

NTRD Program Disclaimers

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

Contract Number: 582-5-70807-M031

Grantee: Extengine Transport Systems, LLC

Date Submitted: September 12, 2005

Report for the **Monthly** period:

Starting Date 8/1/05 Ending Date 8/31/05

Section I. Accomplishments *(Please provide a bulleted list of project accomplishments as well as a description of their importance to the project.)*

Task 1: (all technical work is included in this task)

- A 2001 Mack E7-350 engine has been selected – target engine group is 1998-2003 250-400 Hp on-road engines).
- Catalyst/DPF configuration has been finalized based on E7-350 engine.
- Urea dosing system installed and operating on 5.9L test engine.
- On-going negotiations with EPA and RTI regarding test requirements including methods of aging test hardware – see attached Test Plan.
- Field installation of the DPF on a Freightliner prototype vehicle and laboratory tests on a 5.9L engine have been completed. Systems are working satisfactorily.
- Bench tests of NOx sensors have not shown good correlation to gas analyzers – further study in process.

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

These accomplishments relate to preparation of test hardware and the initiation of testing. Work to date is required prior to start of testing. These charges are not reimbursable by the grant. A no-charge FSR is attached with this report.

Section II: Problems/Solutions

<p>Problem(s) Identified</p> <p><i>(Please report anticipated or unanticipated problem(s) encountered and its effect on the progress of the project)</i></p>	<ol style="list-style-type: none">1) Active DPF uses a fuel borne catalyst to enhance low temperature regeneration. EPA will not approve start of verification testing until the additive solution containing the catalyst is registered as an additive. Registration may take 6-12 months.2) NOx sensor response was not proportional to gas concentration
<p>Proposed Solution(s)</p> <p><i>(Please report any possible solution(s) to the problem(s) that were considered/encountered)</i></p>	<ol style="list-style-type: none">1) The verification test will be conducted without using the additive which can be added later. This may limit the lower temperature duty cycles for the initial verification.2) NOx sensor software needs initialization which was incomplete.
<p>Action(s) Conducted and Results</p> <p><i>(Please describe the action(s) taken to resolve the problem(s) and its effect)</i></p>	<ol style="list-style-type: none">1) E-mail and telephone negotiation with EPA and RTI regarding fuel borne catalyst.2) E-mail communication with supplier to clarify NOx sensor performance.

Section III. Goals and Issues for Succeeding Period: *(Please 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)*

Goals:

- Complete negotiation on program test protocol between RTI, SwRI, EPA and ARB.
- Submit final EPA and ARP test plan documents
- Acquire test engine and remaining test hardware
- Continue tests of SCR control software with self-learning feature using bench prototypes
- Issue PO to RTI

Issues:

- NOx sensor response characteristics
- Establishing SCR self-learning algorithm.



September 12, 2005

Date: _____

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.*

TEST PLAN
Contract No 582-5-70807-M031
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Introduction:

The project is to obtain USEPA verification of Extengine's ADEC diesel emission retrofit system. Negotiations with EPA and ETV are still in process regarding the active DPF planned for this test. The DPF uses a fuel borne catalyst to facilitate low temperature regeneration. According to EPA, the verification program cannot begin until the additive's EPA registration is completed. The additive is manufactured by Rhodia company and is currently beginning at SwRI under a contract with Rhodia. Extengine is now proposing to EPA that the verification be started without use of the fuel borne catalyst.

Proposed Test Protocol:

Emissions are measured using the EPA transient engine test procedure in which 1/6 of a 20 minute cold cycle emissions are averaged with 6/7 of the average of the 3 20 minute hot start cycles. Additional replicates beyond 3 are not necessary for statistical confidence since this the PM control is provided by a DPF with reduction efficiency >85% and NO_x control is provided by SCR with reduction efficiency expected to be >80. Emissions of THC, CO, NO_x, NO₂, PM, CO₂, and fuel consumption are to be measured. Negotiations are now on-going between EPA-OTAC (Cliff Dean) and RTI-ETV (Jenni Elion). The following activity will be the basis for a formal Statement Of Work and RTI contract.

Preparation of Test Parts: (not chargeable to TCEQ grant)

- 2 sets of test hardware consisting of an unaged DPF/SCR catalyst system and an aged DPF/SCR catalyst system with injection system hardware and control computers.
- Aging to be conducted by Olson-Ecologic Engine Testing Laboratories, LLC in Fullerton, California.
- Aging to be performed with a hydrodynamic engine dynamometer running a simulated transient test schedule (without motoring) for 1000 hours.
- Aging to be performed using a 2001 Mack E7-350 diesel engine.
- Aging to be performed with ULSD (maximum 15ppm sulfur).

Testing:

- Two sets (aged and unaged) of test hardware will be provided.
- Emission testing will be conducted by Southwest Research Institute
- The test engine used for aging will be shipped to Southwest Research Institute with the test hardware.
- Baseline tests will be conducted (1 cold start with 3 hot start tests).
- Initial (unaged hardware) tests will be conducted (1 cold start with 3 hot starts tests).

- Final (aged hardware) tests will be conducted (1 cold start with 3 hot start tests).
- Testing is planned for late January 2006.