Clean Transportation Funding from the MSRC

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

Final Report for Contract MS18122

Prepared by:

Universal Waste Systems, Inc.
9016 Norwalk Blvd.
Santa Fe Springs, CA 90607

December 19, 2022

Ms. Leah Alfaro
South Coast Air Quality Management District
Mobile Source Air Pollution Reduction Review Committee
21865 Copley Drive
Diamond Bar, CA 91765

Re: Final Report for Contract MS18122
Universal Waste Systems, Inc.

Dear Ms. Alfaro:

Universal Waste Systems, Inc. (UWS) is pleased to submit the Final Report for Contract MS18122 for the procurement and installation of a Natural Gas Fueling Station and Infrastructure at our facility located at 10120 Miller Way in South Gate, California.

The Final Report is "Prepared for the Mobile Source Air Pollution Review Committee (MSRC) under the AB 2766 Discretionary Fund Work Program".

The contract organizer was David Fahrion, Senior Advisor (Consultant) to Universal Waste Systems, Inc. for the duration of the project. All Quarterly Reports as well as the Final Report were prepared by Mr. Fahrion on behalf of UWS.

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

The final report will provide information on the following areas.

Section 1: Acknowledgements
Section 2: Project Description and Work Performed
Section 3: Problems Encountered
Section 4: Emission Benefits
Section 5: Photographs and Outreach
Section 6: Summary and Conclusions

In closing, we would like to thank the MSRC for this grant which has made the project at 10120 Miller Way in South Gate a success. As well, it has provided the company with a brand new Renewable CNG fueling station capable of fueling over sixty (60) trucks each night thus reducing vehicle miles travelled to and from a third party fueling station.

Please let us know if you have any questions or comments.

Sincerely,

David Fahrion
Senior Advisor

Section 1 - Acknowledgements

The following companies were instrumental in the design, planning, engineering, permitting, procurement, construction and commissioning of the South Gate CNG Fueling Station for UWS. Below is a list of the companies and the role they played in the development and construction of the CNG Fueling Station.

Company Name	Work Performed
City of South Gate	Permits and Inspections
Corry Engineering	Land Use Design and Planning
Furuto Rubio & Associates	Land Use Permitting
OBM Electrical Engineers	Design and Permitting of Electrical Upgrade
Costa & Associates, Inc.	Fuel Dispenser Design
Fuel Systems, Inc.	Fuel System Engineering and Support
Tru-Star Energy, Inc. Fuel Solutions, LLC	Compressors, Dryer, Control Panel and Data Storage Tanks, Slow Fill Posts and Hoses, Connection Releases and Supplies
Ryan Davidson Construction, Inc.	Construction Management and Installation, Electrical and Wiring, Slow-fill Posts and Hoses
Silva Backhoe Services	Dig trenches for electrical lines and fuel delivery to hoses
Stahovich Construction	Concrete Pad Installation
J&T Plumbing Pro's, Inc.	Plumbing Connections and Supplies
Southern California Gas Company	Gas Meter and Delivery of Renewable Natural Gas
Fastech	CNG Station start-up and Commissioning
Fahrion Group LLC	Administration, Management and Reports

This report was submitted in fulfillment of MS18122 and for AB 2766/MSRC Natural Gas Infrastructure Program Contract by Universal Waste Systems, Inc. under partial sponsorship of the Mobile Source Air Pollution Reduction Review Committee (MSRC). Work was completed as of July 19, 2022.

Section 2 – Project Description

Universal Waste Systems, Inc. (UWS) was to install a new Compressed Natural gas (CNG) truck fueling station at its facility located at 10120 Miller Way in South Gate, California. The property where the station will be installed is owned by the City of South Gate and leased to UWS through a long-term lease agreement.

The CNG station is to have new equipment and will dispense greater than 50% natural gas produced by a renewable source. The station commenced operation in July of 2022 and is currently dispense 100% renewable natural gas through a purchase agreement with Tru-star Energy. The fueling station consists of the following equipment at the South Gate site.

