



COORDINATING RESEARCH COUNCIL, INC.

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ALPHARETTA, GA 30022
TEL: 678/795-0506 FAX: 678/795-0509
WWW.CRCAO.ORG

October 16, 2009

In reply, refer to:

CRC Project Number A-73-2

Subject: CRC Request for Proposal No. A-73-2, "CONCEPT/CAM_x Modeling of Expanded Use of Renewable Fuels."

Dear Prospective Bidder:

The Coordinating Research Council (CRC) invites you to submit a written proposal on the subject topic. A description of the project (CRC Project No. A-73-2) is given in Exhibit A

Please indicate via letter, fax, or email by **October 22, 2009** whether or not you intend to submit a written proposal for the project. CRC will answer technical questions regarding the Request for Proposal if they are submitted in writing. CRC will then return written answers to you, along with a copy of the original questions.

The CRC technical group composed of representatives from industry, and government will evaluate your proposal. CRC reserves the right to accept or reject your proposal.

The reporting requirements will be quarterly progress reports and a draft journal article plus supporting appendices at the end of the contractual period along with associated detailed protocol descriptions. The reporting requirements are described in more detail in the attachment entitled, "Reports" (Exhibit B).

The "Intellectual Property Rights Clauses" (Exhibit C and Exhibit D) and "Liability Clause" (Exhibit E) will be a part of the agreement anticipated as a result of this Request for Proposal solicitation.

All computer code developed in this project shall be free of copyright restrictions and licensing requirements. The contractor will assure CRC that it will comply with any copyright restrictions and licensing requirements for any software used in this program.

The proposal must be submitted as two separate documents. The technical approach to the problem will be described in part one (20 pages or less including the background and technical

approach). 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. CRC expects to negotiate a cost-plus fixed fee or cost reimbursement contract. Note that there will be a performance requirement clause in the contract. Important selection factors to be taken into account are listed in Exhibit F. 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 (or one electronic copy) and three (3) copies of the cost proposal (or one electronic copy) should be submitted to:

Mr. Brent K. Bailey
Coordinating Research Council
3650 Mansell Road, Suite 140
Alpharetta, GA 30022

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

The deadline for receipt of your proposal is **November 15, 2009**.

Sincerely,

Brent K. Bailey
Executive Director

EXHIBIT A

Statement of Work

For

“CONCEPT/CAM_x MODELING OF EXPANDED USE OF RENEWABLE FUELS”

Coordinating Research Council Atmospheric Impacts Committee

Request for Proposal

Project A-73-2

Background: At both the federal and state levels, there has recently been legislation that mandates and/or encourages the use of alternative fuels, including ethanol. The Energy Independence and Security Act, passed in December 2007, mandates 35 billion ethanol equivalent gallons of biofuel usage by 2022. On-going and planned increases in ethanol production have made it likely that the supply of ethanol will exceed that required for nationwide 10% blending with gasoline. Although further production increases could expand the pool of E85 available, slow progress on installing E85 infrastructure has produced concerns that an ethanol “glut” could develop. In Minnesota, a law requires the use of ethanol blends up to E20, a blend of gasoline with 20% denatured ethanol, replacing gasoline, by 2013, contingent on EPA granting a waiver for ethanol blends over 10 volume percent. Others have also promoted E15 and E20 as a preferred approach to balance fuel production and use to meet new legislative targets for ethanol fuel. Before E20 can be introduced for use by the existing fleet of vehicles its long term effects on both vehicle performance and air quality should be investigated.

Several projects have been initiated by the Coordinating Research Council, Inc. (CRC) to evaluate both the physical performance and the emissions performance of today’s non-flexible fuel vehicles on mid-level ethanol blend including E15 and E20 along with additional evaluations of emissions characteristics of E85 and lower level ethanol blends in flexible fuel vehicles. These studies are being carried out by the CRC Performance Committee and the CRC Emissions Committee. Other studies on fuel system materials compatibility of mid-level ethanol blends are being carried out by the CRC Advanced Vehicle/Fuel/Lubricants Committee.

