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

Contract Number: 582-11-13469-2019

Grantee: QuantLogic Corporation

Report for the Monthly period: March 1, 2012 to March 31, 2012

Date Submitted: April 10, 2012

Section I. Accomplishments

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

Task 1: Procure Components within 3 months:

- 95% completion of the task.
- All components for engine setup have been procured. The remaining 5% of the procurement refers to retrofits and will require more precise configuration such as dimensions for retrofit and results from the combustion and emission testing. It is more efficient to accomplish them at the stage after the emission reductions development and before the vehicle retrofit stage.
- Specifications for dual-loop exhaust gas recirculation (EGR) components have been finished. The major components for the combustion and emissions development for the retrofit kit were procured.

Task 2: Set up engine retrofit and engine control systems within 6 months:

- 100% completion of the task.
- Completed the engine retrofit and engine control system functionality verification. The engine test cell setup, single loop and dual loop EGR systems, as well as engine control systems have been completed and verified.
- Completed engine and control system setup on stock engine control unit (ECU). Engine was run on stock ECU and operated all normal.
- Completed control system setup on functionality of rapid prototyping control system. Engine was run on the rapid engine control system. Functionality tested and verified.

Task 3: Steady-state engine calibration and emissions testing within 9 months.

- 100% completion of the task.
- Competed the steady state calibration and emissions testing.
    - Defined test points and run the engine at the test points for performance and emissions tuning. Based on the Texas Drayage Truck Driving Cycle, EPA SET and FTP Test Cycles, four modes are selected from SET cycle to represent the steady-state drayage truck operation: Idle, A25, B25 and B50. Their weighting factors are the same as those used by EPA SET Modes. A50 is selected as a transition mode between drayage driving to highway driving.
    - Calibrated emissions measurement systems for Smoke and gaseous emissions.
    - Recalibrated Idle, A25, B25, B50 and A50 modes for low NO_x and particulate matter (PM) emissions as well as maintaining high combustion efficiency. 50% NO_x reduction

goal was achieved by applying low temperature combustion concept at idle and premixed combustion at the remaining modes.

- A comprehensive quarterly report of the Task 3 accomplishment is prepared and submitted.
- Data analysis was conducted and completed.
- A revised quarterly report for Task 3 was submitted.

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

The authorized tasks are related to:

- Task 1: Procure Components within 3 months
- Task 2: Set up engine retrofit and engine control systems within 6 months.
    A. Set up the engine, dual loop EGR retrofit, and engine control systems in the laboratory in preparation for testing.
    B. Install instrumentation for monitoring all major engine operation parameters
    C. Set up the engine control system for fueling control, dual loop EGR control, and boost control.
- Task 3: Steady-state Engine Calibration and Emissions Testing
    A. Re-tune the test engine with dual loop EGR system retrofit for low NO_x and PM emissions over representative steady-state conditions.
    B. Select representative steady-state engine operating conditions on the target engine/vehicle over the EPA ESC 13 mode test cycle and representative operating points over the EPA FTP transient test cycle. Assign emissions reduction targets to each mode based on the mode weighting factor and baseline engine emissions status.
    C. Submit a report of the testing results from the recalibrated engine showing NO_x emissions reductions of at least 50% over the representative steady state operating points.

Section II: Problems/Solutions

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

a) None.

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

a) None.

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

a) None.

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

- Ready to proceed to Task 4 as soon as received Notice to Proceed from TCEQ.

Date: 4/10/2012

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.*