



COORDINATING RESEARCH COUNCIL, INC.

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WWW.CRCAO.ORG

September 29, 2008

In reply, refer to:

CRC Project Number A-69

To: Prospective Bidders

Subject: CRC Request for Proposal No. A-69, "Regional Modeling of Weekday/Weekend Ozone Changes".

The Coordinating Research Council (CRC) invites you to submit a written proposal on the subject topic. A description of the **REVISED** project (CRC Project No. A-69) is given in Exhibit A

Please indicate by letter, fax, or email by **October 3, 2008** 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 industry and government representatives will evaluate your proposal. CRC reserves the right to accept or reject your proposal.

The reporting requirements will be quarterly progress reports and a final report summarizing all work which should include a manuscript suitable for submission to a peer-reviewed journal. The reporting requirements are described in more detail in the attachment entitled, "Reports" (Exhibit B).

The "Intellectual Property Rights Clauses" (Exhibits C and D) and "Liability Clauses" (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 (30 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 but may also elect to request a fixed-price 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 **October 24, 2008**.

Sincerely,



Brent K. Bailey
Executive Director

EXHIBIT A
Request for Proposal
Project A-69
Regional Modeling of Weekday/Weekend Ozone Changes

Objectives:

1. Review and improve (if necessary) the weekend emission inventory in the eastern U.S.
2. Test the ability of a regional modeling system (emission inventory, meteorological model, air quality model) to simulate ozone changes in response to weekday/weekend emission changes.
3. Determine to what extent the weekday/weekend emission changes in upwind cities affect downwind cities and rural areas.

Background:

CRC funded two projects on modeling the impact of weekday/weekend emission changes in Los Angeles. Project A-36 focused on simulation of an episode during the Southern California Ozone Study (SCOS) in 1997 (1). In Project A-56, Los Angeles emissions were projected to 2010, and the simulated weekday/weekend ozone changes in 2010 were compared to those obtained with emissions for 1997 (2). Other modeling studies of the weekday/weekend effect in California have also been published (3, 4). The National Renewable Energy Laboratory funded a modeling study of a weekday/weekend ozone episode in 2002 in southeast Michigan (5). Although the modeling domain was larger than southeast Michigan, the review of the weekend emission inventory, the updates to the inventory, and the modeling were focused on southeast Michigan.

To date, there has apparently been no modeling study of weekday/weekend ozone (and PM) changes over a large regional domain using a consistent set of weekend emission changes for the entire domain. Simulating a weekday/weekend episode provides a more stringent test of a regional model (and the associated emission inventory) than simulating a weekday episode. Because the weekend emission reductions are substantial, a weekday/weekend episode tests the model's ability to simulate the effects of emission reductions. Modeling a regional weekday/weekend episode is also of interest because the emission changes in one urban area may impact ozone concentrations in a downwind urban (or non-urban) area, delayed by the time required for atmospheric transport. Thus, the weekday/weekend ozone changes in a large region may be different or more complicated than those seen in the Los Angeles area, which has no large city upwind or downwind under most transport conditions.

Approach:

The contractor will choose a recent ozone episode in the eastern U.S. containing at least one weekend. The modeling domain should cover most or all of the eastern U.S. with fine grids over the major urban areas. The emission inventory for the entire region will be reviewed with a primary focus on the weekend emissions. Adjustments will be made as necessary to apply a consistent set of assumptions to weekend emissions and to use the latest information on weekend activity data. (Adjustments to weekday emissions may also be considered after review by CRC.) The adjustments and the supporting reasons for them will be documented in the quarterly and final reports. If adjustments are identified that may be important but cannot be made due to lack of key data or other difficulty in implementing the adjustments, these adjustments will be documented as recommendations for future work.

A regional meteorological model (e.g., MM5) and a regional air quality model (e.g., CMAQ, CAMx) will be used to simulate the episode with the revised weekday/weekend emission inventory. Model predictions for ozone (and other pollutants if possible) will be compared to ambient measurements within and downwind of urban areas. In addition to comparing predicted and observed concentrations

throughout the episode, the contractor will also compare predicted and observed concentration changes between weekdays and weekends. The latter analysis should provide an evaluation of the model response to emission changes, which has been described by Gilliland et al. (6) as a dynamic model evaluation. The work by Gilliland et al. may provide some useful approaches for this analysis.

