



# Project Summary

## The Volatile Organic Compound Model Quality Assurance and Sensitivity Testing (Version 1.8)

Mark S. Jennings and Thomas E. Emmel

**This report presents test runs of the Volatile Organic Compound Model (VOCM). VOCM predicts future emission levels of volatile organic compounds (VOCs) by projecting uncontrolled base year emissions into the future. These projected emissions are then reduced by constraints to predict future controlled emissions of VOCs. VOCM also predicts VOC emission control costs. VOCM is a program that runs on the IBM-PC series of computers.**

***This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).***

### Background

VOCM was developed in support of the National Acid Precipitation Assessment Program (NAPAP). NAPAP is developing a number of models to assist in determining the role of various pollutants and industrial sectors in acid rain deposition and damage. Radian Corporation has been retained by the Environmental Protection Agency to develop a model to predict future emission levels of VOCs from the industrial sector. VOCM is a result of this development effort.

VOCM predicts future VOC emissions by applying emission growth factors to a base year uncontrolled emissions data base. The uncontrolled projected emissions are then reduced by emission constraints. Constraints may be defined to be specific to various subsets of emissions based on region, industrial category, and the timing of the constraint with respect to when new/

replaced emissions come on-line. VOCM can also predict emission control costs using simple tables of efficiency (percent VOC reduction) versus control costs (\$/ton VOC reduced) specific to individual industrial categories.

VOCM can project emissions for up to 1000 industrial categories and 50 regions for projection periods 70 years beyond the base year emissions. Data bases provided with VOCM include: 1) 1980 base year uncontrolled and controlled VOC emissions for 101 industrial categories in 49 states; 2) growth factors specific to individual industrial categories in individual states; 3) industrial category retirement rates; 4) constraints modeling various national, regional, and local regulatory programs; and 5) cost tables for individual industrial categories. VOCM includes a built-in data editing system where these files can be modified or entirely new files created.

### Sensitivity Testing

A battery of sensitivity test cases encompassing 19 runs was selected to test VOCM. Parameters were selected over a range for which VOCM might reasonably be applied. The test case scenarios described in the report are:

Scenario	Run Numbers
1. Constant Growth Rate Test	1, 2, 3
2. Stepped Growth Rate Test	4
3. Single Constraint Run	5, 6, 7, 8
4. Multiple Constraint Run	9, 10
5. Offset Constraint Run	11
6. Rollback Run	12
7. Single Cost Table Run	13, 14, 15, 16
8. Multiple Cost Table Run	17
9. Aggregation Run	18
10. Default Run	19



### Objectives/Results

The test runs of VOCM in this report were performed to satisfy two objectives:

- To verify that the calculations and operation of VOCM are in accordance with the specifications and design of the model.
- To exercise the model with actual data developed under the NAPAP program.

The results of the test runs show that the model operates as designed. Test runs with NAPAP data predict an overall annual growth rate of VOC emissions for the U.S. of approximately 1.6% per year for the projection horizon of 1980 to 2010. An overall growth in VOC emission control costs of approximately 4.1% is also predicted.

*Mark S. Jennings (presently with Digital Kinetics, Inc., La Honda, CA 94020) and Thomas E. Emmel are with Radian Corporation, Research Triangle Park, NC 27709.*

*Larry G. Jones is the EPA Project Officer (see below).*

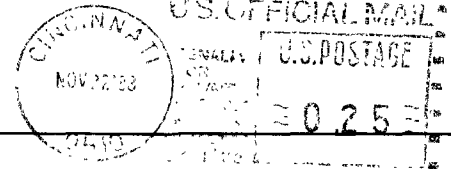
*The complete report, entitled "The Volatile Organic Compound Model Quality Assurance and Sensitivity Testing (Version 1.8)," (Order No. PB 88-234 166/AS; Cost: \$25.95, subject to change) will be available only from:*

*National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161  
Telephone: 703-487-4650*

*The EPA Project Officer can be contacted at:  
Air and Energy Engineering Research Laboratory  
U.S. Environmental Protection Agency  
Research Triangle Park, NC 27711*

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