1. New gas line and meter installed by Sol Cal Gas
2. Compressor providing at less 900 SCFM of combed compression capability
3. Thirty (30) dual-hose time fill posts with hoses for a total fueling capability of 60 trucks
4. One (1) dual-hose fast-fill fuel dispenser
5. Six (6) storage tanks to provide buffer storage

The UWS personnel assembled a team of experts to assist in the design, engineering, permitting, equipment selection, civil construction, station installation and commissioning of the facility. UWS worked closely with all of the traders in order to ensure that the station would meet the grant requirements and the desired fueling capabilities for the company.

As mentioned above, the Project Description was successful and was to construct and install a new Compressed Natural Gas Fueling Station at the UWS facility located at 10120 Miller Way in South Gate, California. The station was completed in July of 2022 and began fueling the UWS fleet located in South Gate.

Work Performed

Phase one of the project was to design, engineer and permit the CNG station with the City of South Gate so a construction schedule could be prepared and construction of the station could commence. UWS enlisted the following companies to assist in preparing the station for the construction phase of the work performed.

Corry Engineering

Corry performed the required land use design and permitting to have the site comply with the local City of South Gate design requirements to construct the facility. Corry Engineering initial work was to prepare a topographic survey and easement and boundary assessment to lay-out where the station would be on the site and ensure that it did not infringe on any existing easements or property lines. This work including identifying where the Edison Electric lines where and how to get power to the station without interfering with any of the existing easements. The final drawing that would be used for the City permitting included the oil line easement, overlaying the Edison easement on the topographic map, recommending the relocation of an Edison power pole and staking the site in order for power to be delivered to the fueling station without risk of damage from the trucks operating on the site.

OBM Electrical Engineers

OBM was responsible for preparing the overall electrical design and plan for the facility which included upgrading the electrical panel, re-routing the electrical power lines to the new panel as well as creating a plan for the trenching of the new power lines. OBM prepared the power requirements needed to power the fueling station and ultimately prepared a final plan for submittal to the City for review and approval.

Furuto Rubio & Associates

Furuto was responsible for the permit activity with the City of South Gate. Mr. Furuto has a long history of permitting projects in the City of South Gate and he was used to present the plans to the City, make changes to the engineering contractors of what the City needed changes with the goal of getting the project to permit readiness. Mr. Furuto finalized the plans with the help of the engineers and ultimately was able to pull a building permit for the fueling station.

Costa & Associates

Costa was hired to provide the structural engineering of the slab and foundation for the fueling station as well as the canopy that would ultimately be installed above the facility.

Fuel Solutions, Inc.

Fuel Solutions was hired to perform the mechanical design and planning for the fueling station and to prepare a permit ready set of drawings for the City of South Gate planning department. This work included the design and calculations associated with the piping to deliver the compressed natural gas from the fueling station to the dual-post fuel hoses for the trucks. This work was performed and was included in the planning package submitted to the City.

Phase two of the project was to procure the equipment that would be installed at the South Gate location to complete the CNG fueling station and prepare it to be commissioned and ready for service. UWS utilized two companies to procure the equipment for the station which were Tru-star Energy and Eco Fuel Solutions both of which provided the equipment necessary to complete the fueling station and prepare it for service. Below is a recap of the equipment that was purchase for the station in South Gate.

Tru-star Energy

The majority of the equipment for the fueling station was provided by Tru-star and consisted of the following components.

- ANGI 300 JGQ 200hp compressor 922 scfm
- ANGI Single 200 hp motor start panel
- ANGI inlet dryer
- ANGI time fill panel
- Tru-star 6,840 cubic feet of buffer storage
- Emerson 050 CNG flow meter
- Communication Panel
- Time fill filter posts with dual filters

Note: The original application was written in 2017 with the award of the contract by the MSRC in 2018. At that time, it was proposed to install two smaller compressors for the station in order to meet the 900 + scfm requirement. When the equipment was finally procured in early 2020, we

were faced with supply and availability issues with the compressors proposed in the application, therefore, after performing some additional research, UWS was able to identify a larger compressor that was able to meet the required scfm stated in the application. Because the unit was available through Tru-star Energy, UWS elected to purchase the larger single compressor capable of generating the proposed amount of scfm in order to meet the contractual requirements.