The CRC Atmospheric Impacts Committee (AIC) proposed a new focus of performing air quality modeling of mid-level ethanol blends using emissions data measured in CRC and related DOE and EPA studies. Through Project No. A-67, CRC is now working to develop a modeling approach for assessing the impacts of fuel changes in an existing fleet using the Consolidated Community Emissions Processing Tool (CONCEPT).

The value of CONCEPT itself derives from completeness: the model has particular utility in developing the most resolved temporal and spatial urban onroad emissions from Travel Demand Modeling(TDM); and once prepared, can quickly reproduce the entire inventory—mobile, point, area, and biogenic—while providing interim quality assurance products. The purpose of our

expansion of CONCEPT is to take existing emission factor model outputs and convert them into alternative fuel emission factors that are then used to create an emission inventory. The new model is used in conjunction with the CAMx air quality grid model to make a new “model suite.” CRC has been working cooperatively with the Lake Michigan Air Directors Consortium (LADCO) to demonstrate this tool in a fully developed test application in the Lake Michigan area.

The AIC is also interested in cooperating with the California Air Resources Board (CARB) and other local agencies in using the new model suite for applications in California. The California application will require additional effort due to extensive code changes required.

To bracket air quality predictions from ethanol emissions changes, the application of the CONCEPT/CAMx “suite” in additional domains will likely be of interest for any given alternative fuel scenario. We prefer using an eastern US regional domain, focusing on effects in selected urban areas. These urban areas could be the Northeastern U.S., Atlanta, or Dallas/Ft. Worth. The Northeast would be important for representation of effects on ozone and PM for a complex urban region; Atlanta might help in characterizing fuels effects on ozone *and* PM in a large urban area dominated by biogenic emissions; Dallas/Ft. Worth would be valuable to depict impacts in an urban area of light industry; St. Louis or Kansas City could be valuable because of the wealth of ambient data measured there.

The AIC is in the process of soliciting a parallel procurement for identifying detailed mass and speciated emissions from various mid-level ethanol blend studies as well as emissions data from flexible fuel vehicle studies of E85 and related fuel blends. The parallel project has been designated as CRC Project No. A-73-1 and this study will develop a protocol for treatment of available alternative fuel emissions data for application in air quality grid model assessments similar to what was done in the Auto/Oil modeling studies of the 1990s.

Overall Project Objectives: Simplify and accelerate air quality modeling of emissions changes that may occur from extensive use of renewable fuels by developing a modeling system ready to evaluate vehicle emission change results found in other CRC and related renewable fuel emission test programs.

Method: The objectives of this project will be achieved through development and application of the CONCEPT/CAMx model suite for emissions inventory processing and air quality prediction modeling. The model suite development will result in a turn-key operation where, once set up, mass and speciation changes corresponding to different fuels can simply be input and the model started. The model suite must allow for timely application to scenarios of interest and therefore be “at the ready” for other users. The final model should also be portable with a goal of using the most advanced single machine processing possible. Considering a regional modeling domain application with emphasis on selected urban areas, we recognize this may not be feasible, but should nonetheless be explored in the proposal. Eventually a flexible application is envisioned

for the ultimate use of CONCEPT with the new EPA MOVES emission factor model, but is not considered part of the current project scope. However, we do request the proposal address the adaptation of CONCEPT to include NONROAD2008, as the current version includes NONROAD 2002.

