

GEORGIA
ENGINEER[®]

TRANSPORTATION

Volume 21, Issue 2 APRIL | MAY 2014



**THE PANAMA CANAL
AT 100 YEARS**

**ROAD DIET SHAPES UP
PONCE DE LEON AVENUE**

TIGER II

THE ATLANTA STREETCAR PROJECT

AFS Expands Alternative Fuels Use

with Largest Public CNG Station in Georgia

By Joey Kline & Khurram Saleem

The demand for cleaner burning alternative fuels such as Compressed Natural Gas (CNG) is growing at a staggering rate. More and more municipalities, counties and companies are starting to transition their fleets to run on CNG-powered vehicles primarily because of the low cost of fuel and the stability of price when compared to gasoline and diesel. On average, CNG is 30% cheaper than gasoline and 40% cheaper than diesel. CNG also offers many environmental benefits that make it a clear choice in order to meet new EPA emissions standards. CNG offers a 30% reduction in carbon emissions and a 90% reduction in fine particulate matter when compared to gasoline and diesel. These advantages, along with the fact that natural gas is a domestically sourced fuel, are increasing the need for more and more reliable fueling locations.

American Fueling Systems (AFS) is a leader in the effort to increase alternative fueling infrastructure and has designed its



American Fueling Systems built the largest public CNG fueling station in Georgia in just seven months, and useage has increased 37% for the year 2013.

facilities to help make the transition to CNG both easy and seamless. AFS, like many of its peers in the marketplace, must strike a balance between top-tier performance in the production and dispensing of CNG, and meeting the unique needs from the variety of users of these facilities.

In September 2012, AFS opened the largest public CNG fueling facility in the state of Georgia. AFS, in partnership with the Department of Energy's Petroleum Reduction Grant, designed and built this facility located at 4420 Buford Highway NE in Chamblee, Georgia in a mere seven months. Located on a 1-acre lot behind Peachtree-DeKalb Airport, this CNG station was the first to be located on a major thoroughfare in the state of Georgia, and the first with a marquee advertising the price; currently, that price is \$2.39/GGE, and it has not changed since January 2013.

This facility produces CNG at a rate of 500 Standard Cubic Feet per Minute (SCFM). The industry is based on a single rate of conversion that is the primary basis for pricing and production. One Gasoline Gallon Equivalent (GGE) equates to 125 cubic feet of natural gas. Using this conversion, AFS is able to produce four GGEs

of CNG per minute. Unlike traditional petroleum stations, CNG facilities focus primarily on producing CNG on an as needed basis with very little in storage. Therefore, it is imperative that the developer and engineers work together to better understand the total and peak consumption of that particular facility.

This AFS CNG station features two J-W Power compressors. Each compressor is 125 horsepower and has a flow rate of 250 SCFM. With a combined flow of 500 SCFM, this compressor system is capable of producing approximately 240 GGE/hour. This compressor package was chosen for its ability to not only satisfy the customer demand upon opening of this facility, but also to handle projected demand as it grows over the coming years. The compressor skids are sized to accommodate the next biggest compressor unit, which means that if the compressors need to be upgraded in the future, the larger compressors can simply be bolted in place and made operational seamlessly. This flexibility of design is evident in all other areas of AFS stations, as well.

Prior to entering the compressors, natural gas flows through a gas dryer man-



ufactured by PSB Industries, whose purpose is to eliminate any moisture and/or particulate matter in the gas. Despite the fact that Georgia has gas with very low moisture content, the gas dryer ensures that the CNG going into customers' fuel tanks is of the highest quality. The gas exiting the dryer is fed directly into the J-W Power compressors.

Within the compressors, the natural gas is compressed in four stages, at ever-increasing pressure. From the compressor, the gas, which is now pressurized at 4,500 psi, flows either to one of two three-bank storage cascades manufactured by CP Industries, or to one of eight hoses on the four Tulsa Gas Technologies CNG dispensers. Whether the gas flows to the storage tanks or to the dispensers is decided by the Priority Panel, which is manufactured by J-W Power. The Priority Panel also decides to which of the four dispensers the gas flows, and is controlled by sophisticated computer software that allows the panel to intelligently route the CNG to where it is needed at any particular moment.

The storage cascades are capable of storing approximately 200 GGE of CNG and serve as complements to the output of the compressors. With the added storage, customers are able to fuel their vehicles at 10-12 GGE/minute. All piping connecting the compressors, storage tanks, priority panel and dispensers is seamless stainless steel. To avoid possible choke points, the piping was installed with a goal of minimizing the use of mechanical joints and sharp bends wherever possible. Within the equipment enclosure, all piping is above ground. This feature ensures that as the station grows in the future, connections between new pieces of equipment will be seamless and not require a shutdown of the station to dig up underground piping. The only underground piping is from the priority panel to the currently operational dispensers as well as those planned for future expansion.

Each dispenser is coupled with a stand-alone payment processing system manufactured by Fuel Master. The payment system is equipped to accept all major credit and fleet cards. In addition,

customers that have the capability to be invoiced (as opposed to paying by credit card at the point of purchase) can simply enter their unique identifying number and begin fueling. All transaction data is captured by the payment system and downloaded to AFS's servers at our headquarters. This capability allows the AFS analytics team to study customer data, and ultimately draw business conclusions that help guide internal decision-making as well as client's future vehicle acquisitions.

The station features two canopies that are each 17.6 feet high. There are four dual-hose dispensers that allow eight vehicles to fuel simultaneously. Also, AFS installed an empty concrete pad under the second canopy to allow for the addition of another alternative fuel in the future. Liquefied Natural Gas (LNG) and Liquefied Petroleum Gas (LPG) both have the potential to serve more customers in the area surrounding this station, and are viable options for expansion at a later date.

During its first full year of operations,

this CNG station dispensed a total of 136,430 GGEs of CNG and ended 2013 with consumption up 37% for the year. For the first three months of 2014, the consumption has been even higher and with more and more fleets looking to CNG as their fuel of choice, this station is well on its way to achieving the short-term goal of 20,000 GGEs per month.

The United States is the largest natural gas producer in the world according to Energy Information Administration. The abundance of natural gas, coupled with stable prices and reduced carbon emissions, is making CNG the fuel of choice for many of the nation's fleets. All of these factors have contributed to the recent surge in demand for CNG, especially in and around the logistical hub of Atlanta. There are significant resources being poured into CNG infrastructure development in and around the state of Georgia and AFS, with its experience and impeccable market reputation for expert design and engineering services, is poised to be at the forefront of this energy revolution. ❖



With award-winning facilities like the Regional Readiness Center in Cumming, Ga., our growing Atlanta office provides the services our military needs: aviation, facility design, program management and electrical transmission and distribution.



www.burnsmcd.com/atlanta

And more than a century after our firm's humble beginnings, our employee-owners adhere to the same singular mission: **Make our clients successful.**



Engineering, Architecture, Construction, Environmental and Consulting Solutions

*Proud to be one of FORTUNE's
100 Best Companies to Work For*