Because of the delay in equipment procurement and the start of construction due to the length of the permitting process, all of the estimated costs used in the 2017 application where significantly understated with all of the trades coming in well above our estimates used in 2017. The savings generated from only purchasing one compressor approximately $50,000 where used to offset the increase in all of the other costs such as; permitting, construction, installation, supporting equipment and the overall management of the project which is reflected in the supporting invoices from the vendors.

Eco Fuel Stations, LLC

Eco Fuel Solutions also provided some of the equipment to outfit the fueling system for the trucks. Eco provided additional buffer storage that would ensure that the fast fuel had adequate fuel capacity as well as the complete hose assemblies to deliver the fuel from stainless steel lines to the nozzle attached to the trucks. Below is a recap of the equipment list.

- ASME 3-pack Buffer Storage
- 16 – 20' hose assemblies
- 16 – 30' hose assemblies
- 28 – 35' hose assemblies

Phase three of the project was to construct the CNG fueling station and prepare it for commissioning and ultimately to place it in to service. The construction of the station was coordinated and completed by Ryan Davidson Construction with the assistance of a few sub-contractors that perform specific tasks that were outside the scope of the general contractor.

- Silva's Backhoe Service preform the trenching for the electrical lines and the fuel delivery to the CNG posts. In addition, they also provided the bollards to protect the fueling station from being hit by a truck. At the completion of the underground work, Silva's filled the trenches, compacted them and paved the areas with asphalt.
- Stahovich Construction was responsible for the civil work which consisted of laying out the fuel station pad, installing conduits for the delivery of the electrical wiring and then pouring the concrete pad for the CNG station equipment to be installed.
- J&T Plumbing Pro's where hired to complete the plumbing portion of the project and installed all of the fueling posts, run the stainless steel lines that would deliver the fuel and make all the connections. Once all the equipment was installed and connected, J&T's performed a leak test by pressurizing the system to ensure that there were no leaks found prior to connecting the
- Ryan Davidson Construction as the General Contractor on the job performed the majority of the work to install the equipment and prepare it for commissioning. The task handled by Davidson Construction are as follows:

- All electrical wiring and connects from the Nema 3R panel to the fueling station
- Upgrade and install new electrical switch gear in order to improve the electrical service to support the new CNG station
- Install a new concrete pad for the Nema R3 panel and switch gear
- Install a new electrical panel, wiring and connections to power the fueling station
- Install lighting fixtures around the fueling station in order to provide adequate lighting
- Install a new sub-panel at the fueling station compound to house all of the electrical breakers
- Set and install the CNG compressor, inlet dryer, motor start panel, time fill panel, buffer storage, flow meter and communication panel
- Install all of the hose posts and hoses for the trucks in order to prepare them for connection by the plumber

Phase four of the project was to work with the Southern California Gas Company to connect the new CNG station to the gas line in order to commission the station and begin fuel delivery. It was necessary for So Cal Gas to improve the size of the gas line to ensure that the station would have adequate flow of gas to operate properly. This required the Gas Company to perform what they call a betterment project which increases the size of the gas line on Miller Way as well as from the delivery point off of Garfield just south of the facility. This project was requested in 2019 after the gas assessment was completed and ultimately completed in late 2021.

Once the betterment project was completed, the Gas Company installed a 4" gas delivery line into the Miller Way property in order to prepare for the installation of the gas meter and to begin delivery of the gas. The gas meter was installed in early-2022 and all the connections were made in order to have the station ready for gas turn one once the commissioning was scheduled.

The final phase of the project was to commission the station for operation which started with a final test of the time fill hoses in order to ensure that they could handle the 3500 psi of pressure that would be required to fuel the trucks. This testing was completed by Fastech Construction and Station Maintenance in March 2022 and was deem successful.

Once the pressure testing was completed, UWS reached out to Compressor Design and Services to perform the commissioning of the station. As you will see from the attached letter, the station was commissioned on July 19, 2022 and the station was deemed operational and ready to fuel the UWS compressed natural gas trucks with renewable natural gas.

Section 3 – Problems Encountered

The MSRC contract was signed in February of 2019 which initiated the design and engineering of the CNG fueling station at the facility located at 10120 Miller Way in South Gate. Most of 2019 was used to work with the City of South Gate to amend the lease with the City to allow for the fueling station as well as receive land use approval which would authorize the construction of the facility. During 2019, we did not really encounter any problems other than the City was slow to respond to our consultants work to entitle the site to allow for the construction of the fueling station.

