COORDINATING RESEARCH COUNCIL, INC.
5755 NORTH POINT PARKWAY, SUITE 265
ALPHARETTA, GA 30022
TEL: 678/795-0506 FAX: 678/795-0509
WWW.CRCAO.ORG

July 23rd, 2019
In reply, refer to:
CRC Project No. E-127-1

Dear Prospective Bidder:

The Coordinating Research Council (CRC) invites you to submit a written proposal to provide services for "Analysis and Review of DHA Methods used in CRC Oxygenated Gasoline Emissions Projects E-94-2, E-94-3, and E-129" (CRC Project No. E-127-1). A description of the project is presented in Exhibit A, "Statement of Work."

Please indicate by letter, fax, or email by **August 6th, 2019** if 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 at least one week before the proposal submission deadline. CRC will then return written answers to all of the bidders, along with a copy of the original questions. Questions submitted within a week of the deadline may not be answered before the proposal submission deadline.

A CRC technical group composed of industry 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 cost-plus fixed fee or cost reimbursement contract for the research program.

Contract language for intellectual property and liability clauses is presented in Exhibit C and in Exhibit D, respectively.

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.

Electronic copies of the technical and cost proposals should be submitted to:

Amber B. Leland
Coordinating Research Council
5755 North Point Parkway, Suite 265
Alpharetta, GA 30022

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

The deadline for receipt of your proposal is **August 20th, 2019.**

Yours truly,

Amber B. Leland
Deputy Director

EXHIBIT A: STATEMENT OF WORK
CRC Project E-127-1
Analysis and Review of DHA Methods used in CRC Oxygenated Gasoline Emissions Projects E-94-2, E-94-3, and E-129

Background

Recently, several CRC projects (1-3) investigating oxygenated gasoline fuels and the resultant effects on emissions have been completed. In the CRC E-94-2 project, exhaust emissions data (with a focus on particulates) was collected over the LA92 drive cycle for 12 vehicles utilizing gasoline direct injection (GDI) engines. Fuels were differentiated by ethanol content, octane number (AKI), and particulate matter index (PMI) resulting in a total of 8 fuels. (PMI, developed by Honda, provides a means to assess particulate formation "potential" of a given fuel.) Fuels were "match" blended so that ethanol, octane, and PMI targets could be reached. To provide a comprehensive picture of how varying ethanol content, octane, and PMI affect vehicle emissions, the E-94-3 program was created to utilize "splash" blended fuels. For both programs, extensive statistical analysis indicated that increasing ethanol content (from 0- to 10-percent, by volume) and PMI cause increased particulate emissions. Octane effects were deemed statistically insignificant. More recently, E-129 investigated emissions effects of iso-butanol and MTBE in addition to ethanol and found, in general, a *decrease* in both gaseous and particulate emissions with *increasing* oxygenate content (from 3.5 to 5.5 wt%).

As part of these programs, detailed hydrocarbon analysis (DHA) was performed for all test fuels using both the traditional ASTM method (D6730-01), as well as a newer, *enhanced* method (4) that can identify more "unidentified" hydrocarbon (HC) components (thus resulting in a more accurate PMI value). In considering the spectrum these programs covered with respect to oxygenate type and fuel blending strategies, CRC Emissions Committee members seek an outside investigator to perform a meta-analysis of the DHA methods used in these studies.

Scope of Work

Step 1: Analysis of ASTM and *enhanced* DHA data

In a comprehensive analysis, compare traditional- and enhanced DHAs along with particulate emissions data from the E-94 and E-129 programs. Identify HC species groups that positively correlate with increased particulate emissions. In this step, both ASTM DHA and enhanced DHA data will be compiled, analyzed, and compared. Further, the data will be grouped by species e.g. C_{10}, C_{12}, etc.

Step 2: Analysis of the impact of unidentified HC components

Analyze how unidentified components in a traditional DHA affect particulate emissions. In other words, does the enhanced method improve predictions and/or correlations?

Step 3: Suggestions to improve particulate formation predictions

Identify strategies, or improvements, to the current PMI equation to better account for the presence of oxygenates. Graph calculated PMI values of all fuels to compare differences resulting from using D-6730-01 versus the enhanced method.

Step 4: Project Updates

Upon project kickoff, contractor and CRC project committee members shall meet (via phone conference) at a frequency (e.g. monthly, bi-monthly, etc.) deemed appropriate by project participants. Monthly project status reports shall be provided.

Step 5: Final Report

At the end of the project, the selected contractor shall create a report documenting the results of the analysis, including conclusions, and logical next steps as we seek to better understand the effect of oxygenates on gasoline particulate emissions.

References

1. "Evaluation and Investigation of Fuel Effects on Gaseous and Particulate Emissions on SIDI In-Use Vehicles," Southwest Research Institute Project No. 03.20955, prepared for the Coordinating Research Council, CRC Project No. E-94-2, March 2017.
2. "Impacts of Splash-Blending on Particulate Emissions for SIDI Engines," Southwest Research Institute Project No. 03.21955-1, prepared for the Coordinating Research Council, CRC Project No. E-94-3, June 2018.
3. "Alternative Oxygenate Effects on Emissions," SGS Project No. TS2017CRC005996, prepared for the Coordinating Research Council, CRC Project No. E-129, May 2019.
4. "Enhanced Speciation of Gasoline," Separation Systems, Inc. Project No. 03.20955, prepared for the Coordinating Research Council, CRC Project No. AVFL-29, June 2018.

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 (Microsoft Word) 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).

The draft report must have appropriate editorial review corrections made by the contractor prior to submission to CRC to avoid obvious formatting, grammar, and spelling errors. The report should be written in a formal technical style employing a format that best communicates the work conducted, results observed, and conclusions derived. Standard practice typically calls for a CRC Title Page, Disclaimer Statement, Foreword/Preface, Table of Contents, List of Figures, List of Tables, List of Acronyms and Abbreviations, Executive Summary, Background, Approach (including a full description of all experimental materials and methods), Results, Conclusions, List of References, and Appendices as appropriate for the scope of the study. Reports submitted to CRC shall be written with a degree of skill and care customarily required by professionals engaged in the same trade and /or profession.

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 ten (10) hardcopies including a reproducible master copy of the final report. The final report shall also be submitted as electronic copies in a pdf and Microsoft Word 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 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.