NTRD Program Disclaimers

1. Disclaimer of Endorsement:

The posting herein of progress reports and final reports provided to TCEQ by its NTRD Grant Agreement recipients does not necessarily constitute or imply an endorsement, recommendation, or favoring by TCEQ or the State of Texas. The views and opinions expressed in said reports do not necessarily state or reflect those of TCEQ or the State of Texas, and shall not be used for advertising or product endorsement purposes.

2. Disclaimer of Liability:

The posting herein of progress reports and final reports provided to TCEQ by its NTRD Grant Agreement recipients does not constitute by TCEQ or the State of Texas the making of any warranty, express or implied, including the warranties of merchantability and fitness for a particular purpose, and such entities do not assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information,apparatus, product, or process disclosed, or represent that its use would not infringe privately owned rights.

Texas Commission on Environmental Quality
New Technology Research & Development (NTRD) Program
Monthly Project Status Report

Contract Number: 582-5-70807-0009

Grantee: The University of Texas at Austin

Date Submitted: December 15, 2005

Report for the **Monthly** period:

Starting Date November 1, 2005 Ending Date November 30, 2005

Section I. Accomplishments (*Please provide a bulleted list of project accomplishments as well as a description of their importance to the project.)*

The project involves the collaboration of two University of Texas at Austin research centers: the Center for Space Research (CSR) and the Center for Energy and Environmental Resources (CEER). The CSR team is led by Melba Crawford (Co-PI), Gordon Wells (Co-PI) and Teresa Howard. The CEER team is led by Elena McDonald-Buller and David Allen.

Accomplishments in November by the two research teams include the following:

- As part of Task 2.1, CSR and CEER communicated with Christine Wiedinmyer from the National Center for Atmospheric Research (NCAR) to discuss progress made under the New Eastern Texas Land Use Land Cover (LULC) Classification project funded by the Texas Environmental Research Consortium. Work on the LULC project continued in November, with anticipated delivery of final results in December. These results will be used as inputs for the GloBEIS modeling activities described in Task 2.1.

- A related collaboration between the CEER team and NCAR's Christine Wiedinmyer, funded separately through the U.S. EPA, may provide insights relevant to the current NTRD study. The CEER team and Wiedinmyer are currently applying the MODIS vegetation continuous fields (VCF) data product to improve the allocation of tree cover in East Texas. The groups are also beginning to implement the new NCAR Model of Exchange of Gases between the Atmosphere and Nature (MEGAN) to estimate biogenic emissions in Texas and to conduct an inter-comparison with the emission estimates produced by GloBEIS.

- The CSR team provided CEER with the necessary datasets for the initial modeling work described in Task 2.2. The CSR team mapped the IGBP MODIS land cover classification for the entire regional domain to the eleven categories used in the CAMx dry deposition algorithms. CEER provided feedback for the mapping process. CSR generated gridded datasets of the proportion (percent) of land cover per grid cell per land cover class for the following domains and grid resolutions:
    - Regional domain (36 x 36 km grid cells)
    - East Texas domain (12 x 12 km grid cells)
    - Dallas/Fort Worth domain (4 x 4 km grid cells)
    - Houston/Galveston/Beaumont/Port Arthur domain (4 x 4 km grid cells)
    - Austin/San Antonio domain (4 x 4 km grid cells)

- The CEER team began to examine the air quality and dry deposition impacts for the August 22-September 6, 2000, Houston modeling episode and conducted sensitivity studies that focus on the mapping of the IGBP classifications to the CAMx categories.

- The CSR team selected NOAA-12 AVHRR datasets collected during 1999-2000 to begin to examine the relationship between the Palmer Drought Sensitivity Index (PDSI) and normalized difference vegetation index (NDVI) as described in Task 2.4. The NOAA-12 data collections overlap the operational history of several other NOAA POES satellites, as well as the NASA Terra and Aqua MODIS collections. Thus, the NOAA-12 data provide a common basis to support the comparison of NDVI-PDSI relationships across a variety of sensors.

- The CSR team continued to explore causes for the depressed values reflected in the MODIS Aerosol Optical Thickness product to be developed under Task 2.5. An initial survey of apparently low AOT estimates in the data collected in 2000 suggests some relationship with events involving the transport of Saharan dust. Additional Saharan dust events from 2002 and 2002 were selected for investigation to determine if the AOT estimates are similarly depressed.

- The CSR team identified the primary NASA AMSR-E test areas in Iowa, Arizona and other regions that offer the most suitable analogs to surface conditions in Texas for analysis of the effectiveness of the soil moisture products derived from the AMSR-E microwave collections in conjunction with Task 2.6.

- In addition to work on the project tasks, the CEER and CSR teams attended and made a joint presentation about the goals of their NTRD research during the TexAQS II Satellite Data Meeting on November 21, 2005. Representatives from NASA, NOAA, and TCEQ attended the meeting. The presentation was distributed to the meeting participants and is available to other interested parties upon request.

Indicate which part of the Grant Activities as defined in the grant agreement, the above accomplishments are related to:

As noted, the accomplishments are primarily related to Tasks 2.1, 2.2, 2.4, 2.5 and 2.6, with specific subtasks 2.1.1.1, 2.1.1.2, 2.1.1.3, 2.2.1.1, 2.2.1.2, 2.4.1.1, 2.5.2 and 2.6.1 receiving primary attention.

Section II: Problems/Solutions

Problem(s) Identified (Please report anticipated or unanticipated problem(s) encountered and its effect on the progress of the project)	*The very large file size (>1.2 GB) of the land cover database used as a source for the GloBEIS model necessitated the development of an alternate data preparation method.*

Proposed Solution(s) *(Please report any possible solution(s) to the problem(s) that were considered/encountered)*	*An alternate method for data preparation is in development and will be implemented in December.*
Action(s) Conducted and Results *(Please describe the action(s) taken to resolve the problem(s) and its effect)*	*Refinement of the land cover database, funded by TERC, is nearing completion; it was considered most beneficial to apply the alternative data preparation method to the refined dataset.*

Section III. **Goals and Issues for Succeeding Period**: (*Please provide a brief description of the goal(s) you hope to realize in the coming period and identify any notable challenges that can be foreseen)*

The primary goal of the CSR team is to provide CEER with the necessary datasets for the initial modeling activities described in Task 2.2. In addition, work will continue to prepare the land cover date for the GloBEIS modeling described in Task 2.1, with an anticipated delivery date in December.

Once completed by CSR under the TERC-funded LULC project, the CEER team will use the Landsat-based land cover products developed for the Houston and Dallas areas to obtain estimates of biogenic emissions using GloBEIS to compare with the results obtained with the data from Wiedinmyer et al. (2001) that currently serve as the standard input for modeling done by TCEQ.

The CEER team will continue to analyze the predicted impacts of using the new MODIS-based data for the CAMx dry deposition algorithms.

By the end of December with the completion of other related field data collection projects, the CSR team will be able to assess the level of effort required for future field data collection that falls within the scope of the NTRD project.

An early assessment of the published results available from NASA AMSR-E Science Team during the next several weeks will allow tentative conclusions to be drawn regarding the feasibility of applying the current soil moisture algorithms to data collected for regions of Texas.

Date: *December 15, 2005*

Authorized Project Representative's Signature

NOTE*: Please attach any additional information that you feel should be a part of your report or that may be required to meet the deliverable requirements for tasks completed during this reporting period.*