AQRP Monthly Technical Report

PROJECT TITLE	Analysis of Surface Particulate Matter and Trace Gas Data Generated During the Houston Operations of DISCOVER-AQ	**PROJECT #**	14-009
PROJECT PARTICIPANTS	Rice University University of Houston	**DATE SUBMITTED**	8/6/2014
REPORTING PERIOD	**From:** July 1, 2014 **To:** July 31, 2014	**REPORT #**	1

A Financial Status Report (FSR) and Invoice will be submitted separately from each of the Project Participants reflecting charges for this Reporting Period. I understand that the FSR and Invoice are due to the AQRP by the 15th of the month following the reporting period shown above.

Detailed Accomplishments by Task

Please note that while the Rice portion of this project has begun (officially as of July 1, 2014, though work did not commence until the following week), the University of Houston group was still awaiting funds as of July 31, 2014; therefore, they were unable to start work during the period covered by this report. As such, a description of the work for Task 8 (which focuses on assessing the importance of biogenic activity and is the first task for which primary responsibility lies with the University of Houston) is not included despite the original work plan specifying that it would begin during this period.

This project is broken down into several tasks, and some of the work for an individual task may be complementary to other tasks. The only Rice-focused task on which progress was expected during this period is Task 1, which focuses on determination of particle emission factors as a function of size (if possible) when mobile laboratory sampling was obviously occurring within a specific plume. Generally this occurred while the mobile laboratory was on-road. As such, emissions factors will focus on organic aerosol of particle diameter smaller than one micron.

For Task 1, a protocol for determination of these emission factors has been determined. A ratio of enhancements in organic aerosol to enhancements in either carbon monoxide (CO) or nitric oxide (NO) will be compared to known emission factors for CO or NO (to be taken from Environmental Protection Agency (EPA) modeling). Enhancements are defined relative to the background immediately before and after the plume sampling. Plumes of organic aerosol while the mobile laboratory was on-road have been identified for the DISCOVER-AQ period, and the corresponding enhancements in organic aerosol have been calculated. So far, eight specific episodes have been identified; enhancements in sub-micron organic aerosol ranged from 14 to 215 micrograms per cubic meter.

Preliminary Analysis

No true analysis beyond the calculations described above has been performed to date.

Data Collected

No new data has been collected as part of this project as it is purely a data analysis project.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

Beyond the lack of funds in place for the University of Houston team (expected to be resolved in the very near term), the only minor problem identified so far is that the currently available time-averaged CO and NO data are too low in temporal resolution for this effort. The University of Houston team will provide the higher resolution data necessary, allowing for calculation of the enhancement ratios.

Goals and Anticipated Issues for the Succeeding Reporting Period

With the higher resolution CO and NO data, it will be possible to calculate the enhancement ratios for each event. With the high-definition cameras, the type of vehicle will be identified for each on-road event. Therefore, multiple points can be combined to provide data across vehicle type. An additional approach will be to combine points across location type. The appropriate emission factor for vehicle type or location will be determined by regression between the enhancement ratios and the EPA estimates.

Detailed Analysis of the Progress of the Task Order to Date

Progress on Task 1 has been adequate over the first month of the project. It is expected to be complete during the second month of the project, during which Task 2 will commence. Task 2 is focused on chemical characterization of large emission events (not necessarily on-road). Because Tasks 1 and 2 are complementary, however (by being focused on emissions), appropriate progress on Task 2 is expected during the second month of the project as well. Due to delays in funding, the project team will need to find a way to make up the lost time for Task 8 during the second month of the project.

Submitted to AQRP by: Robert J. Griffin

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