Assuming reasonable model performance in predicting ambient concentrations and concentration changes, additional analyses will be done to determine the impact of weekday/weekend emission changes in large urban areas on downwind urban and rural areas. Applications of probing tools and sensitivity simulations will be used as appropriate for this analysis. A key question is whether the emission changes and the impact of the emission changes is restricted primarily to the urban areas or is more widespread.

The results of this project will be compared to prior work on modeling the impact of weekday/weekend emission changes on ozone in the Los Angeles region to discern similarities and differences. Also, recommendations will be developed to improve the modeling of ozone episodes that include weekends.

Although the focus of the project is on ozone, simulation and analysis of PM changes may also be proposed, if there are sufficient ambient data during the episode to evaluate model predictions and the data show substantial weekday/weekend variations.

Deliverables: Quarterly progress reports will be prepared along with a final report summarizing all work. The final report will consist of a 1-2 page executive summary, a manuscript suitable for submission to a peer-reviewed journal, and a set of appendices that includes other information generated in the project that could not be included in a journal paper. Any computer programs developed in this project should be made available to the Coordinating Research Council without restrictions. Also, the input modeling data sets and the model used (or a detailed description of the model configuration if the model is in the public domain) should be made available to the Coordinating Research Council upon request.

References:

1. G. Yarwood, T. E. Stoeckenius, J. G. Heiken, A. M. Dunker, Modeling weekday/weekend ozone differences in the Los Angeles region for 1997. *J. Air & Waste Manage. Assoc.* 53, 864 (2003).
2. G. Yarwood, J. Grant, B. Koo, A. M. Dunker, Modeling weekday to weekend changes in emissions and ozone in the Los Angeles basin for 1997 and 2010. *Atmos. Environ.* 42, 3765 (2008).
3. L. C. Marr, R. A. Harley, Modeling the effect of weekday-weekend differences in motor vehicle emissions on photochemical air pollution in central California. *Environ. Sci. Technol.* 36, 4099, (2002).
4. A. Cohan, W. Chang, M. Carreras-Sospedra, D. Dabdub, Influence of sea-salt activated chlorine and surface-mediated renoxification on the weekend effect in the South Coast Air Basin of California. *Atmos. Environ.* 42, 3115 (2008).
5. G. Yarwood, B. Koo, T. E. Stoeckenius, J. G. Heiken, Modeling weekend and weekday ozone in southeast Michigan, draft final report for National Renewable Energy Laboratory under agreement RCE-55510-01, ENVIRON, June 27, 2007.
6. A. B. Gilliland, C. Hogrefe, R. W. Pinder, J. M. Godowitch, K. L. Foley, S T. Rao, Dynamic evaluation of regional air quality models: Assessing changes in O₃ stemming from changes in emissions and meteorology. *Atmos. Environ.* 42, 5110 (2008).

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. 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, MODEL SOURCE CODE AND USER'S GUIDE

The contractor shall submit to or distribute for CRC thirty-five (35) hardcopies (or one hardcopy and one electronic pdf-compatible copy transmittable via email) of a rough draft of a final report and a model user's guide, if appropriate, within thirty (30) days after completion of the technical effort specified in the contract. A CD ROM disc containing model source code and test case input and output files shall be submitted on an as-needed basis—not to exceed 35 copies. 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 single final report is to be composed of an overall project Executive Summary, a journal article, and attached exhibits containing relevant appendices, and/or supporting report chapters. The report shall be complete in itself and contain no reference, directly or indirectly, to the periodical report(s). The user's guide shall describe only the portions of the model developed under contract to CRC, including test case model input and output listings.

The CRC Steering Committee shall furnish comments regarding the report and user's guide, if appropriate, to the contractor within one (1) month after the draft copy.

Within thirty (30) days after receipt of the approved draft copy of the final report and user's guide, the contractor shall make the requested changes and deliver to CRC fifty (50) 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.