**AB 2766/MSRC Infrastructure** **Alternative Fuel Program**

# Final Project Report

## CONTRACT NO. MS10679

## Walnut Valley Unified School District

**880 S. Lemon Avenue**
**Walnut Calif. 91789**
**November 2018**

# Upgrade and Expand Existing Compressed Natural Gas Station and Vehicle Maintenance Facility

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**"Prepared for the Mobil Source Air Pollution Review Committee (MSRC) under AB 2766 Discretionary Fund Work Program"**

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**Project Description & Work Performed**

Walnut Valley Unified School District has partnered with the Mobil Source Air Pollution Reduction Review Committee (MSRC) to design and build a Compressed Natural Gas (CNG) fueling station replacing the existing, small, slow fill station that was past its useful life with a newly renovated CNG Fuel Station that can meet the current and future CNG fueling needs of the school district located at 880 S. Lemon Avenue in Walnut, California. The station was designed with the purpose of facilitating the fleet of 24 CNG school buses and future additions to the fleet. In the past five years, 13 gross polluting diesel buses were replaced by 13 CNG-fueled buses. In 2019 the District will be replacing 4 more gross polluting diesel buses with 4 CNG-fueled buses.

In regards to the planning of the station, the main objective was to accommodate this station expansion using the same location currently being used by the districts School Buses. This was accomplished by the installation of a dual skid-mounted, 75 standard cubic feet per minute (SCFM) compressor system complete with time-fill system controls capable of 150 scfm, a communication panel, and 8 additional dual-time fill posts.

Table 1: Equipment List

| Quantity | Equipment | Specifications |
|---|---|---|
| 2 | Compressor | W120B1-AL High Pressure, Air Cooled Compressor – 75 SCFM electric, motor-driven, skid mounted CNG compressor system complete with integrated compressor and time-fill system controls including a communication panel, on-skid starter pane, and on-skid time fill panel. |
| 1 | Dryer | PSB Model NG-SV-6.5-2 Dryer – low-pressure non-regenerative desiccant-type gas dryer |
| 14 | Fueling Nozzle | CNG Nozzle, 3600 psig |
| 8 | Time-fill post assemblies | Dual-hose non-metered time-fill post assemblies |

Source: Compressor Design and Services, Inc.

Site Preparation, Construction and Installation

In order to obtain the most cost effective pricing, Walnut Valley USD released a call for bids prior to entering into an agreement for services. Walnut Valley USD released bid openings for the CNG Fuel Facility Upgrade Project in March 2016. WVUSD entered into an agreement with Fueling and Service Technologies, Inc. dba Fastech in April 2016. Construction for the project started in May 2016. Fastech removed the older equipment and completed trenching for electrical, gas lines, and fueling posts also cut and removed noncompliance bollards.

After the site preparations were completed, the contractor installed the new CNG equipment (compressor, dryer, time-fill post), new fencing and concrete masonry unit (CMU) block wall enclosure, emergency shutdown (ESD) buttons, and signage. The existing parking lot slurry coated and restriped. Relocated existing light pole and installed new head, as well as installed (2) new light poles and heads. There was a final fire and building inspection before the start-up and commissioning of the CNG fueling station.

CDSI performed the commissioning of the compressor packages on July 8, 2016. The installation and commissioning consisted of testing the utility gas and electric connections, as well as complete operation of the compressor package.

Compressor pressure and temperatures were within the standard expected range with only a slightly lower inlet pressure than expected. This was due to an inlet regulator that was installed previously by the city gas company. The regulator was replaced soon after and both compressors have been well within expected operating parameters. There was no delay or issue due to low inlet pressure.

The District was able to start up the fueling system on July 8, 2016. The parking lot at the site yard was slurred and lighting was completed and training all took place in July with no complications. Monthly services and any routine maintenance will be performed by a trained CDSI technician to assure continuous operations of the system.

**Issues or Problems Encountered**

So Cal Gas Service had to be suspended for about 1 month while SCG upgraded our line and installed a new meter

to allow for a maximum load of 9120 MBTUH for the new station. The existing school bus fleet was required to find an alternate site to fuel the CNG buses. WVUSD was able to enter into agreement with Titan CNG, LLC and fuel the fleet of CNG school buses during this time at South Coast AQMD site. During the course of the project, Walnut Valley USD did not encounter any other significant issues or problems.

Emissions Benefits

Data Collection Plan

SoCalGas meter and monthly statements were used to supply gas usage in therms. The service agreement with CDSI includes reports that were available to determine compressor run time in hour and GGEs. The WVUSD transportation department keeps daily reports on vehicles and mileage. These reports were analyzed to determine the vehicle use and mileage as well as the monthly fueling.

## Data Collection

Six months of throughput, usage, and operations data from the project was collected, and is shown in Table 2 below.