Approach: Through this competitive solicitation, the initial A-67 “Proof of CONCEPT” will be advanced to a fully functioning CONCEPT/CAMx suite ready to use with applications of emissions data from CRC and related “emissions change data” following a data handling protocol developed in CRC Project No. A-73-1. (See CRC RFP A-73-1 at www.crcao.org.) The data handling protocol to be developed under A-73-1 may not be completed until later in 2010. Proposals submitted under this solicitation will be accepted if they offer to prepare the air quality-modeling suite (CONCEPT/CAMx) in a state ready to apply appropriate emissions change data. Extensive alternative fuel emissions data are required to implement actual fuel simulations and some of these data will be available later in 2010. Therefore, a base proposal would address the Phase 1 Eastern US domain described below to develop the CONCEPT/CAMx tool ready for fuel simulation applications. The Phase 2 Western US domain may be proposed as an optional addition to the base Phase 1 program scope. Other optional additions to the program scope are the actual applications of the CONCEPT/CAMx model suite using various sensitivity cases or fuel scenarios such as one where there is extensive use of flexible fuel vehicles operating on E85 fuel or scenarios of extensive use of E20 fuels in conventional vehicles. It is recognized that such applications will rely on data availability and completion of the recommendations in the data handling protocol to be developed under A-73-1.

Phase 1 Scope: Eastern US Domain: Ultimately, AIC is interested in modeling the ozone and PM impacts due to the use of biofuel blends in the urban nonattainment areas across the U.S. Traditionally, the domains were single, such as for Atlanta, Houston, or Dallas/Fort Worth, because of the existence of applications used in State Implementation Plans. Domains grew in size to represent, for example, the northeast, the Lake Michigan Region, the west, the southeast, etc. Now modeling domains cover the contiguous United States in 36 km and nested 12 km grid resolution. The CAMx runs can be completed on a single machine, and we are interested in such an application, but we are also interested in an additional nested grid at 4 km resolution that enables better spatial and temporal resolution of urban plumes. Four kilometer grid nesting for multiple urban areas will certainly add to the runtime of the applications, and may not be feasible.

We recognize the computational balance that must be struck in performing CAMx runs with a large domain but finer grid. Furthermore, the computational burden may require machine clustering, rather than attempting to limit the number of machines to one. Run time limitations may need to be recognized and compromised. It is left to the contractor to propose modeling domain configuration, with consequent estimated costs.

Venues of interest include those mentioned above in the Eastern US. At this time, we are tentatively steering away from Houston, since industry emissions are more dominant there, and the mobile source impacts might be unclear.

Characteristics of the domain nests must address:

- Inclusion of TDM results, a search for others and subsequent onroad emissions development
- Gridded or potential to nest a grid to 4 km resolution
- SIP demonstration emissions inventories
- Diversity in emissions source categories without sacrificing the focus on mobile source emissions
- Balance of simplicity and accessibility with technical completeness and credibility

The proposal should also address:

- Potential future expansions in scope, such as adaptation to accommodate MOVES, NONROAD2008+, modifications to CONCEPT to address ethanol effects from: refueling; other area source effects (marketing and transportation, terminal fugitives, storage tanks)); and ethanol production and processing.
- The episode or year to be modeled must be identified and justified, with reasons for either developing a future base case, or working only with the episodic data.

The purpose of evaluating various scenario applications using CCONCEPT/CAMx is to study air quality benefits of fuels and technology changes in venues with a unique air quality mix. To do this, CONCEPT will be adapted to use factors to modify Mobile6.2 outputs according to vehicle class, model year, roadway type, emissions process, pollutant. CONCEPT must also be adapted to use factors to modify NONROAD2008 outputs according to vehicle and equipment type, emissions process, and pollutant.

Emissions and (TDM) data that are available--probably in other emissions inventory processor formats--must be acquired and prepared for use by CONCEPT, for the modeling domain. It is recognized that acquiring TDM or emissions data can be somewhat challenging.

Phase 2 Scope: Following successful completion of the eastern US application, AIC is interested in conducting a second phase study using the CONCEPT/CAMx suite for California. The applications will certainly focus on the South Coast Basin, which may be a nested 4 km grid of the western contiguous US domain.

Phase 2 Objectives. Develop a tool that quickly uses other CRC research to predict reactive pollutant impacts (e.g., without waiting for formal adoption of new data into EMFAC/OFFROAD).

Methodology. For use in California, CONCEPT scripting must be adapted to use EMFAC and OFFROAD emissions models. Similarly, TDM application data from the South Coast Association of Governments must be acquired and other California travel modeling such as truck models, or others from “important” Metropolitan Planning Organizations”, and adapted for use by CONCEPT.

