

## **EPA's SPECIATE 4.4 Database: Development and Uses**

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SPECIATE is the U.S. Environmental Protection Agency's (EPA) repository of volatile organic gas and particulate matter (PM) speciation profiles of air pollution sources. Some of the many uses of these source profiles include: (1) creating speciated emissions inventories for regional haze, PM, greenhouse gas (GHG), and photochemical air quality modeling; (2) estimating hazardous and toxic air pollutant emissions from PM and organic gas primary emissions; (3) providing input to chemical mass balance (CMB) receptor models; and, (4) verifying profiles derived from ambient measurements by multivariate receptor models (e.g., factor analysis and positive matrix factorization).

Abt Associates, Inc. developed SPECIATE 4.4 through a collaboration involving EPA's Office of Research and Development (ORD) and Office of Air Quality Planning and Standards (OAQPS) in Research Triangle Park, NC, and Office of Transportation and Air Quality (OTAQ) in Ann Arbor, MI. EPA released SPECIATE 4.4 in early 2014 and, in total, the SPECIATE 4.4 database includes 5,728 PM, volatile organic compound (VOC), total organic gases (TOG), and Other Gases profiles. New to SPECIATE 4.4 are comprehensive speciation of TOG profiles from oil and gas fugitive emissions, gasoline vehicle exhaust, VOC emissions from the dairy industry (including silages, other feedstuffs, and animal waste), gasoline vapor from enclosed fuel tanks, PM profiles from the Kansas City Light-Duty Vehicle Emissions Study, outdoor wood boiler aerosol emissions, and commercial aircraft jet engine PM emission profiles. This paper describes the SPECIATE 4.4 database, provides specific examples of its use, and makes recommendations for future improvements.

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