OBJECTIVE
Recruit and guide a team of 40 participants from several of India's governmental and educational institutions to develop the first comprehensive PM10 emissions inventory and database for the region of Pune, India (population approximately 3.5 million). Complete the project within seven working days at a minimum of cost.

APPROACH
Prior to arriving in India, detailed project schedules and plans for developing the inventory system were developed to ensure sustained and measurable progress. The facilities for developing the emission inventory included two meeting rooms in a local Pune hotel (including the sweltering “Ming Suite”), six rented computers with slow dial-up internet access, and one inkjet printer that sometimes actually worked.

The majority of the participants, both university students and professionals, had little or no prior emission inventory experience. Participants were recruited with the help of the Mumbai (Bombay) office of the U.S. Agency for International Development and the U.S.-Asia Environmental Partnership (USAID/USEAP). Following a half-day introduction to what an emission inventory is and inventory development methods, each participant selected their area of work—emissions estimation or emissions database.

Each member was then assigned very specific and measurable tasks. For example, the table below shows the tasks for preparing the paved road dust estimates.

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The emission estimation team, lead by Gaffney, initially dispersed throughout the city of Pune, scouring local agencies for needed activity information such the quantity of wood burned in stums for cooking, the number of people sweeping streets with brooms, the production of regional brick kilns, and trash generation rates.

These activity data were then incorporated into existing U.S. EPA, California Air Resources Board, or other emission estimation methods that were modified to reasonably reflect the Pune conditions.

The database team, lead by Benjamin, subdivided into groups to tackle database design and implementation, database coding systems, project web design and development, and evaluation of geographic information system (GIS) and global positioning system (GPS) tools.

RESULTS
The Pune emission inventory team successfully developed a complete PM10 emission inventory for Pune city and the surrounding rural area. Emission estimates were based on local inputs and Pune conditions. The results are shown graphically above.

The team also completed development of a relational database system in Microsoft Access, an automated data loader, emissions reports, and the project website. A full report for the project is available at the project website at: http://www.unipune.ernet.in/dept/envi/poi/index.html

DISCUSSION
Prior to developing the inventory it was expected that the largest PM10 contributors in Pune would be on-road mobile sources and industry. The current results throw that assumption into question. Based on the inventory, open agricultural burning, fugitive dust, and other sources appear to also be significant regional PM10 emission sources.

Speciated PM10 monitoring data and increased spatial and temporal refinement are needed to evaluate the reasonableness of the initial emission estimates.

CONCLUSIONS
Through the combination of outstanding logistical support, a clear and complete plan of attack, and extremely capable and enthusiastic participants, the Pune team built the first comprehensive PM10 emissions inventory and database system for the region.

This emissions inventory provides critical block in the foundation needed to improve air quality.

The participants now have real world, hands-on experience in performing emission estimates and developing an emissions database system in a fast pace, team environment.

This knowledge is invaluable as India continues its proactive efforts to better understand their sources of air pollution, and to develop innovative solutions to improve air quality and health throughout the country.