Simply stated, the Phase 2 Scope is a reiteration of the ideas in Phase 1, but for focus on fuel effects in the South Coast. The simplicity is mitigated by the fact that CONCEPT has not been adapted for the emissions processing tools used in California—EMFAC and OFFROAD. The adaptation could be challenging.

Project Deliverables (for each phase):

- Quarterly Progress Reports
- A Final Report consisting of an executive summary, a journal article and appendices (the appendices will contain detailed supporting data and information that cannot be included in a journal article)
- Public Domain-Resident Code and Documentation
- A supplemental User's Guide

EXHIBIT B

REPORTS

QUARTERLY TECHNICAL PROGRESS REPORTS

The contractor shall submit a quarterly technical progress report covering work accomplished during each calendar quarter of the contract performance. The Work Scope Document may serve as one of the progress reports. Thirty-five (35) hardcopies or one electronic Microsoft Word compatible file (<1 MB) of the quarterly 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 thirty-five (35) hardcopies (or one hardcopy and one electronic word and 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, 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 program and results achieved under the contract. The report shall be complete in itself and contain no reference, directly or indirectly, to the periodic progress report(s).

The CRC Steering Committee shall furnish comments regarding the report to the contractor within one (1) month after receipt of the draft copy.

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 twenty (20) hardcopies including a reproducible master copy of the final report. The final report shall also be submitted as an electronic copy in Microsoft Word file format. The electronic copy will be made available for posting on the CRC website.

EXHIBIT C

INTELLECTUAL PROPERTY RIGHTS

A. Protected Works

The term “Protected Works” as used in this agreement includes any and all works of authorship, inventions, discoveries, processes, machines, manufactures, compositions of matter, formulas, techniques, computer programs, systems, mask works, trade secrets, proprietary information, schematics, flow charts, databases, customer lists, marketing plans, product plans, business strategies, financial information, forecasts, trademarks, service marks, brand names, trade names, compilations, documents, data, notes, designs, drawings, ideas, concepts, technical data and/or training materials, and improvements to or derivatives from any of the above, whether or not patentable, or subject to copyright or trademark or trade secret protection, delivered by _____ to CRC under this Agreement or conceived, developed or produced by _____, whether alone or jointly with others, in connection with or pursuant to _____’s performance under this Agreement.

B. Assignment and Ownership of Protected Works

_____ agrees that except as provided in Section C below:

(1) All copyrightable Protected Works which are created by _____ pursuant to this Agreement shall be deemed “Works Made for Hire,” as that phrase is defined in Section 101 of the United States Copyright Act, 17 U.S.C. 101, and used in 17 U.S.C. 201, on behalf of CRC and that CRC shall own right, title, and interest, including the worldwide copyright, in and to such materials; and

(2) _____ hereby assigns and agrees to assign to CRC all of its respective rights, title, and interest in Protected Works, including all rights of inventorship and authorship, all patents and patent applications, all copyrights, all trademark and service mark rights, all rights in trade secret and proprietary information, all rights of attribution and integrity and other moral rights, and all other intellectual property rights of any type (collectively referred to herein as “Intellectual Property Rights”); and

(3) _____ and _____’s successors in interest will, at CRC’s request and without further consideration, communicate to CRC any facts known to them respecting the Protected Works, and testify in any legal proceedings, sign all lawful papers, make all rightful oaths, execute all divisional, continuing, continuation-in-part, or reissue applications, all assignments, all registration applications and all other instruments or papers to carry into full force and effect, the assignment, transfer and conveyance hereby made or intended to be made and generally do everything possible for title to Intellectual Property Rights in the Protected Works to be clearly and exclusively held by CRC, including the execution from time to time as requested by CRC, Confirmatory Assignment, Agreements in the form attached as Exhibit D; and

(4) _____ agrees that it will not apply for any state, federal, or other U.S. or foreign jurisdiction's registration of rights in any of the Protected Works, and that it will not oppose or object in any way to applications for registration of same by CRC or others designated by CRC; and

(5) _____ agrees to provide CRC a copy of the source code and all annotations thereto for all deliverables under this Agreement.

