Maintenance Facility Modifications

FINAL REPORT

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

Prepared by the City of Anaheim

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CONTRACT NUMBER ML16045

ACKNOWLEDGEMENTS

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This report was submitted in fulfillment of ML16045 and Maintenance Facility Modifications by City of Anaheim under the partial sponsorship of the Mobile Source Air Pollution Reduction Review Committee (MSRC). Work was completed as of August 30, 2018.

DISCLAIMER

The statement and conclusions in this report are those of the contractor and not necessarily those of the Mobile Source Air Pollution Reduction Review Committee (MSRC) or the South Coast Air Quality Management District (SCAQMD). The mention of commercial products, their sources or their uses in connection with material reported is not to be construed as either an actual or implied endorsement of such products.

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EXECUTIVE SUMMARY

The City of Anaheim was awarded $275,000 in AB 2766/MSRC Local Government Match Program grant funding by the Mobie Source Air Pollution Reduction Review Committee in June 2016. The City used these grant funds to modify its Public Works Fleet and Facility Services Compressed Natural Gas (CNG) Maintenance Facility.

The work performed consisted of installing and making fully functional a system to detect natural gas leaks from vehicles inside the repair bays and provides annunciation, control signals and alarms. Other project components included installating a ventilation system with a power exhaust system, replacing heaters with compliant technology, relocating lighting and closing to exposure a utility/storage mezzanine area. Installation of the system is necessary because of the increased and increasing number of City fleet vehicles and equipment using CNG as their fuel source and the need to service and maintain these vehicles.

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CHAPTER 1:
Project Background and Purpose

The City of Anaheim was awarded $275,000 in AB 2766/MSRC Local Government Match Program grant funding by the Mobile Source Air Pollution Reduction Review Committee in June 2016. The City used these grant funds to modify its Public Works Fleet and Facility Services Compressed Natural Gas (CNG) Maintenance Facility, including upgrades to the existing ventilation system, a gas detection alarm (visual and audible), compliant heaters with auto shutoff valves in case of CNG release, and other modifications needed to protect the facility and personnel in case of an accidental release of compressed natural gas.

The City of Anaheim is California's tenth largest city with a population of nearly 350,000 and is known worldwide for its entertainment, tourism, sports teams, and convention activities. Under the umbrella of the Department of Public Works, Fleet Services has a 40-member team operating out of a 47,000 square-foot, 30 bay repair facility. Fleet Services is responsible for purchasing and maintaining all of the vehicles and motorized equipment used by the City. Anaheim's fleet consists of over 1,200 pieces of equipment, of which over 780 are on-road vehicles, over 460 are trailers, generators, and other miscellaneous equipment types, and almost 30 are off-road unit engines. At the start of this grant period, the on-road vehicles included 47 natural gas alternative fuel vehicles. Of the 47 compressed natural gas fuel vehicles, 16 were large-capacity, heavy-duty vehicles (e.g., street sweepers, vacuum trucks, trash trucks, broom trucks, etc.) with a fueling capacity of 60 – 70 GGE (gasoline gallon equivalent) and 31 were passenger-size vehicles (e.g., Honda Civic Natural Gas model) with a fueling capacity of approximately 14 GGE.

The City of Anaheim was awarded $380,000 in AB 2766/MSRC Local Government Match Program grant funding by the Mobile Source Air Pollution Review Committee (MSRC) in April 2015. The City used these grant funds to address its need for additional capacity to supply fuel for its fleet, by upgrading its existing compressed natural gas (CNG) refueling station with fast-fill equipment. The upgraded fueling station enabled the City of Anaheim to meet its fleet services fuel demands, prepare for fleet growth, and be in a position to negotiate and offer back-up alternative CNG fueling to other regional fleet services.

The increased number of CNG-powered vehicles in the fleet has resulted in the need for a dedicated location to work safely on CNG vehicles and equipment. This award addresses that need.