Universal Waste Systems decided to be the construction manager for the project and

Because of the delays in 2019, some of this work moved into 2020 which as most in the world know, was when the pandemic hit which further added to the delays in the responding to the design, planning, engineering and land use requirements from the City. There was a good portion of 2020 when City Hall was closed and we were required to send things in by email and wait for the appropriate response.

Most of the design, planning approvals and engineering were completed by the end of 2020 or in the early portion of 2021. We received our building permit for the project on March 4, 2021 authorizing the construction of the fueling station and the appropriate infrastructure improvements.

Once the building permit was in hand, the balance of the equipment such as; fueling posts and hoses, lighting, electrical equipment and so on where order to gear up for the construction portion of the project. Unfortunately, with the pandemic still in effect the supply chains were out well into the future and much of the additional equipment we needed was delayed until late 2021. Fortunately, we had purchased the ANGI compressor from Tru-Star Energy and all of the components and they were on site in South Gate. This allowed us to begin some of the construction and prepare for the installation.

The other delay consisted around the betterment project that was needed to improve the size of the gas line to make sure there was adequate volume of natural gas to efficiently operate the CNG station. Southern California Gas was backed up on these types of projects and the improvement to the gas line was delayed until late 2021 before it would start. Ultimately, the project started and it was completed in early 2022 which aligned with the construction schedule for the completion of the fueling station.

The final delay was hiring a company to perform the commissioning of the fueling station. The major obstacle to this was that UWS had essentially built and installed the station with its only contractors and most companies that were qualified to perform the commissioning were reluctant to do the work because they had not done the construction and installation. We finally found two companies, Fastech and Compressor Design and Service that were willing to check the fueling station to ensure it was properly installed and then commission it for service. As noted earlier in the report, the fueling station was placed into service on July 19, 2022.

Section 4 – Emission Benefits

The Universal Waste Systems South Gate Fueling Station was a complete success with some delays due to the pandemic and issues with receiving material and equipment due to supply chain issues.

