

**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-CEM)

Report for the Monthly period: April 2013 **Date Submitted:** May 9, 2013

Section I. Accomplishments

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

Hydrogen reformer and fueling station

- For the month the reformer was operated for about six hours and produced 2.1 kilograms (kg) of hydrogen (H₂).
- Gas Technology Institute (GTI) made trip to Austin, Texas, to perform the following work on the station to address prior and ongoing maintenance/repair issues.
 - Install new computer and monitor. Old computer was having frequent memory reference errors leading to intermittent problems when running the station.
 - Installed power measurement equipment and data acquisition in the electrical room. This will allow UT-CEM to quantify the cost of producing hydrogen at the station.
 - Install new solenoid valves on the priority fill panel and in the dispenser. Prior valves were needing frequent rebuild.
 - Install new high pressure check valves in priority panel and modify tubing to make these check valves more accessible and easier to replace. Prior check valves were failing frequently.
 - Removed leaking compressed air dryer from electrical room. GTI also ordered a new desiccant dryer but it arrived after their visit to Austin. UT-CEM personnel will install the dryer.
- Gathered samples from the H₂ storage vessels and sent them to Smart Chemistry for analysis. The results show that the impurities in the H₂ storage vessels are below the SAE J2719 specification for fuel cell vehicles.
- The hydrogen tube trailer back-up supply was removed from the hydrogen station site.

Hydrogen fuel cell bus

- As of the end of the last reporting period, the Proterra bus had been returned to Greenville, South Carolina, to diagnosis an electrical fire during service on March 18, 2013. Diagnosis at Proterra during April 2013 found that one of the DC/DC converters on the bus was damaged severely.
- At the end of March 2013, shortly after the incident, the team suspected an electric short on external cabling caused the fire. Proterra's observations of the DC/DC converter damage point to the initial failure occurring within the DC/DC converter and then causing the nearby cabling insulation to melt. There was no evidence of a hard short between the wires and cables to the vehicle chassis.
- The DC/DC converter was sent to its manufacturer, US Hybrid, for further diagnosis. It is unclear if a root cause can be determined based on the damage and data collected from the bus. As of the end of April 2013, the team is still awaiting the results from US Hybrid's investigation.
- With the NTRD project ending in May 2013, the bus will likely not return to service in the upcoming month.

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

Task 2.5: The PERFORMING PARTY will operate the hydrogen fuel cell hybrid-electric bus in a realistic working environment over a twelve month period, including using the hydrogen generation and fueling station as the bus's primary fuel source.

Section II: Problems/Solutions

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

- a) No new problems to report this period.

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

- a) N/A

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

- a) N/A

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

- Proterra and US Hybrid will complete investigation of the DC/DC converter failure. Results will be documented in the project's final report to TCEQ.
- Although the bus is not in Austin and in operation, UT-CEM plans to empty one of the hydrogen storage tanks and run the station. This will allow UT-CEM to use the newly installed power monitoring equipment and quantify the cost of producing hydrogen at the station.
- Close out project and write final report.

Date: 05/09/2013

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.*