CHAPTER 2:
Scope of Work

The City of Anaheim's scope of work under contract ML16045 was to install and make fully functional at its fleet maintenance and repair facility a natural gas detection and control system architecture, whereby the City would:

A. In the major repairs section of the facility:
    i. Install a firewall
    ii. Install a methane detection system; and
    iii. Install a ventilation system automatically activated upon methane gas detection;
B. Throughout facility:
    i. Replace heaters as necessary to ensure no open flames or skin temperatures greater than 750 degrees;
    ii. Relocate lighting to below the classified area for ventilation; and
    iii. Seal electrical conduits as needed.

The fleet maintenance and repair facility remained operational throughout the installation of the system and related modifications. Twelve service bays were designated for servicing CNG-fueled vehicles and equipment and in this area was installed the natural gas detection system.

The detection system includes:

- Catalytic bead natural gas detectors and sensor transmitters
- Gas detection system controllers and relay panels
- Audible and visual alarms (flashing lights and horns)
- All control outputs; exhaust fan starts and power shunting
- Battery back-up system

The system is designed such that it distinguishes between normal standby operation, low alarms and high alarms and will take a corresponding action depending on the system status. When no natural gas is detected (normal standby operation), the system illuminates a steady green lamp at each of the visual lighting stations. During a low alarm (when natural gas concentrations reach 25% of the lower explosive limit – or LEL), the system starts exhaust fans to remove contaminated air, opens select garage doors to a specified height to supply make-up air, shuts off gas supply and electrical power to all heaters, and initiates audible and visible low alarms. For a high alarm (40% LEL), the system starts or continues the exhaust fans, keeps the garage doors open, disconnects power to all vehicle lifts in the CNG bays, disconnects power to all receptacles in the bays, disables compressed air source, and changes to high alarm audible and visible signals including red flashing strobes.

CHAPTER 3:
Results

Installation of the CNG leak detection system was completed on August 20, 2018. Since that time, the project contractor has delivered training about the system, its use, performance parameters, control systems, and safety procedures to all affected stakeholders, including vehicle technicians and their supervisors, City firefighters, and staff electricians. Regular system inspection, testing, and calibration is scheduled for and occurs twice annually with the resulting Certificates of Calibration and Compliance maintained in our FAMIS work order system as part of our regulatory compliance program.

To date, no CNG releases have been detected and the system is operating in normal standby mode. Since installation, 66 CNG vehicles have gone through the service bays where 670 tasks and operations have been performed on them, including inspection and testing, routine maintenance, troubleshooting and repairs, and preparation for disposition and auction.

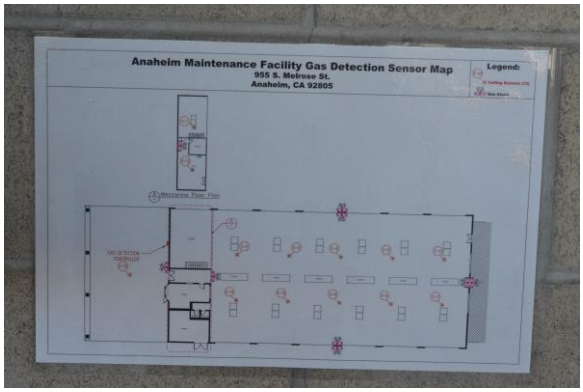
The City completed the project on time and within budget, and encountered no significant problems during construction. The City will continue to monitor the success of this project in order to support the estimated reduction in GHG emissions and its reliance on petroleum, and improve air quality within the state of California.

Audible and visible alarms; detection system

System monitoring and control system

Exterior and perimeter alarms

Exterior alarms



Gas Detection Senson Map

CHAPTER 4:
Conclusions

The City of Anaheim is dedicated to reducing GHG emissions caused by its fleet and improving air quality throughout Orange County. The completion of the CNG leak detection system in the City's fleet maintenance facility ensures that the City has the capacity to safely meet the needs of its current CNG powered fleet, as well as the projected growth of its fleet over the next five years. The investment of $275,000 by MSRC in this important project provided the City with the capital it needed to complete this critical enhancement. Without it, the City's acquisition of additional CNG vehicles would likely have languished, due to the clear lack of capacity to service and repair these vehicles safely

APPENDIX A:

Acronyms

Mobile Source Air Pollution Review Committee (MSRC)

Compressed Natural Gas (CNG)

Gasoline Gallon Equivalent (GGE)

Greenhouse gas (GHG)