



COORDINATING RESEARCH COUNCIL, INC.

3650 MANSELL ROAD, SUITE 140
ALPHARETTA, GA 30022
TEL: 678/795-0506 FAX: 678/795-0509
WWW.CRCAO.ORG

July 7, 2009

In reply, refer to:

CRC Project No. AVFL-17a

Dear Prospective Bidder:

The Coordinating Research Council (CRC) invites you to submit a written proposal to provide services for " Investigation of biodiesel chemistry, carbon footprint and regional fuel quality" (CRC Project No. AVFL-17a). A description of the project is presented in Exhibit A, "Statement of Work."

Please indicate by letter, fax, or email by **July 21, 2009**, whether or not you or your organization intends to submit a written proposal for this research program. CRC will answer technical questions regarding the Request for Proposal if they are submitted in writing. CRC will then return written answers to all of the bidders, along with a copy of the original questions.

A CRC technical group composed of industry and government representatives will evaluate your proposal. CRC reserves the right to accept or reject any or all proposals.

The reporting requirements will be monthly progress reports and a summary technical report at the end of the contractual period. The reporting requirements are described in more detail in the attachment entitled "Reports" (Exhibit B).

The proposal must be submitted as two separate documents. The technical approach to the problem will be described in part one, and a cost breakdown that is priced by task will be described in part two. The cost proposal document should include all costs associated with conducting the proposed program. The technical proposal shall not be longer than 10 pages in length.

CRC expects to negotiate a fixed price contract for the research program. Bidders should quote a fixed price structure.

Contract language for intellectual property and liability clauses is presented in Exhibit C and in Exhibit D, respectively. Bidders are also advised that government funds may be used to support the research, and therefore certain government contract terms and conditions may apply.

Important selection factors to be taken into account are listed in Exhibit E. CRC evaluation procedures require the technical group to complete a thorough technical evaluation before considering costs. After developing a recommendation based on technical considerations, the costs are revealed and the recommendation is modified as needed.

Thirty (30) copies of the technical proposal and three (3) copies of the cost proposal (or one each electronic-copy) should be submitted to:

Dr. Chris Tennant
Coordinating Research Council
3650 Mansell Road, Suite 140
Alpharetta, GA 30022

Phone: 678-795-0506
Fax: 678-795-0509
E-mail: ctennant@crcao.org

The deadline for receipt of your proposal is **August 11, 2009**.

Yours truly,

A handwritten signature in black ink, appearing to read 'Chris Tennant', written in a cursive style.

Chris Tennant
Deputy Director

EXHIBIT A

STATEMENT OF WORK

CRC Project AVFL-17a

Investigation of biodiesel chemistry, carbon footprint and regional fuel quality

Background:

The RFS2 program as enacted by Congress for the first time requires the displacement of petroleum diesel fuel with low carbon renewable fuels. The program also requires renewable fuels to meet certain greenhouse gas (GHG) emission reduction targets. Biofuels have received a lot of attention in view of the RFS2 proposal and the requirement to blend high volumes of biofuels in the future. Biofuels would include ethanol and biodiesel. In this work, only biodiesel is studied. Biodiesel is an example of a clean, renewable and biodegradable source of energy. Biodiesel offers several advantages when compared to petroleum diesel. It contributes to significant CO₂ reduction relative to petroleum-derived diesel. It contains no sulfur or aromatics. Conventional biodiesel is produced when a vegetable oil is reacted with an alcohol (methyl or ethyl) usually in the presence of a catalyst. The transesterification reaction produces fatty acid methyl ester (FAME) and glycerol. Biodiesel properties are known to be influenced by the composition of the fatty acids. Properties such as the cetane number, oxidative stability, viscosity and the cold flow properties are dependent on the fatty acid composition and chemical structure.

In evaluating the biodiesel, one of the most important factors is the greenhouse gas (GHG) emissions that are emitted during the production of the biodiesel. Although a highly controversial matter, biodiesel is known to have a lower carbon footprint compared to petroleum derived fuels, meaning biodiesel production results in some reductions of the GHG. These reductions in GHG vary among the various biodiesels, and it will be useful if data can be collected in this regard.

The biodiesel quality also varies geographically and locally in various part of the world. Poor quality fuel results in fuel filter plugging and higher emissions. It is of interest to suppliers as well as the auto manufacturers to know how much variance is out there.

Objectives:

- (1) To investigate and evaluate the FAME in terms of their chemistry and composition and their influence on the emission characteristics.
- (2) To investigate the carbon footprint of the various biodiesels.
- (3) To collect data on the regional biodiesel fuel quality in the various regions of the world

Methodology:

This project will consist of three tasks.

Task 1: To investigate and evaluate the FAME in terms of their chemistry and composition and their influence on the emission characteristics. For example, the carbon chain length, the location and the number of double bonds in the FAME structure and how they influence the FAME properties and emissions. Significant information have already been collected in AVFL-17 but this will be more focused and up to date collection of data , for example, location of the double bonds in the FAME structure and how they influence the FAME properties such as cold flow, cloud point, CFPP, CN, oxidation stability, density and emissions.

