



COORDINATING RESEARCH COUNCIL, INC.

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WWW.CRCAO.ORG

July 2, 2007

In reply, refer to:

CRC Project Number A-65

To: Prospective Bidders

Subject: CRC Request for Proposal No. A-65, "Accuracy of Regional Simulations of Background Ozone and PM"

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-65) is given in Exhibit A

Please indicate by letter, fax, or email by **July 13, 2007**, 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 summary technical report at the end of the contractual period along with associated model code. 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. 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 **August 6, 2007**.

Sincerely,



Brent K. Bailey
Executive Director

EXHIBIT A
STATEMENT OF WORK
for
CRC Project A-65

Accuracy of Regional Simulations of Background Ozone and PM

Objectives:

1. To determine whether the emission inventories for natural sources used in regional simulations yield ozone and PM concentrations that are in agreement with current estimates of background concentrations.
2. If the agreement is not reasonable, to determine possible deficiencies in the natural emission inventories and/or model formulation and the potential impacts of such deficiencies on ozone and PM control strategies

Background:

Regional simulations of ozone and PM employ emission inventories for natural and anthropogenic sources. The anthropogenic increment to ozone and PM is simply the difference between a simulation with all sources present and a simulation with only natural sources present. Emission control strategies seek to reduce the anthropogenic emissions so that the background ozone or PM plus the anthropogenic increment to the pollutant meets the relevant standard.

The accuracy of regional simulations of ozone and PM has been determined by comparing model predictions for historical episodes or entire years to ambient data. However, there have apparently been no tests of whether regional simulations using only natural emissions give ozone and PM concentrations in reasonable agreement with estimates of background ozone and PM concentrations reported in the literature. In particular, regional simulations normally use "clean" boundary concentrations, but it is unclear whether simulations with natural emissions alone will give ozone and PM concentrations consistent with these "clean" boundary concentrations.

If regional simulations with natural emissions give ozone and PM concentrations that are too low or too high compared to background concentrations but simulations with all emissions included agree with measurements, then the anthropogenic increments to ozone and PM will be too high or too low, respectively. If the anthropogenic increments to ozone and PM are inaccurate, then emission control strategies developed from regional modeling (particularly NO_x control strategies) are likely also to be inaccurate.

Approach:

The contractor will review recent literature (journal articles and regulatory reports) to determine the best estimates of continental background concentrations of ozone, PM and precursors. If necessary, a distinction will be made between background concentrations with and without anthropogenic influence. The results of the review will be communicated to CRC in an early quarterly report.

The contractor will acquire the meteorological, emissions, and other data for at least two, and preferably more, regional simulations of ozone and PM conducted over the past 10 years. The simulations can be for annual-average or episodic concentrations. However, the emissions for natural sources must be available separately or can readily be determined separately from the emissions for anthropogenic sources. The contractor will then run simulations without the anthropogenic emissions (but other inputs unchanged) and compare results to the boundary concentrations used in the simulations and to the literature values for background ozone, PM, and precursor concentrations. In a self-consistent simulation with natural emissions and boundary concentrations without anthropogenic influence, the predicted ozone and PM concentrations within the modeling domain will be similar to the boundary concentrations.

If there is substantial disagreement between the simulations and the boundary or background concentrations, the contractor will then conduct sensitivity simulations to estimate possible deficiencies in the natural emissions, boundary concentrations, other model input data, or the model itself. The contractor will conduct additional sensitivity simulations to estimate how such deficiencies affect control strategies developed from the regional modeling.

References 1-8 below are recent, relevant publications discussing background concentrations, simulations of long-range transport, and background sources of NO_x emissions (e.g., lightning).

Duration

The bidders are requested to propose a schedule and detailed timeline for completion of all work, including submittal of the draft and final summary report in the form of a journal article with supplemental appendices and the draft and final user's guide.

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 the review of recent literature and 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.

Performance

Contractor performance will be evaluated at the conclusion of the project duration. Budgets should be task-specific and will be paid accordingly. Unsatisfactory performance of the project by the contractor as determined by CRC may affect the decision of awarding future CRC projects to the contractor. Unsatisfactory performance includes unreasonably late, incomplete, or inadequate deliverables that are significantly at variance with the contractual agreement, as determined by CRC.

References:

1. A. M. Fiore, D. J. Jacob, I. Bey, R. M. Yantosca, B. D. Field, A. C. Fusco, J. G. Wilkinson, Background ozone over the United States in summer: Origin, trend, and contribution to pollution episodes. *J. Geophys. Res.* 107, D15,4275 (2002).
2. A. Fiore, D. J. Jacob, H. Liu, R. M. Yantosca, T. D. Fairlie, Q. Li, Variability in surface ozone background over the United States: Implications for air quality policy. *J. Geophys. Res.* 108, D24,4787 (2003).
3. R. Vingarzan, A review of surface ozone background levels and trends. *Atmos. Environ.* 38 3431-3442 (2004).
4. A. Hakami, J. H. Seinfeld, Q. Li, D. W. Byun, V. Coarfa, P. Percell, A. Sandu, K. Singh, Satellite based inversion of NO_x emission using the adjoint of CMAQ. Fifth Annual CMAS Conference, October 16-18, 2006, Chapel Hill, NC. www.cmascenter.org/conference/2006/ppt/session7/hakami.ppt
5. S. Wu, L. J. Mickley, D. J. Jacob, J. A. Logan, R. M. Yantosca, D. Rind, Why are there large differences between models in global budgets of tropospheric ozone?. *J. Geophys. Res.* 112, D05302 (2007).
6. J. J. West, A. M. Fiore, V. Naik, L. W. Horowitz, M. D. Schwarzkopf, D. L. Mauzerall, Ozone air quality and radiative forcing consequences of changes in precursor emissions. *Geophys. Res. Lett.* 34, L06806 (2007).
7. Task Force on Hemispheric Transport of Air Pollution, 2007 Interim Report, www.htap.org/activities/2007_Interim_Report.htm
8. R. C. Hudman, D. J. Jacob, S. Turquety, E. M. Leibensperger, L. T. Murray, S. Wu, A. B. Gilliland, M. Avery, T. H. Bertram, W. Brune, R. C. Cohen, J. E. Dibb, F. M. Flocke, A. Fried, J. Holloway, J. A. Neuman, R. Orville, A. Perring, X. Ren, G. W. Sachse, H. B. Singh, A. Swanson, P. J. Wooldridge, Surface and lightning sources of nitrogen oxides over the United States: Magnitudes, chemical evolution and outflow. *J. Geophys. Res.* 112, D12S05 (2007).

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, 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 the model user's guide 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. One option for the single final report is to have it 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 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.