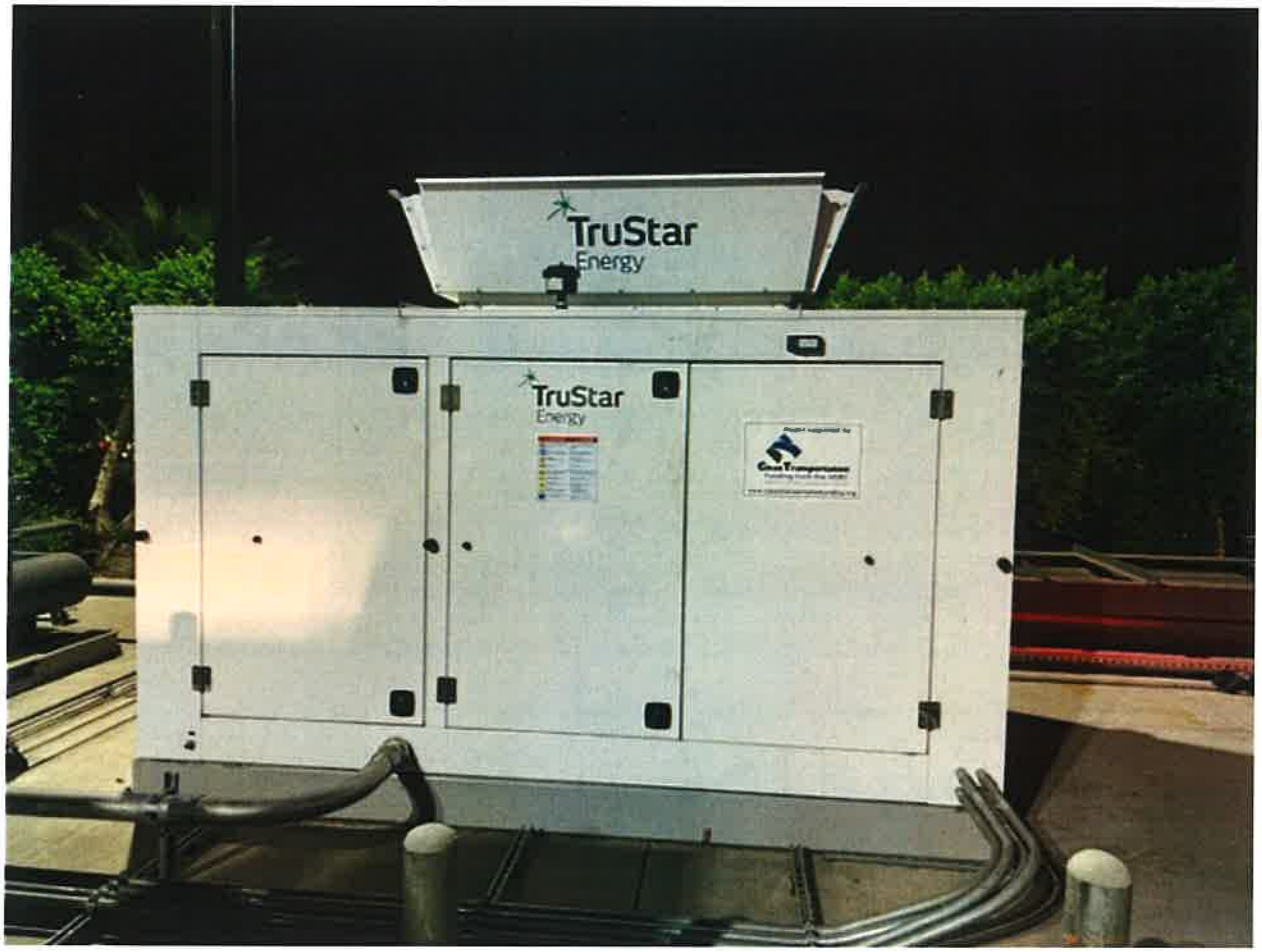
The fueling station is currently serving approximately 80 refuse, recycling and organics collection trucks each night at the South Gate facility. The facility is open 24 hours per day, so the maintenance staff is able to remove trucks once they are full for the next day and connect another truck to the fuel hoses in order to maximize the fuel output to the fleet.

UWS has made the following calculation of miles saved from not need to fuel at a public facility adding additional miles travelled to the trucks routes. We estimate the following in Emission Benefits.

Calculation

Number of Trucks:	80
Avoided Miles Travelled:	10.3
Total Avoided Miles per Day:	824
Total Avoided Miles per Month:	24,720
Total Avoided Miles per Year:	296,640
Carbon Ton Offset per Vehicles:	1.41
Total Number of Vehicles:	80
Annual Total of Carbon Offset:	112.8 tons of Co2

Section 5 – Photographs

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POWERED BY NATURAL GAS

Summary and Conclusions

In summary, Universal Waste Systems, Inc. (UWS) installed a new Compressed Natural gas (CNG) truck fueling station at its facility located at 10120 Miller Way in South Gate, California.

The CNG station is to have new equipment and will dispense greater than 50% natural gas produced by a renewable source. The station commenced operation in July of 2022 and is currently dispense 100% renewable natural gas through a purchase agreement with Tru-star Energy. The fueling station consists of the following equipment at the South Gate site.

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The UWS personnel assembled a team of experts to perform the design, engineering, permitting, equipment selection, civil construction, station installation and commissioning of the facility. UWS worked closely with all of the traders in order to ensure that the station would meet the grant requirements and the desired fueling capabilities for the company.

In conclusion and after some delays due to the pandemic and issues with material and supplies being available, the project is completed and operating at 100% efficiency. The project was designed to service the refuse, recycling and organics collection fleet for Universal Waste Systems domiciled at the South Gate facility. Currently, a fleet of 80 trucks are fueled by the project with renewable natural gas supplied through a fuel supply agreement with Tru-star Energy.

The project will eliminate 112.8 metric tons of Co2 from the elimination of trips to a third party fueling station located outside of the operating footprint of the company and its routing. In addition to the avoided trips to and from the third party fueling station, the company has much better control over the operation of the trucks and the overall routing and the efficiency of their drivers.

In closing, we would like to thank the MSRC for the Grant which made this project possible and successful. We are available for any follow up questions that the staff may have.