

**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:** March 2012 **Date Submitted:** April 5, 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:
  - Installed new combustion air blower, dispenser purge blower, and electrical enclosure blower to address air compressor failure from previous month.
  - Removed existing combustion air delivery equipment and began installation of new flow control valves and meters for improved control of combustion air flow to the fuel processor.
  - Began installation of improved process water pump and controller.
  - Completed fabrication of redesigned burner for the reformer. Installed burner in reformer's external shell. Successfully completed ignition test on burner at lower than idle set points.
  - Conditioned the shift catalyst and packed shift reactor in nitrogen to prevent oxidation until it is placed back into service at the UT hydrogen station.
  - Shipped reformer and shift reactors back to Austin on March 29, 2012
- Proterra fuel cell bus arrived in Austin on March 10, 2012. Operational manuals were also delivered with the bus.
- Performed successful fueling of the Proterra bus throughout March 2012. Hydrogen dispenser and compressor are both online and allowing high-pressure fills with hydrogen supply from the tube trailer.
  - To date, the station has dispensed a total of 44.4 kilograms of compressed hydrogen gas into the Proterra fuel cell bus on four separate fuelings to support pre-service testing and route validation activities.
- Temporary tags for the bus were obtained for the week of March 12, 2012. Permanent tags are expected first week in April 2012.
- Began route validation and pre-service trials with the bus. Trial runs on two Capital Metro UT Campus routes were driven and data was obtained. Model correlation is currently in progress.

*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.
- Task 2.1.2.5: The PERFORMING PARTY and GTI will provide a supply of backup hydrogen for bus refueling.
- Task 2.3: The PERFORMING PARTY will ensure that the Proterra bus, Capital Metro personnel, and support material are prepared for the demonstration.

## **Section II: Problems/Solutions**

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

- a) During operation of the hydrogen compressor there was an o-ring seal failure on a fitting located on a filter installed on the compressor's outlet tubing which caused a leak.
- b) A leak occurred in the hydrogen station's medium storage bank during unattended operation of the hydrogen compressor.
- c) Human Machine Interface (HMI) control panel screen was not updating with current pressure and temperature readings.
- d) During pre-service testing of the Proterra bus, the fuel cell modules behaved intermittently during bus operation.
- e) The bus delivery and hydrogen station upgrades have taken longer than anticipated. The modified contract schedule following Amendment 02, anticipated the bus demonstration beginning in March 2012. Current projections are for a demonstration start date by May 2012, which will allow for training of operators and station commissioning.

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

- a) Replace leaking o-ring or entire fitting.
- b) Suspect failure in check valve on medium pressure bank. New check valve was ordered and an additional check valve will be installed on compressor discharge line upstream of the priority panel. GTI will investigate and try to determine the escape path of the hydrogen from the medium bank and evaluate any possible equipment damage that may have occurred.
- c) It was determined that the IP address on the computer had been changed.
- d) Proterra and Hydrogenics had service technicians on-site to diagnosis the problem. They determined there was an error in the bus control software programming.
- e) Training schedules will be compressed as best as possible, but a no-cost schedule amendment will be needed to re-baseline the programs scope of work and deliverables.

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

- a) Leaking O-ring was replaced and fitting is currently holding pressure after several hours of operation on the compressor.
- b) Awaiting arrival and installation of check valves.
- c) Reassignment of the IP address allowed the control panel to update, however there still are communication issues between the computer and the remote input-output islands.
- d) The programming error was resolved and the bus and its fuel cell modules have been operating normally to date.
- e) UT will plan to submit the amendment request in May 2012 once the demonstration start date is firm.

### **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 upgrades and preparation with GTI. (Task 2.1)
  - Install reformer and update PLC programming
  - Install additional gas analyzers to monitor hydrogen purity
  - Begin commissioning of the station
- Complete/continue preparations for bus demonstration. (Task 2.3)
  - Complete pre-service trials and testing
  - Complete driver and operator training

Date: 4/5/2012

---

*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.*