garage where repairs are performed on CNG vehicles. This system is the brain that ensures the building is being monitored day and night, providing protection for staff, facilities, drivers, and assets. The equipment specified for facilities requires industrial equipment FM & CSA approved. Selection should meet the latest codes and offer the most modern technology. Web-based monitoring technology that will provide centralized reporting of the facility and give you the ability to respond to issues quickly.



Methane Detector

### DILUTION

#### Make-Up Air

Make-up air is an integral part of the safety system. Introducing fresh air to the facility once a leak is detected allows the plume of natural gas to become less concentrated. A less concentrated plume of gas is less likely to ignite within the facility. To introduce fresh air after a leak has occurred, optional means include bay doors opening automatically, supply air fans or continuously opened natural air louvers all these options will allow fresh air to flow into the facility, replacing the air that is extracted out of the facility. Recommended approach would be dependent on your facility using the most efficient economical strategy to dilute a leak as quickly as possible, and to remove the methane gas from the facility.

### EXTRACTION

#### Ventilation

Following NFPA 30A - Ventilation (extraction) is required in all facilities performing maintenance on vehicles, particularly natural gas vehicles. In fact, two levels are required inside natural gas service facilities. The first level of ventilation is required for day-to-day

operations and should be in operation any time personnel are working inside the facility. The rate of ventilation is defined by NFPA 30 as: 1 cubic foot per minute (cfm) per square foot of ceiling area and ensures fresh air moves through the facility for the maintenance personnel. Additionally, these fans can be dual purposed used as extraction fan motors for CNG compliant facilities however, they must be explosion-proof in order for them to be used for ventilation after a leak is detected.

The second level of ventilation required is considered stand-by ventilation, as it only operates once a leak has been detected. It is activated by the methane detection system described above. The rate of stand-by ventilation is defined by NFPA 52 as: 1 cfm per 12 cubic feet of room volume and provides approximately five to six full air changes per hour considering room volume inside the facility to force the leaked natural gas to exit through the ventilation system.



Explosion-proof exhaust fans for the first level of ventilation.

### **Separation**

Isolating the maintenance areas from other parts of the building is critical. While the maintenance area will receive special ventilation systems, the rest of the building will not. To ensure a plume of natural gas does not “creep” or migrate into other areas of the building, we recommend sealing any openings like doorways or windows, and install automatic closures to ensure the maintenance shop areas remain isolated from the rest of the building.

### **Heating**

Code is very specific about the heating systems that are used to provide heat for a NGV maintenance shop. Per NFPA 30 A, no open flames, or appliances with temperatures exceeding 750 °F are allowed. Compliant facilities must remove all the heating systems currently in the maintenance shop and replace them heating systems that 1) Do not exceed surface temperatures of 750°F. 2) Do not allow recirculation of facility air exchanges specifically across open flames. Options, replacing heaters with units for CNG compliant facilities or moving the heating systems outdoors, the risk of an open flame ignition source will be mitigated, should a methane leak occur inside the maintenance shop. There are infrared heaters that are specially designed to be compliant for shops that service natural gas vehicles.

### **Indoor Shop Lighting**

NFPA 30A, NFPA 70 - Current building codes for natural gas vehicle maintenance facilities include a requirement that the 18” space beneath the under-side of the ceiling be designated as a hazardous zone. This means any spark producing equipment in this zone must be appropriately classified. As part of a compliant building modification, we recommend the lighting, associated conduit, and wiring will be lowered to 24” below the ceiling, moving everything out of the classified zone or upgrading lighting, conduit and junction boxes to Code compliant Class 1 – Division 2 which can be costly again dependent on your facility.

## VALUE-ENGINEERED ALTERNATE SOLUTION

Inside a maintenance repair facility that is set-up for natural gas vehicles, it is possible to define each work bay as minor repair, or major repair. A bay that is established for minor repairs will be able to perform basic lubrication or inspection type services including fluid changes, tune-ups, brake system repair, and tire rotations. A bay that is established for major repairs will be able to do all types of work on a vehicle including: engine overhauls, fuel system repair, body, or fender repairs. A facility modification for a major repair area is much more extensive than a facility modification for a minor repair area. Major repair bays will have the same scope of work as stated in the described Code requirements above, including the following upgrades:



- Ventilation upgrades for natural gas vehicles
- Heating upgrades including no open flames, and no surface temperatures above 750°F
- Methane detection and overall system controls
- Operational and safety signage

An alternate solution separates the major repair bays from the minor repair bays using Separation Methane Boundaries (see picture). The Methane barrier that shown as an example is installed from the floor to the ceiling in a maintenance facility. It isolates an area of the shop that is to be used for major repairs. This is an alternative solution which must be accepted by the local authority having jurisdiction. This alternate solution provides an option to reduce the scope of work required to upgrade your maintenance facility, which saves you significant capital costs, if applicable.