(6) The deliverables provided to CRC by _____ under this Agreement shall not include any Protected Works which infringe the Intellectual Property Rights of any third party or for which _____ does not have the ownership and authority necessary to make the conveyances of rights described in this Section B. _____ will obtain the express written consent of CRC prior to incorporating into the deliverables any works owned by parties other than _____.

C. Portions of Protected Work

With respect to portions of the Protected Works which were originally developed by _____ prior to and unrelated to the course of performance under this Agreement (Pre-Existing Protected Works), _____ will continue to own these Pre-Existing Protected Works. However, _____ hereby grants to CRC a fully paid, perpetual, irrevocable, worldwide, non-exclusive license to prepare derivative works from such Pre-Existing Protected Works (using either CRC's own employees, independent contractors, or sponsoring participants), and to reproduce Pre-Existing Protected Works and derivative works therefrom, and to make, use, distribute, perform, and display such Pre-Existing Protected Works and derivative works therefrom and reproductions thereof, both in connection with the Protected Works and otherwise, and to sublicense the rights granted to CRC in this paragraph.

EXHIBIT D

CONFIRMATORY ASSIGNMENT

For good and valuable consideration, receipt of which is hereby acknowledged, _____ (_____) has assigned and does hereby assign and transfer to CRC, _____'s entire right, title, and interest in and to any and all Intellectual Property Rights in Protected Works, as defined below, including but not limited to the Protected Works specifically identified below and the Protected Works delivered to CRC by _____ or conceived, developed, or produced by the _____, whether alone or jointly with others, in connection with the Projects identified below:

Specific Protected Works: _____

Specific Projects:

Additional Terms and Definitions:

1. The term Protected Works as used in this agreement includes any and all works of authorship, inventions, discoveries, processes, machines, manufactures, compositions of matter, formulas, techniques, computer programs, systems, software, source code, object code, hardware systems, mask words, trade secrets, proprietary information, schematics, flow charts, databases, customer lists, marketing plans, product plans, business strategies, financial information, forecasts, trademarks, service marks, brand names, trade names, compilations, documents, data, notes, designs, drawings, ideas, concepts, technical data and/or training materials, and improvements to or derivatives from any of the above, whether or not patentable, or subject to copyright or trademark or trade secret protection.
2. The term Intellectual Property Rights as used in this agreement includes all of _____'s rights, title, and interest in Protected Works, including all rights of inventorship and authorship, patents and patent applications, all copyrights, all trademark and service mark rights, all rights in trade secret and proprietary information, all rights of attribution and integrity and other moral rights, and all other intellectual property rights of any type.
3. _____ further agrees at CRC's request and without further consideration, _____ and _____ successors will communicate to CRC any facts known to them respecting said Protected Works, and testify in any legal proceedings, sign all lawful papers, make all rightful oaths, execute all divisional, continuing, continuation-in-part, or reissue applications, all assignments, all registration applications and all other instruments or papers to carry into full force and effect, the assignment transfer and conveyance

hereby made or intended to be made and generally do everything possible for title to Intellectual Property Rights in the Protected Works to be clearly and exclusively held by CRC.

4. _____ agrees that it will not apply for any state, federal, or other U.S. or foreign jurisdiction's registration of rights in and of the Protected Works, and that it will not oppose or object in any way to applications for registration of same by CRC or others designated by CRC.

5. _____ agrees to provide to CRC a copy of the source code and all annotations thereto for all Protected Works assigned under this Agreement.

Signed and sealed this ____ day of _____, _____.

Signed on behalf of CONSULTANT:

By: _____

Printed Name: _____

Title: _____

STATE OF _____

COUNTY OF _____

On this ____ day of _____, _____, before me personally appeared _____ personally known to me proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument, and acknowledged to me that he executed the same of his own free will for the purposes therein set forth.

Notary Public
[SEAL]

EXHIBIT E

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 F

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.