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

Contract Number:	582-11-13472-2019		
Grantee:	Transportation Power, Inc.		
Report for the Monthly period:	11/12/11 – 12/09/11	**Date Submitted:**	12/09/11

Section I. Accomplishments

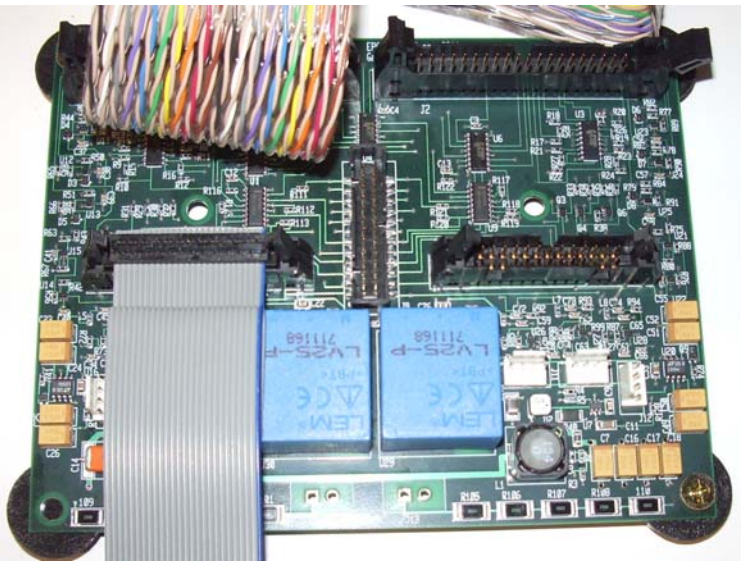
Provide a bulleted list of project accomplishments as well as a description of their importance to the project.

- Validated the functionality of the "ElecTruck" drive system by successfully test driving the first vehicle to use this system, a Navistar Class 8 truck. This is important to the project because, while the drive system is presently installed on a Navistar truck, the same basic system will be used to propel the electric terminal tractors. Hence, this represents the first concrete validation that the all components of the ElecTruck system work together as expected and greatly increases confidence that the terminal tractors will function as intended with their variant of the ElecTruck system.

Figure 1. Navistar truck undergoing drive testing with the ElecTruck system.

- Continued bench testing of our advanced onboard Inverter-Charger Unit (ICU), which is important because this is the only major new component (not included on the current Navistar truck) that will be used in the terminal tractors. ICU bench testing is on schedule for completion by January 2012. In addition, significant progress was made in integrating the Quantum inverters used on the current Navistar truck with the ElecTruck system. This is important because the Quantum inverters are our backup option for controlling the terminal tractor motors if there are any delays in ICU development.

Figure 2. Interface board of new Inverter-Charger Unit.



- Completed drive testing and road familiarization of the first terminal tractor powered by its stock diesel powertrain. Began the process of familiarization with vehicle Controller Area Network (CAN) communication protocols and messages have been logged for use later in integrating stock systems with the electric drive, after the stock system has been taken apart. Initiated actual disassembly of the first tractor vehicle.
- Conducted a planning meeting as a precursor to begin physical modifications to the first terminal tractor. At the meeting, long lead procurement items were identified and a detailed timeline was assembled for the vehicle conversion. A follow-up review was scheduled for December 16, 2011. This is an important milestone because it represents a winding down of the design phase of the project and the beginning of the transition to vehicle integration.
- Executed a confidentiality agreement with Cargotec, manufacturer of the terminal tractors, and obtained wiring schematics for the tractors. This is important because it initiates a closer working relationship with Cargotec and provides data that will accelerate the integration process and reduce the likelihood of mistakes that could cause delays or increase project costs.

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

- The first two accomplishments listed above relate to Task 2.1.1, “Final Component Selection and Procurement.” The third through fifth tasks above relate to Task 2.2.2, “Tractor Installation.”

Section II: Problems/Solutions

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

a) Initial testing of the Navistar truck identified several minor problems relating to the ElecTruck drive system, including software issues with the Quantum inverters that impeded our ability to effectively control the system's drive motors, insufficient pumping capacity to pump the cooling fluid required to cool the drive motors and inverters, and shortcomings in the initial design of our electrical fault isolation system. These problems had a minor impact on the progress of the project because correcting them delayed our ability to focus engineering resources on the terminal tractor project.

b) Facility modifications required for venting of diesel exhaust were not completed as expected due to delays by the contractor. These delays do not significantly affect the project because we've been able to test drive the diesel tractor without the facility improvements. In the longer term, however, these modifications need to be completed if we are to continue working with diesel engines and fuel systems at our present facility.

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

a) The drive system issues in the first Navistar truck have largely been resolved. The vehicle is functioning adequately with one working inverter, and a second working inverter is expected to be available within a matter of days. In addition, TransPower has requested delivery of two additional Quantum inverters so we have backup units in case of future problems with this product. Generally, the Quantum inverter does not appear to be as mature or robust a product as was originally represented by Quantum. However, its low cost still justifies the investments that have been made in improving the product, assuming the issues encountered over the past few months can be permanently resolved within a reasonable period. In the longer term, these inverters will be replaced entirely with our own ICU, so any lingering impacts of the Quantum inverter problems will be temporary. The other problems encountered during drive testing of the Navistar truck enabled us to make improvements in the ElecTruck system that should reduce the likelihood of encountering similar problems on the terminal tractors. In this sense, the terminal tractor project is benefiting significantly from TransPower's investments in its on-road Class 8 truck project, at no financial cost to the terminal tractor program.

b) The material for the required facility improvements was delivered to our site by the contractor, so we believe this work will be completed soon. In the meantime, the delay is not affecting our progress on the project.

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

a) The last 2-3 weeks of the reporting period were spent resolving the problems encountered during testing of the Navistar truck. Diligent attention to these issues seems to have resolved all of them, and to have resulted in an improved drive system configuration. These types of problems are extremely common during the first phases of testing any new drive system in a vehicle for the first time, so no extraordinary measures are deemed necessary at this time. Again, it is expected that integration of the terminal tractors will proceed more quickly and with fewer problems than would otherwise be encountered, as we benefit from the lessons learned testing the ElecTruck system in the Navistar truck over the past two months.

b) As the facility modification issue is not affecting the project at this time, we are not taking any action other than planning to contact the contractor if we don't see progress in completing the modifications within the next few days. This matter should be permanently resolved before the end of the next reporting period.

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

We remain behind in our schedule for removing the diesel engine and fuel system from the first terminal tractor, but with or without the facility modifications discussed previously, we plan to achieve this during the next reporting period. We are also behind in completing the drive system layout, but now that the Navistar truck is functional and we have more active support from Cargotec, we expect to see greatly accelerated progress on this task over the next several weeks. We also plan to complete selection of the transmission and any other major components that differ from those used in the current Navistar truck. While progress has been less than expected in the two months since the first tractor was delivered to our facility, we have expended minimal contract funds over this period, so these resources will be available to support a greatly scaled-up effort over the next 2-3 months. Our goal is to achieve a high level of completion of the first electric tractor by the end of the first quarter of 2012.

Date: 12/9/2011

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.*