**Table 2: Six Months of Data Collection**

| | July 2016 | Aug 2016 | Sept 2016 | Oct 2016 | Nov 2016 | Dec 2016 |
|---|---|---|---|---|---|---|
| Therms as Documented by Utility Bills | 1,043 | 3,162 | 5,460 | 6,076 | 5,529 | 3,851 |
| Compressor Run Time (Hours) | 35 | 101 | 136 | 326 | 549 | 642 |
| GGE | 1,240 | 3,575 | 4,814 | 11,540 | 19,434 | 22,726 |
| Number of Non-District Vehicles Fueled per Month | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of Type 1 Bus Fueled per Month | 12 | 19 | 20 | 20 | 22 | 22 |
| Number of Type 2 Bus Fueled per Month | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of Days per Month Vehicles were Fueled | 10 | 20 | 23 | 26 | 25 | 19 |
| Maximum Capacity of the New Fueling System (SCFM) | 75 | 75 | 75 | 75 | 75 | 75 |
| Miles Traveled per Bus by Odometer Reading | 1,295 | 8,669 | 16,291 | 20,967 | 18,068 | 11,928 |
| Gallons of Gasoline and/or Diesel Fuel Displaced by Using Natural Gas (with Associated Mileage Information) | 259 | 1,734 | 3,258 | 4,193 | 3,614 | 2,386 |

Source: Walnut Valley Unified School District

Analysis

The CNG fueling station started up on July 8, 2016. There was low usage in July and August 2016 due to summer recess. School resumed on August 18, 2016. The October 2016 saw a spike in usage due to higher than normal number of field trips for the school year. There was also a dip in usage in December 2016 due to winter recess between December 17 – 31, 2016. The new CNG station used about 453 DGEs per day for 22 CNG buses.

Results

The district started with 16 CNG buses in 2012. The district increase the fleet with 8 additional buses by 2014, retiring the older pre 1997 diesel buses. With the expected expansion and upgraded CNG fueling system, the district expects to use about 270 diesel gallon equivalents a day. Since the compressors are expected to produce about 300 diesel gallon equivalents over a 12 hour period at night (56/135 x 60 minutes x 12 hours), the system should serve the needs of the district easily for the next 15 years or more. The District expected to use about 270 DGEs per day with a fleet of 28 CNG buses. Based on the 6 months of usage, the new CNG station used about 453 DGEs per day for 22 CNG buses, an increase of the anticipated usage for the CNG fueling station.

**Maintenance Facility Modifications**

Walnut Valley Unified School District also partnered with the Mobil Source Air Pollution Reduction Review Committee (MSRC) to improve the current vehicle maintenance facility located at 880 S. Lemon Avenue in Walnut, California. With $75,000 grant support from the MSRC as part of contract MS16097 Walnut Valley USD was able retrofit its maintenance and repair facility to ensure compliance for natural gas vehicles. With the support from MSRC Walnut Valley USD installed a methane detection system including overhead methane detection detectors, emergency lights, overhead exhaust fans and energy efficient motors, motorized roll up garage doors for auto automation during an alarm, auto shut off valve to existing gas regulator, auto shutoff to lighting controls during a detection, safety signage, exterior emergency lighting and a complete methane detection control panel.

**Photographs & Outreach**

In June 2017, Walnut Valley USD announced its award from MSRC on the District website available for viewing at: https://www.wvusd.k12.ca.us In addition, the press release was sent to eight local newspapers and five other senators and public officials.

**Figure 1: CNG Station Demolition**

**Figure 2: New Compressors**


**Figure 3: Trenching**

**Figure 4: Installed Time-Fill Post Assembly**

**Figure 5 & 6: Methane Gas Detection Control Panel and Alarm System**

**Figure 7: Electrical Service Panel Figure 8: Emergency Shut Off at Gas Regulator**

**Summary and Conclusion**

The existing CNG station was at the end of its useful life and the District had more buses than time-fill hoses. This project was a success in that the District CNG station now has the ability to produce 70 GGE per hour and fuel all of its CNG buses at once overnight. The compressors have been running well ever since commissioning.

In 2012, WVUSD had 16 CNG school buses. Through the course of the project, the District replaced 8 diesel buses with CNG school buses. In 2019 the District will replace 4 more diesel school buses. The intent of the school district with successful project implementation is to eventually replace the remaining diesel buses with CNG. The District has been able to stop using diesel and run almost exclusively with CNG buses since the installation and startup of the new station.

Natural Gas is a clean, safe, and abundant fuel, and is used as an alternative fuel to meet low-emission standards. Maintenance facilities servicing natural gas vehicles must be constructed or modified to meet safety requirements specific to the use of natural gas. Unlike most liquid fuels, the properties of natural gas cause the liquid to rise in the event of a leak. This requires facilities to implement detection and ventilation systems to meet safety standards. The modification of the maintenance facility will assist in the use and development of natural gas vehicles. Walnut Valley USD is committed to reducing emissions and implementing cleaner solutions, such as the construction of alternative fuel infrastructure and natural gas vehicle deployment throughout the South Coast Air Basin.