Task 2: To investigate the carbon footprint of the various biodiesels. Collect literature data on life cycle analysis of the various biodiesels using different models. A critical evaluation of the various studies which are most complete and based on sound science is required in this Task. Land use change impacts especially international, are often very complex and not as easily understood. Attempts should be made to explain the various assumptions.

Task 3: To collect literature data on the regional and national biodiesel fuel quality specifications and measurement methods used in the various regions of the world and how they are enforced.

A computer literature search is to be used to collect appropriate data to accomplish the objectives. Published data in the open literature are to be collected. The data are to be analyzed and organized for easy interpretation.

Schedule:

The project will commence in Q4 of 2009 and will be completed by Q3 of 2010. There will be a comprehensive Project report with identification of data gaps and recommendations for further work.

Deliverables:

A comprehensive project report will be published at the end of the Q3 2010. Several papers will be prepared by the contractor for publications in the SAE or other forums.

EXHIBIT B

REPORTS

MONTHLY TECHNICAL PROGRESS REPORTS

The contractor shall submit a monthly technical progress report covering work accomplished during each calendar month of the contract performance. An electronic Microsoft® Word compatible file (<1 MB) of the monthly technical progress report shall be distributed by the contractor within ten (10) calendar days after the end of each reporting period. The report shall contain a description of overall progress, plus a separate description for each task or other logical segment of work on which effort was expended during the reporting period.

FINAL REPORT

The contractor shall submit to or distribute for CRC an electronic pdf-compatible copy transmittable via email) of a rough draft of a final report within thirty (30) days after completion of the technical effort specified in the contract. The report shall document, in detail, the test program and all of the work performed under the contract. The report shall include tables, graphs, diagrams, curves, sketches, photographs and drawings in sufficient detail to comprehensively explain the test program and results achieved under the contract. The report shall be complete in itself and contain no reference, directly or indirectly, to the monthly report(s).

Within thirty (30) days after receipt of the approved draft copy of the final report, the contractor shall make the requested changes and deliver to CRC thirty (30) hardcopies including a reproducible master copy of the final report. The final report shall also be submitted as an electronic copy in a pdf or pdf-convertible file format. The final report may be prepared using the contractor's standard format, acknowledging author and sponsors. An outside CRC cover page will be provided by CRC. The electronic copy will be made available for posting on the CRC website.

EXHIBIT C

INTELLECTUAL PROPERTY RIGHTS

Title to all inventions, improvements, and data, hereinafter, collectively referred to as (“Inventions”), whether or not patentable, resulting from the performance of work under this Agreement shall be assigned to CRC. Contractor X shall promptly disclose to CRC any Invention which is made or conceived by Contractor X, its employees, agents, or representatives, either alone or jointly with others, during the term of this agreement, which result from the performance of work under this agreement, or are a result of confidential information provided to Contractor X by CRC or its Participants. Contractor X agrees to assign to CRC the entire right, title, and interest in and to any and all such Inventions, and to execute and cause its employees or representatives to execute such documents as may be required to file applications and to obtain patents covering such Inventions in CRC’s name or in the name of CRC’s Participants or nominees. At CRC’s expense, Contractor X shall provide reasonable assistance to CRC or its designee in obtaining patents on such Inventions.

To the extent that a CRC member makes available any of its intellectual property (including but not limited to patents, patent applications, copyrighted material, trade secrets, or trademarks) to Contractor X, Contractor X shall have only a limited license to such intellectual property for the sole purpose of performing work pursuant to this Agreement and shall have no other right or license, express or implied, or by estoppel. To the extent a CRC member contributes materials, tangible items, or information for use in the project, Contractor X acknowledges that it obtains only the right to use the materials, items, or information supplied for the purposes of performing the work provided for in this Agreement, and obtains no rights to copy, distribute, disclose, make, use, sell or offer to sell such materials or items outside of the performance of this Agreement.

EXHIBIT D

LIABILITY

It is agreed and understood that _____ is acting as an independent contractor in the performance of any and all work hereunder and, as such, has control over the performance of such work. _____ agrees to indemnify and defend CRC from and against any and all liabilities, claims, and expenses incident thereto (including, for example, reasonable attorneys' fees) which CRC may hereafter incur, become responsible for or pay out as a result of death or bodily injury to any person or destruction or damage to any property, caused, in whole or in part, by _____'s performance of, or failure to perform, the work hereunder or any other act of omission of Contractor in connection therewith.

EXHIBIT E

PROPOSAL EVALUATION CRITERIA

- 1) Merits of proposed technical approach.
- 2) Previous performance on related research studies.
- 3) Personnel available for proposed study – related experience.
- 4) Timeliness of study completion.
- 5) Cost.