

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

Contract Number: 582-11-12630-3264
Grantee: EcoPower Hybrid Systems (Ecopower)
Report for the Monthly period: April 2013 **Date Submitted:** May 10, 2013

Section I. Accomplishments

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

Electrical design:

- Programmable logic control (PLC) programming for lithium technology is now fully completed.
- Electrical design review of the system is completed including bridging of existing Crane signals in the electrical design is fully completed.
- Sequential flow chart of operation is completed at 100%.
- Shop test is completed.
- Electrical interconnections are completed between control and power management panel (CPMP)-inverter-genset-battery rack.
- Genset manual maintenance mode is fully functional.
- Overall electrical design review of the system is completed.
- PLC programming for lithium technology is being finalized.
- Shop test, charge and discharge of the system are tested and functional.

Battery Management System (BMS):

- Testing of PLC communication with two battery management system (BMS) masters and their 27 cell group modules (for a total of 216 cells) is completed. System is functional.
- The new BMS firmware is validated and the cell value broadcast bug is fixed.

Battery:

- Battery pack was tested in charge and discharge using the complete system. The system is working as expected.
- Testing of the baseline emission is scheduled for May 1, 2013, to May 4, 2013.
- Transportation authorizations are obtained from Department of Transportation (DOT) and Transport Canada.

Thermal and mechanic:

- After customer needs review, the expected fuel tank modification is non-required
- Decals on enclosures are installed
- Transformer support weldment is completed and ready to be installed.
- Resistor grid support is completed.
- Installation drawings and instructions are completed
- Verification of thermal balancing of the battery pack was performed

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

All realizations are related to Task 2 (Engineering) and Task 3 (Manufacturing) of the project.

Section II: Problems/Solutions

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

- Schedule remains very tight.

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

- We are currently increasing internal effort to deliver on time

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

- Plan is finalized and the unit will be ready on time for shipping to Houston. We are still following carefully all activities to mitigate any potential delay on schedule.

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

- Failure mode and effect analysis (FMEA) of CPMP document will be ready.
- Sequential flow chart of operation will be completed
- Inverter braking chopper strategy will be tested.
- FMEA of CPMP document will be ready.
- Complete all product drawings.
- Complete operating/maintenance procedures.
- Schedule Kone to upgrade the software in the variable frequency drives (VFDs).
- Perform after install emissions tests. Emission testing of current equipment will occur during first week of May 2013 and will be used as reference to demonstrate emission reduction.
- The complete Ecocrane system will be shipped to APM Terminals in Houston, Texas, the second week of May for an immediate installation.
- The rubber tire gantry (RTG) crane repowered with the new lithium-ion EcoCrane Hybrid Power Plant will be commissioned tested and emission testing will be performed before the end of the project.

Date: May 10, 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.*