

**Texas Commission on Environmental Quality  
New Technology Research & Development (NTRD) Program  
Monthly Project Status Report**

**Contract Number:** 582-11-11145-3264  
**Grantee:** The University of Texas at Austin (UT)  
**Report for the Monthly period:** April 2012 **Date Submitted:** May 9, 2012

### **Section I. Accomplishments**

*Provide a bulleted list of project accomplishments as well as a description of their importance to the project.*

#### **Hydrogen Station Upgrades**

- Completed installation of combustion air blower and modifications to the electrical enclosure blower
- Completed installation of new flow control valves and meters for improved controlling of the flow of combustion air to the fuel processor. Verified control valve operation and programmed proportional–integral–derivative (PID) loops in programmable logic controller (PLC) code.
- Completed installation of improved process water pump and controller. Verified process pump operation and programmed control loop in PLC code.
- Verified ramp up set points for natural gas and combustion air feeding the new burner and operated burner up to processing temperature.
- Verified operation of make-up water pump, process valves, pressure swing adsorption (PSA) rotation and booster compressor as well as all other instrumentation and control signals.
- Installed controls to automatically power up parts per million (ppm) analyzer and purge with nitrogen from a remote signal.
- Began to develop new fuel processor ramp up algorithm
- Replaced two check valves on the station’s priority panel, addressing unresolved issue from previous monthly report.
- Ran station and produced hydrogen. Carbon monoxide (CO), methane (CH<sub>4</sub>), and carbon dioxide (CO<sub>2</sub>) impurities measured in the produced hydrogen were below J2719 limits.

#### **Hydrogen Bus**

- The bus completed pre-service trials during April 2012 with several successful hydrogen fueling events. To date, the station has dispensed a total of 101 kilograms of compressed hydrogen gas to the bus and the bus has driven over 600 miles in Austin.
- Completed First Responder training with the Austin Fire Department and response crews near UT's downtown campus where the bus will be operated. First responder training at the fueling station site is scheduled for May 2012.
- Completed trainer training for the bus. Trainer training included driving and fueling lessons for the Capital Metro / First Transit supervisor that will be responsible for training other operators who may be assigned to the hydrogen bus after initial individual training. The team has scheduled individual training for all operators of the bus in May 2012, as well as maintenance crews and fuelers.
- With successful completion of pre-service trials, the bus demonstration start date has been scheduled for May 31, 2012. This coincides with the start of the UT Summer class schedule. Although the team was initially targeting a start date earlier in May, it was Capital Metro's preference to delay the

demonstration since the UT shuttle route services are in flux during May due to the break between semesters. Drivers and routes also change during the summer, which would have required double the training. Thus, the team decided it would be most efficient to start the demonstration in line with the UT Summer class schedule.

- A media ride-along event has been scheduled for late May 2012, and a kick-off event announcing the bus demonstration will be held at the Pickle Research Campus hydrogen fueling station site on June 7, 2012.

*Indicate which part of the Grant Activities as defined in the grant agreement, the above accomplishments are related to:*

- Task 2.1.1: The PERFORMING PARTY will contract with Gas Technology Institute (GTI) to prepare hydrogen fueling station and increase hydrogen fuel capacity. (This task has been completed.)
- Task 2.1.2: The PERFORMING PARTY will contract with GTI to replace and upgrade components of the hydrogen fueling station as necessary to prepare it for use in the demonstration.
- Task 2.2.2: The PERFORMING PARTY and GTI will provide training for bus personnel, fueling personnel, and on-site personnel for both routine and emergency activities that may need to be performed during the demonstration period.
- Task 2.3: The PERFORMING PARTY will ensure that the Proterra bus, Capital Metro personnel, and support material are prepared for the demonstration.
- Task 2.4: The PERFORMING PARTY will complete pre-service trails with the Proterra bus and ensure that all Capital Metro Personnel are trained in the bus's operation and maintenance.

## Section II: Problems/Solutions

*Problem(s) Identified: Report anticipated or unanticipated problem(s) encountered and its effect on the progress of the project*

- a) Hydrogen station: two mass flow meters were not functioning.
- b) Hydrogen station: the exhaust fan starter was not functioning.
- c) Hydrogen station: one of the remote input/output (IO) head modules was not functioning
- d) Hydrogen station: after initial testing it was determined that more combustion air will be needed to achieve the desired hydrogen production.
- e) Bus and hydrogen station delays, as well as Capital Metro scheduling, have caused the start date of the demonstration to slip to May 31, 2012, versus the anticipated March 2012 date from the Scope of Work (SOW) in Amendment 02.

*Proposed Solution(s): Report any possible solution(s) to the problem(s) that were considered/encountered*

- a) Replace flow meters.
- b) Replace exhaust fan starter.
- c) Replace IO module.
- d) Replace flow meter with a larger meter that will allow greater air flow.
- e) Amendment 03 was submitted to TCEQ requesting a schedule change for the SOW at no cost.

*Action(s) Conducted and Results: Describe the action(s) taken to resolve the problem(s) and its effect*

- a) Replacement meters are now operational.
- b) New starter was installed and exhaust fan is operational.
- c) New IO module was installed and programmed.
- d) Larger flow meter was shipped and installed by UT. Testing with the new flow meter will occur soon. Results will be known next month.
- e) Awaiting approval of Amendment 03.

### **Section III. Goals and Issues for Succeeding Period:**

*Provide a brief description of the goal(s) you hope to realize in the coming period and identify any notable challenges that can be foreseen*

- Continue fueling station commissioning and preparation with GTI. (Task 2.1)
  - Finalize set points and begin producing hydrogen at 10-20 kilograms per day to match bus consumption
- Complete preparations for bus demonstration. (Task 2.2 and 2.4)
  - Complete driver and operator training
  - Complete fueler training
  - Complete first responder training at fueling site
- Complete bus charger reprogramming. (Task 2.3)
- Begin demonstration phase (Task 2.5)

*Date: 5/9/2012*

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*Authorized Project Representative's Signature*

**NOTE:** *Please attach any additional information that you feel should be a part of your report or that may be required to meet the deliverable requirements for tasks completed during this reporting period.*